The Whole Child: Development in the Early Years

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ROTEL (REMIXING OPEN TEXTBOOKS WITH AN EQUITY LENS) PROJECT
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Contents

Introduction 1

Land Acknowledgement 3

Historical nations 3

Present-day nations and tribes 3

Suggested readings 4

Chapter One: Perspectives on Early Childhood

Childhood Defined 7

Periods of Development 7

Domains of Development 7

Historical Perspectives 9

History of Childhood 9

Emerging Themes 11

Cultural Perspectives 15

Developmentally Appropriate Practice 18

How do these previously discussed perspectives shape the way we raise and educate children? 18

How is Child Development Studied? 19

Chapter Two: Theorists and Theories of Development

Theories of Development 23

Psychosocial Theory 24

Trust vs. Mistrust (Infancy) 25

Autonomy vs. Shame/Doubt (Toddlerhood) 25

Initiative vs. Guilt (Preschool Years) 25

Industry vs. Inferiority (Elementary Years) 26

Identity vs. Role-Confusion (Adolescence) 26

Intimacy vs. Isolation (Early Adulthood) 26

Generativity vs. Stagnation (Middle Adulthood) 26

Integrity vs. Despair (Older Adulthood) 27

Criticism of Psychosocial Theory 27

Educational Implications 28

Behaviorist Theory 30
Criticisms of Behaviorism 30
Educational Implications 31
Social Cognitive Theory 32
Criticism of Social Cognitive Theory 33
Educational Implications of Social Cognitive Theory 33
Cognitive Theory 35
Sensorimotor Development 35
Preoperational Development 36
Concrete Operational Development 36
Formal Operational Development 37
Criticisms of Piaget's Cognitive Development Theory 37
Educational Implications 37
Sociocultural Theory 39
Criticisms of Sociocultural Theory 39
Educational Implications 40
Humanistic Theory 41
Educational Implications 43
Criticisms of Humanistic Theory 43
Ecological Theory 45
Educational Implications 46
Criticisms of Educational Theory 46
Other Contemporary Theories to Consider 47
Theory of Multiple Intelligences 47
The Nine Intelligences 47
Bloom's Taxonomy 49
Mindset Theory 50

Chapter Three: Domains in Development

Themes of Development 55
Nature versus Nurture 55
Continuity versus Discontinuity 55
Universal versus Individual Development 55
Development versus Growth 56
The Four Domains of Development 57

Physical/Biological Development 58
Height and Weight 58
Gross and Fine Motor Skills 59
Universals in Physical Development 59
Cognitive Development 61
Memory 61
Intelligence 61
Language 62
An Interesting Example of Cognitive Development: Lying 63
Social Development 65
Friendship in Early Childhood 65
Theory of Mind 66
Emotional Development 67
Self-Regulation 68
Emotional Development 69

Chapter Four: Brain Development from Conception to Age 8

Biology of the Brain 73
Brain Cells: Neurons 73
The Main Structures of the Brain 77
Spinal Cord 77
Medulla Oblongata 77
Cerebellum 78
Pons 78
Midbrain 78
Cerebrum 78
Cerebral Cortex 79
Occipital Lobe 81
Parietal Lobe 81
Temporal Lobe 83
Frontal Lobe 84
Brain Development During Gestation 86
Brain Development in Infants and Toddlers 88
Brain Development in Preschool and School-Age Children 89

Chapter Five: Prenatal Development and Birth

The Role of Genetics 93

Concerns in Conception 96
Gene-Linked Abnormalities 96
Prenatal Testing for Genetic Abnormalities 96
Other Concerns 97
The Germinal Period 98
Pregnancy Concerns 101
Risk Factors 101
Environmental Hazards 102
Medical Conditions 102
Other Concerns 103
Birth 104
After Birth 105

Chapter Six: Infancy

Physical Development in Infancy 109
Infant Gross Motor Skills 111
Infant Fine Motor Skills 112
Cognitive Development in Infancy 114
Factors that Impact Cognitive Development 114
Language 115
Imitation 121
Memory 122
Media Attributions 122
Social and Emotional Development in Infancy 123

Chapter Seven: Toddlers (15 Months to 3 Years)

Physical Development for Toddlers 127
Bowel and Bladder Control 127
Safety Concerns 128
Car Seat Safety 128
Immunizations 128
Cognitive Development for Toddlers 130
First Sentences: Language Development in Toddlerhood 130

Social and Emotional Development for Toddlers 131
Biting 131
Hitting/Scratching and Temper Tantrums 131
Toddler Property Laws Author Unknown 132
2-3 Year Milestones 133

Chapter Eight: Early Childhood Development

Physical Development in Early Childhood 137
Growth in Height and Weight 137
Brain Development 137
Signs of Vision Problems 137
Gross Motor Skills 138
Fine Motor Skills 138
Young Children's Artistic Drawings 139
Handedness 141
Sleep and Sleep Problems 141
Nutrition 141
Accident Prevention 142
Cognitive Development in Early Childhood 143
Vygotsky's Theory of Development 144
Vygotsky vs. Piaget 145
Literacy in Early Childhood Education 145
Nourishing the Young Child's Cognitive Development 145
Social and Emotional Development in Preschool 147
Emotional Development 147
Moral Development 147
Gender 148
Peer Influence 148
Teacher Influence 149
School and Media Influences 149
Child Abuse 149
Importance of Play 149
Social Development in Preschool: Friendship 150

Chapter Nine: School Age (5 Years to 8 Years)

Physical Development in School Age 153

Overall Physical Growth 153

Brain Growth 153

Sports 153

Cognitive Development in School Age 155

Cognitive Growth 155

7-8 Year Olds 155

The Emergence of Concrete Operational Thought 155

Inductive Reasoning 156

Language & Literacy Development 156

Intelligence 156

Gardner's Theory of Multiple Intelligences 157

When Development Looks Atypical 158

Conclusion

Glossary 161

Grant Information 169

References 170

Thank you for choosing: The Whole Child for your textbook needs! This book was written specifically for the emerging child psychology student or early childhood educator in mind. The authors have taught both Child Psychology and Child Growth and Development throughout their careers as community college professors. They have also raised a total of six children, worked with children and schools internationally, and serve as educational consultants in a variety of settings.

Deirdre and Doris desired a textbook that was both comprehensive and concise. Students do not need a lengthy volume to digest, but they do need a strong understanding of how a young child develops. Only with this understanding can developmentally appropriate practice emerge in the classroom and in other places that are loving and caring spaces for young children. We are so grateful for the many contributors to this textbook that have also brought their knowledge and expertise in working with children and teaching at the collegiate level. With the rising cost of textbooks, we are also committed to finding quality, accessible materials for our students.

This text gives an overview of development, beginning in the mother's womb through about the age of eight. It starts with a look at perspectives of early childhood, including how children have been viewed historically as well as cross-culturally. Following this chapter, there is a complete overview of the important theorists that have helped to deepen and bring clarity to how children develop. These theories include psychodynamic, behavioral, social cognitive theory, cognitive theory, humanistic, multiple intelligence, growth mindset, and Bloom's taxonomy. Understanding the implications of each theory is important foundational knowledge for the study of development.

Chapters Three and Four give an overview of the domains of development, followed by an overview of the developing brain. Chapter Five takes a look at the prenatal period, including the birth and postpartum process. Chapter Six describes development in infancy, and Chapter Seven describes the toddler years, including safety considerations that are critical for this period. Chapter Eight looks at the preschool years, including the role of peers, play, and television (and other electronics) in development.

Chapter Nine concludes the text with a brief look at the start of what is known as the school-age years, universally recognized as between the ages of five and eight.

As you prepare to start this journey, please enjoy this beautiful poem written by Diane Loomans.

> "If I had my child to raise over again:
> I'd build self-esteem first and the house later
> I'd finger paint more and point the finger less
> I would do less correcting and more connecting
> I'd take my eyes off my watch and watch with my eyes
> I would care to know less and know to care more
> I'd take more hikes and fly more kites
> I'd stop playing serious and seriously play
> I would run through more fields and gaze at more stars
> I'd do more hugging and less tugging
> I'd see the oak tree in the acorn more often
> I would be firm less often and affirm much more
> I'd model less about the love of power
> And more about the power of love."
> Diane Loomans (2004)

The years of early childhood are indeed so very special. Any parent will report that despite the challenges that often come with young children, the early years pass too quickly. It is our hope that you will gain valuable knowledge within this resource but also a renewed sense of purpose in discovering the amazing development of the whole child.

With gratitude for all of the lessons young children continue to teach us,

Deirdre & Doris

Land Acknowledgement

As part of the ROTEL Grant's mission to support the creation, management, and dissemination of culturally-relevant textbooks, we must acknowledge Indigenous Peoples as the traditional stewards of the land, and the enduring relationship that exists between them and their traditional territories. We acknowledge that the boundaries that created Massachusetts were arbitrary and a product of the settlers. We honor the land on which the Higher Education Institutions of the Commonwealth of Massachusetts are sited as the traditional territory of tribal nations. We acknowledge the painful history of genocide and forced removal from their territory and other atrocities connected with colonization. We honor and respect the many diverse indigenous people connected to this land on which we gather, and our acknowledgment is one action we can take to correct the stories and practices that erase Indigenous People's history and culture.

Identified tribes and/or nations of Massachusetts

Historical nations

- Mahican
- Mashpee
- Massachuset
- Nauset
- Nipmuc
- Pennacook
- Pocomtuc
- Stockbridge
- Wampanoag

Present-day nations and tribes

- Mashpee Wampanoag Tribe
- Wampanoag Tribe of Gay Head Aquinnah
- Herring Pond Wampanoag Tribe
- Assawompsett-Nemasket Band of Wampanoags
- Pocasset Wampanoag of the Pokanoket Nation
- Pacasset Wampanoag Tribe
- Seaconke Wampanoag Tribe
- Chappaquiddick Tribe of the Wampanoag Indian Nation
- Nipmuc Nation (Bands include the Hassanamisco, Natick)
- Nipmuck Tribal Council of Chaubunagungamaug
- Massachusett Tribe at Ponkapoag

In the event that we have an incorrect link or are missing an existing band/nation, please let us know so that we may correct our error.

Suggested readings

Massachusetts Center for Native American Awareness
- A guide to Indigenous land acknowledgment
- 'We are all on Native Land: A conversation about Land Acknowledgements' YouTube video
- Native-Land.ca | Our home on native land (mapping of native lands)
- Beyond territorial acknowledgments – âpihtawikosisân
- Your Territorial Acknowledgment Is Not Enough

CHAPTER ONE: PERSPECTIVES ON EARLY CHILDHOOD

After completing Chapter One students will be able to

- Identify areas in which children's lives can be improved
- Describe historical views of child development
- Define biological, cognitive and social and emotional processes
- Outline the periods of development
- Explain cross-cultural beliefs about child development
- Describe how child development is studied
- Define developmentally appropriate practice

Two-and-a-half-year-old Santiago sits at a small table, arms stretched out, hands limp. His teacher places a small chunk of banana with the skin on it in front of him. Santiago looks up at the teachers, smiles, and then picks up the banana in his fist. Using his right hand, index finger, and thumb, he slowly peels the banana, and then with a flat hand, shoves the whole piece into his mouth.

As six-year-old Chloe paints, she looks at the postcard she is copying, being very careful to use the same colors in her painting as on the postcard. As she paints, she says to Johanna, "I'm using gold first because that's my favorite, then the green". Johanna passes the red paint and laughs, "Red's last!" Chloe laughs, takes the pot of red paint, and begins to stir it vigorously.

Three-month-old Zuri has a full head of darkest brown hair and thin, almost non-existent eyebrows. She has big brown eyes, full round cheeks, small ears, and a small nose. She has olive skin and a bald spot on the back of her head. Zuri does not yet have any teeth and seems to drool continuously. Her body is not proportional yet—her torso is full and round; she has tiny feet and long fingers. Zuri is twenty-two inches in length and weighs thirteen pounds.

What do all of these children have in common? They are all developing "normally." But what does that mean, and how can we be sure? The field of developmental psychology has sought to explore exactly those questions.

Developmental Psychology is the study of how and why humans change throughout their lifespan. By studying sequences of typical development, we are able to make determinations about what might be considered expected and healthy, and what may be a red flag of atypical development or development that may be heading off track. In other words, it is only once we understand what typical, healthy development looks like that we are able to recognize atypical or unhealthy development, and then can intervene.

Childhood Defined

Periods of Development

As children move from infancy to young adulthood, they go through key periods of development. **Ages and Stages** is a term used to describe these periods of development. Although what defines these periods of childhood has varied widely throughout history and across cultures, The American Academy of Pediatrics defines these periods as follows:

Prenatal Period which begins with conception and ends with birth
Infancy which is marked by the months from birth through fifteen months
Toddlerhood which encompasses sixteen months through a child's third birthday
Early Childhood, spanning three to five years of age
Middle Childhood, which spans the ages of five to twelve
Adolescence, which includes the ages of twelve to eighteen

Each age and stage is characterized by its own set of expected characteristics and changes. As we seek to provide the best possible care and education for children, these distinct time periods provide a helpful framework in which to study childhood (Bee & Boyd, 2009; Berk, 2017; Childhood defined, n.d.).

Domains of Development

Within these five time periods, we are then able to study primary areas in which change occurs, referred to as the **domains of development**. We will examine child development across four major domains: **Physical/ Biological, Cognitive** (including intelligence), **Social** (relationships and self-awareness), and **Emotional** (encompassing internal states such as temperament, emotional regulation, and understanding the emotions of others).

Growth vs. Development

In talking about child development, it's important to keep in mind that growth and development do not refer to the same processes, although they are often used interchangeably.

Development refers to overall changes that occur that result in improved functioning or achievement (for example, cognitive development, social development).

Growth refers specifically to physical or biological changes that occur. Growth can be directly observed and measured.

In this chapter, we will explore

- definitions of childhood
- the areas of development that developmental psychologists study
- the historical and cultural contexts we need to understand when studying development
- the difference between growth and development
- various themes which emerge when studying child development
- how child development is studied

Historical Perspectives

History of Childhood

Throughout Ancient Times, the Middle Ages, and most of Early Modern History, the idea of childhood as we understand it today didn't exist. In part because of the hardships of life in general, and in part because of very high infant and child mortality rates (primarily due to malnutrition, disease, and general lack of access to medical care), the way families viewed childhood was fundamentally different from the way it is viewed now.

Before the 16th century, the focus of families was on survival. A child's value was in their ability to contribute toward that goal. It wasn't until the late 1500's that the idea of a need for education of the common man emerged. Until this point, it was primarily only those who intended to enter the clergy or become government officials or physicians who received any kind of formal education. As societies developed and progressed, they began to recognize the value of developing a skilled workforce. As a result, families began to need support in providing an education for their children, and the first of what could be recognized as modern schools were established.

It had been widely believed that until modern times, children were primarily treated with indifference, dealt with harshly, and regarded as miniature adults. This argument, which was famously made by French historian Philippe Ariès (1914–1984) in his 1960 book titled, *Centuries of Childhood*, has since been disputed. Ariès came to this conclusion after studying historical writings about childhood (or lack thereof) and paintings depicting children through the Middle Ages. However, it is now understood that the depiction of children in pre-18th century art as miniature adults was not at all due to any lack of regard or affection parents had for their children. According to Alastair Sooke, in his article for the *BBC,* "*How Childhood Came to Fascinate Artists*", Ariès' thinking was flawed for two key reasons:



Painting by Lavinia Fontana depicting Bianca degli Utili Maselli, holding a dog and surrounded by six of her children (c. 1565–1614).

Pictures of children were surprisingly rare during the late Middle Ages and even into the 16th Century. In those days, the infant Jesus was the principal image of childhood in art. For another, when artists finally started to paint children with greater frequency during the 17th Century, they did so in a way that seems unnatural to modern eyes, by presenting them as miniature adults. (Sooke, 2016)



Painting by Pieter Bruegel the Elder called Children's Games (c. 1560).

He goes on to explain that paintings of the children of nobility (because they were the only ones who could afford to have their portraits painted) served a different purpose than snapping a photo of a child today; it was not meant to capture a moment in time. Rather, children were often dressed and posed as adults in an effort to depict their parents' hopes for the person they would become. For royalty, these portraits became important advertisements to potential suitors. It was, in reality, a very early form of the personal profile.

Our current notions of childhood are primarily rooted in the works of 17th-century English philosopher John Locke and of 18th-century Swiss philosopher Jean Jacques Rousseau.

Locke (1632-1714) is probably most famous for his notion of children coming into the world as a tabula rasa, a Latin term translated as "blank slate". He believed that infants were neither inherently good nor inherently evil (as was commonly believed at the time—a reference to the church's teachings of original sin) but rather were neutral or "blank". A child's nature and personality would develop over childhood, during which time he believed a child was particularly impressionable and sensitive to new experiences. Because he believed that children were born with no set predeterminations and since the child's mind was so malleable, an adult could mold him or her with careful diligence. Many of his ideas about education endure today, most notably:

- Each person develops according to his or her unique experiences, and thus the need for individualized education
- Learning should be enjoyable, with many opportunities for play

- Educators should focus on teaching critical thinking skills
- Children learn best through sensory experiences

Rousseau's (1712-1778) philosophy of education emphasizes the development of a child's character and moral sense. The goal was for the child to learn to remain principled and honorable, even in the unnatural and imperfect society in which the child would have to live. He also believed that children should learn through exploration and experiences carefully led by adults. This philosophy was predicated upon the idea that children were born inherently good, not inherently wild or evil (or even neutral, as Locke believed). This was all very radical thinking for the time.

Some of Rousseau's ideas that continue to influence education today are:

- Teaching should be flexible and responsive
- Children learn best from hands-on experiences
- Children's thinking is different from adults'
- Children go through distinct phases of development

Locke and Rousseau helped to pave the way for what we consider our modern ideas about education. Many other early educational pioneers used Locke's and Rousseau's groundbreaking work as the foundation for even more progressive ideas about childhood and education. Examples include:

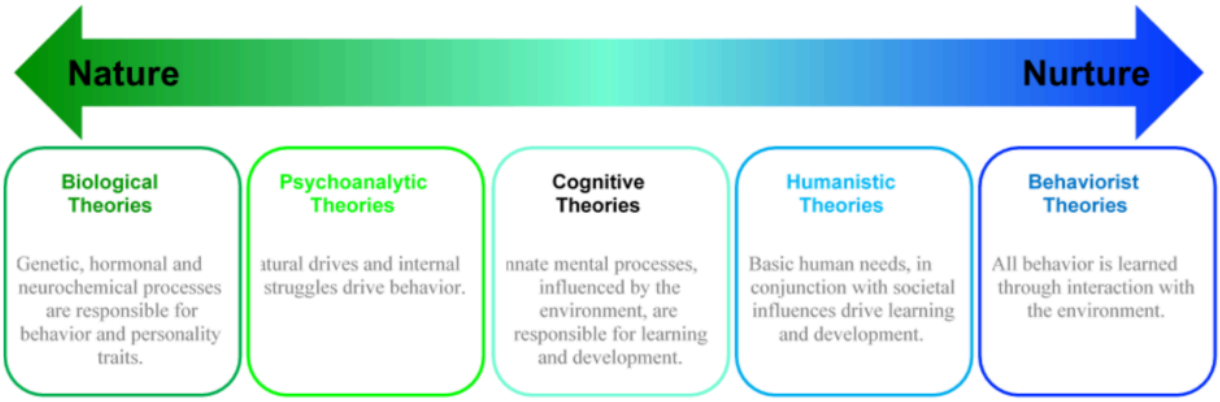
- Integrated curriculum and the need for educating the whole child (the belief that all aspects of human growth and development are interrelated)—*Johann Pestalozzi*
- Expansion of education to infants and toddlers—*Robert Owen*
- Play as the most important construct for learning, and the importance of creating play experiences that reflect the natural world in which children live. These ideas became the foundations for kindergarten—*Freidrich Froebel*
- Child-centered education and intentional teaching—*John Dewey* (Sooke, 2016)

Emerging Themes

Nature and Nurture

As we reflect on these ideas about childhood throughout Western history, we see that distinct themes of development begin to emerge. Probably the most well-known is the theme of nature vs. nurture. This refers to the debate within developmental psychology concerned with examining whether certain characteristics and aspects of behavior are primarily the result of biological programming and inheritance (nature) or whether they are learned and the product of experience (nurture). Proponents of the nature view of development believe that humans develop based on a predetermined genetic plan that we inherit from our parents. Examples of this thinking can be seen, perhaps most famously, in the work of Charles Darwin and his theories of evolution, but also in later theorists such as Arnold Gesell (Bee & Boyd, 2009; Berk, 2017; Childhood defined, n.d.).

Proponents of the nurture view of development believe that humans develop based on the influences and experiences we collect over our lifetime, regardless of genetic makeup. Some of the most enduring theories of the nurture view of development stem from the works of John Watson, B.F. Skinner and Albert Bandura, whom we'll explore in chapter two.



As you will see throughout this text, it is the interplay among all these factors that ultimately results in who we become.

As Dr. David Rettew explains in his post "Nature Versus Nurture: Where We Are in 2017" for Psychology Today:

Today, most scientists who carefully examine the ever-expanding research base have come to appreciate that the nature and nurture domains are hopelessly interwoven with one another. Genes have an influence on the environments we experience. At the same time, a person's environment and experience can directly change the level at which certain genes are expressed (a rapidly evolving area of research called epigenetics), which in turn alters both the physical structure and activity of the brain. (Rettew, 2017)

Embedded in the debate over nature and nurture are notions of stability and change— that is, ideas about how changeable and/or prone to influence, development and behavior are—as well as notions of universal vs. individual development. These debates seek to answer questions such as:

- Can patterns of behavior change?
- Can certain genetic and/or environmental influences be overcome?
- What accounts for individual differences in development?
- Why does human development seem to follow certain universal, predictable patterns?

Continuous and Discontinuous Development

Another debated controversy in the field of human development is the idea of continuous vs. discontinuous sequences of development. Continuous development refers to the idea that development occurs as the result of a continual maturation process—a steady unfolding of changes throughout the lifetime. This type of development can be thought of as similar to that of a tree. The organism (in this case, a tree) gradually develops and changes over time, but maintains the same primary characteristics and functions as it did before—just larger and more complex.

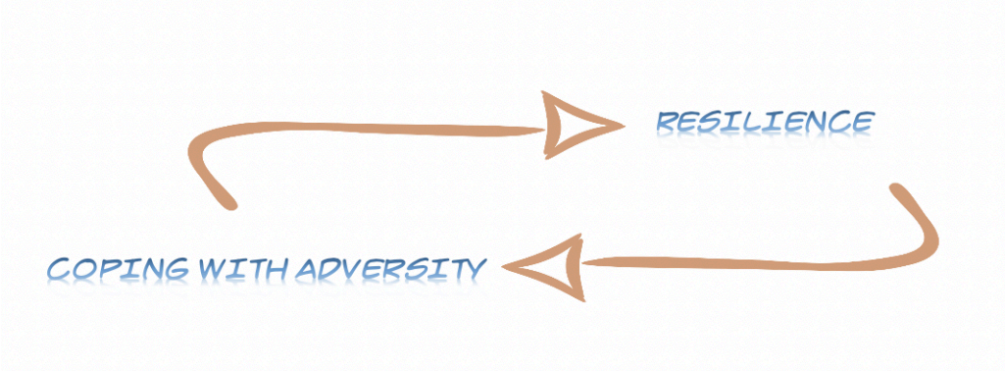
Discontinuous development refers to the idea that development occurs in distinct stages, each stage being fundamentally different from the preceding or following stages. This type of development is similar to that of a butterfly. At each stage of a butterfly's life (egg, caterpillar, chrysalis, adult), the butterfly is very different from any other stage, and yet it is still a butterfly (Bee & Boyd, 2009; Berk, 2017; Childhood defined, n.d.).

In Chapter Two, we will explore more deeply how theories of development can fall into these categories of being either continuous or discontinuous.



Risk and Resilience

A more contemporary debate that has arisen around educating and caring for children has to do with how we view risk and resilience. Conventional wisdom dictated that it was in children's best interests to try to limit (as much as possible) their exposure to any form of adversity or loss. While most agree that it is, in fact, in children's best interests to protect them from any kind of trauma, tragedy, threat, or significant stress, in recent decades, it seems that the pendulum has swung too far in the direction of insulating children from any and all forms of stress and loss. However, it is through this stress and loss that children learn to cope with future stress and loss, thus becoming resilient. Rather than using the everyone-gets-a-trophy strategy of rewarding children, we have come to understand that genuine and authentic praise serves children much better. It's important to keep in mind that resilience is not a trait that people either have or do not have. It involves behaviors, thoughts, and actions that can be learned and developed. When children experience adversity—whether it be the loss of a parent or not making the team—helping them to frame the experience as one they can survive helps them for the next encounter. It becomes a positive feedback loop; adversity helps children to learn resilience, which then helps children to be more resilient in the face of future adversity. The key is in helping them learn effective coping strategies and supporting them through the resilience process. The American Psychological Association provides more information in their publication, "Resilience Guide for Teachers and Parents", which can be found on their website (APA, 2012).



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Cultural Perspectives

It's valuable to take into consideration that these themes are based upon what is commonly referred to as "WEIRD" societies, that is societies which are Western, Educated, Industrialized, Rich and Democratic. American society certainly falls within this description, but by no means do all societies. Childhood actually has different meanings around the world. Depending on various cultures' shared patterns of behaviors, interactions and understandings, we see different constructs of childhood emerge. The following articles: "Different Cultures, Different Childhoods" (Montgomery, 2013) from The Open University, and "A Cross-Cultural Perspective on Childhood" (2018) from Human Relations Area Files (HRAF) provide some eye-opening examples of these differences in beliefs about childhood.

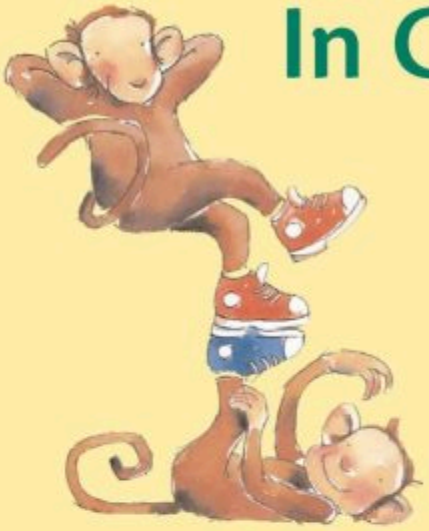
Despite these differences, in 1989 the United Nations General Assembly adopted the first human rights treaty which articulates basic universal civil, political, economic, social, health and cultural rights of children, known as the Convention on the Rights of the Child (UNCRC). According to the United Nations International Children's Emergency Fund (UNICEF), the Convention:

- Defined childhood as a separate space from adulthood and recognized that what is appropriate for an adult may not be suitable for a child.
- Called on governments to provide material assistance and support to families and to prevent children from being separated from their parents.
- Recognized that children are the holders of their own rights and are therefore not passive recipients of charity but empowered actors in their own development.

As a direct result of the policies that were able to be put in place in the years since the Convention was adopted, the world has seen significant improvement in the quality of life for children. Almost unbelievably, as of the writing of this text, the United States is ***the only*** member of the United Nations that has ***not*** ratified the treaty. It is believed that this is the case because of very powerful lobbying by special interest groups.

UN Convention on the Rights of the Child

In Child Friendly Language



unicef

"Rights" are things every child should have or be able to do. All children have the same rights. These rights are listed in the UN Convention on the Rights of the Child. Almost every country has agreed to these rights. All the rights are connected to each other, and all are equally important. Sometimes, we have to think about rights in terms of what is the best for children in a situation, and what is critical to life and protection from harm. As you grow, you have more responsibility to make choices and exercise your rights.

Article 1
Everyone under 18 has these rights.

Article 2
All children have these rights, no matter who they are, where they live, what their parents do, what language they speak, what their religion is, whether they are a boy or girl, what their culture is, whether they have a disability, whether they are rich or poor. No child should be treated unfairly on any basis.

Article 3
All adults should do what is best for you. When adults make decisions, they should think about how their decisions will affect children.

Article 4
The government has a responsibility to make sure your rights are protected. They must help your family to protect your rights and create an environment where you can grow and reach your potential.

Article 5
Your family has the responsibility to help you learn to exercise your rights, and to ensure that your rights are protected.

Article 6
You have the right to be alive.

Article 7
You have the right to a name, and this should be officially recognized by the government. You have the right to a nationality (to belong to a country).

Article 8
You have the right to an identity – an official record of who you are. No one should take this away from you.

Article 9
You have the right to live with your parent(s), unless it is bad for you. You have the right to live with a family who cares for you.

Article 10
If you live in a different country than your parents do, you have the right to be together in the same place.

Article 11
You have the right to be protected from kidnapping.

Article 12
You have the right to give your opinion, and for adults to listen and take it seriously.

Article 13
You have the right to find out things and share what you think with others, by talking, drawing, writing or in any other way unless it harms or offends other people.

Article 14
You have the right to choose your own religion and beliefs. Your parents should help you decide what is right and wrong, and what is best for you.

Article 15
You have the right to choose your own friends and join or set up groups, as long as it isn't harmful to others.

Article 16
You have the right to privacy.

Article 17
You have the right to get information that is important to your well-being, from radio, newspaper, books, computers and other sources. Adults should make sure that the information you are getting is not harmful, and help you find and understand the information you need.

Article 18
You have the right to be raised by your parent(s) if possible.

Article 19
You have the right to be protected from being hurt and mistreated, in body or mind.

Article 20
You have the right to special care and help if you cannot live with your parents.

Article 21
You have the right to care and protection if you are adopted or in foster care.

Article 22
You have the right to special protection and help if you are a refugee (if you have been forced to leave your home and live in another country), as well as all the rights in this Convention.

Article 23
You have the right to special education and care if you have a disability, as well as all the rights in this Convention, so that you can live a full life.

Article 24
You have the right to the best health care possible, safe water to drink, nutritious food, a clean and safe environment, and information to help you stay well.

Article 25
If you live in care or in other situations away from home, you have the right to have these living arrangements looked at regularly to see if they are the most appropriate.

Article 26
You have the right to help from the government if you are poor or in need.

Article 27
You have the right to food, clothing, a safe place to live and to have your basic needs met. You should not be disadvantaged so that you can't do many of the things other kids can do.

Article 28
You have the right to a good quality education. You should be encouraged to go to school to the highest level you can.

Article 29
Your education should help you use and develop your talents and abilities. It should also help you learn to live peacefully, protect the environment and respect other people.

Article 30
You have the right to practice your own culture, language and religion - or any you choose. Minority and indigenous groups need special protection of this right.

Article 31
You have the right to play and rest.

Article 32
You have the right to protection from work that harms you, and is bad for your health and education. If you work, you have the right to be safe and paid fairly.

Article 33
You have the right to protection from harmful drugs and from the drug trade.

Article 34
You have the right to be free from sexual abuse. Article 35 No one is allowed to kidnap or sell you.

Article 36
You have the right to protection from any kind of exploitation (being taken advantage of).

Article 37
No one is allowed to punish you in a cruel or harmful way.

Article 38
You have the right to protection and freedom from war. Children under 15 cannot be forced to go into the army or take part in war.

Article 39
You have the right to help if you've been hurt, neglected or badly treated.

Article 40
You have the right to legal help and fair treatment in the justice system that respects your rights.

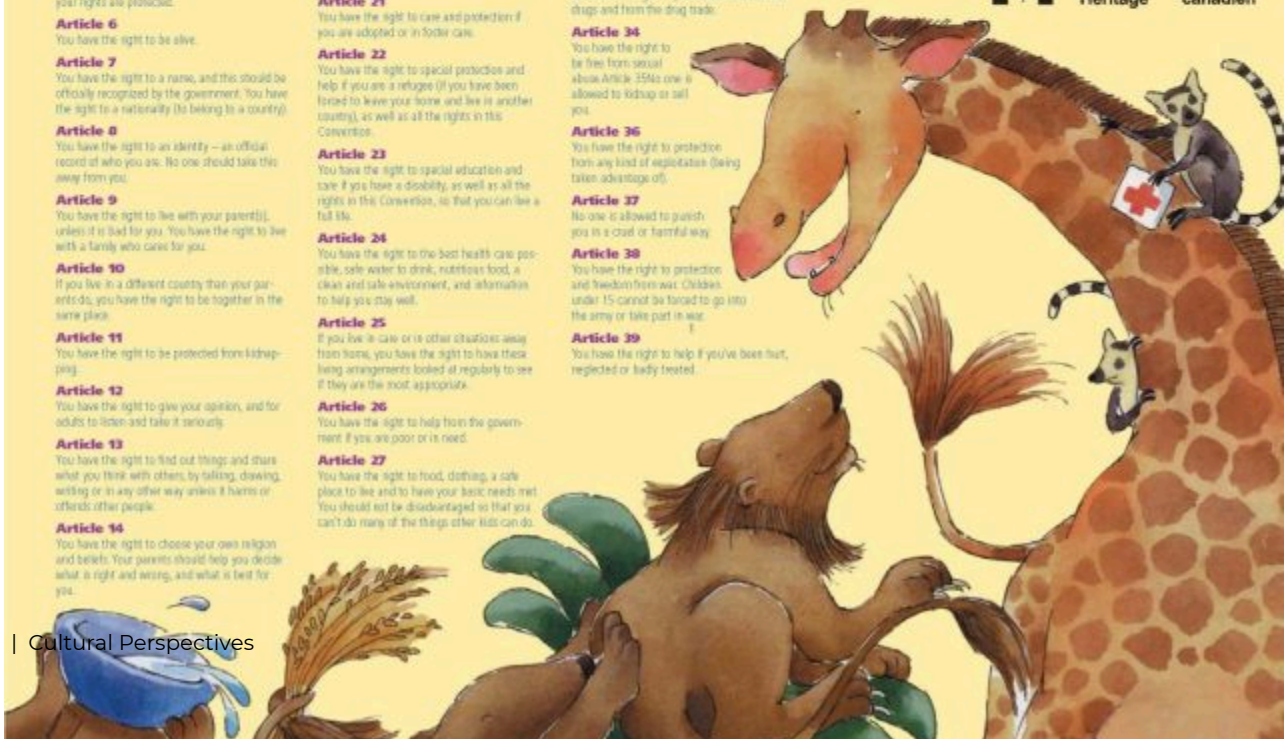
Article 41
If the laws of your country provide better protection of your rights than the articles in this Convention, those laws should apply.

Article 42
You have the right to know your rights! Adults should know about these rights and help you learn about them, too.

Articles 43 to 54
These articles explain how governments and international organizations like UNICEF will work to ensure children are protected with their rights.

QUEEN ALEXANDRA FOUNDATION FOR CHILDREN

Canadian Heritage | Patrimoine canadien



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Developmentally Appropriate Practice

How do these previously discussed perspectives shape the way we raise and educate children?

In 1989, The National Association for the Education of Young Children (NAEYC) set out to answer just this question. NAEYC published its first position statement related to **Developmentally Appropriate Practice (DAP)**, and while many other advocacy agencies have also sought to define developmentally appropriate practice, NAEYC's position is considered the gold standard and most widely accepted. NAEYC has since updated its position in order to remain current with and responsive to new research developments. According to NAEYC,

Developmentally Appropriate Practice (DAP) is a framework designed to promote young children's optimal learning and development. To make decisions that reflect best practices, educators take into consideration what they know about:

- child development and learning
- each child as an individual
- each child's social and cultural context

These three guiding principles are used in all high-quality early childhood programs and are reflected throughout this text (NAEYC, 2022).

How is Child Development Studied?

Researchers use three primary methods in studying development in order to draw their conclusions:

- longitudinal studies
- cross-sectional studies
- case studies

Longitudinal Studies refer to studies in which a large group of children is studied over time in order to look at specific changes that occur. Longitudinal studies may examine a single aspect of development or multiple aspects at once. Data is collected at two or more different time intervals, but typically the study looks at development multiple times over the course of several months or even over an entire lifetime. While some of the most valuable data about development has been gained through the use of longitudinal studies, because these studies are so comprehensive and lengthy, they tend to be very expensive to carry out and can take decades to be able to draw any concrete conclusions. Ultimately, longitudinal studies aim to draw conclusions that can be generalized over a population.

Cross-Sectional Studies refer to studies in which comparisons are made in the abilities and behaviors of two or more groups of children, each group being of a different age; for example, comparing the language skills of two-year-olds to the language skills of five-year-olds in order to come to some conclusion about the changes that occur between the ages of two and five. An advantage of this type of study is that it is typically less costly to carry out because the studies can be held over a very short timeframe—researchers don't have to wait for children to get older. A drawback to these studies is that researchers are comparing more apples to oranges, rather than apples to apples.

Case studies refer to investigations in which a single child or small group of children are studied. Case studies are far more in-depth and detailed than longitudinal studies, include the related contextual conditions in which development is observed, and draw upon data from multiple sources. Because case studies apply only to a single or very small group of individuals, the results typically cannot be generalized to a larger population (Berk, 2017; Crain, 2011).

When looking at data from various types of studies, it's essential to understand the difference between a **correlation** and a **causation**. Notable market analyst, Ben Yaskovitz, describes the difference as, "Correlation helps you predict the future, because it gives you an indication of what's going to happen. Causality lets you change the future." (Yaskovitz, 2013)

Correlation describes the relationship among two or more variables that appear to be related to one another, but **one does not necessarily cause the other** to occur. For example, there is a correlation between ice cream consumption and drowning (Yaskovitz, 2013). It seems that ice cream consumption rises and falls with the rate of drownings. However, there is nothing about eating ice cream that causes people to drown. In this case, it seems that there is another factor involved—weather. In certain climates and during certain seasons, people tend to consume more ice cream. More people in those climates and during those seasons tend also to be engaged in water -related activities, and the more people involved in water-related activities, the more drownings that tend to occur. The two factors are related but one does not cause the other to happen.

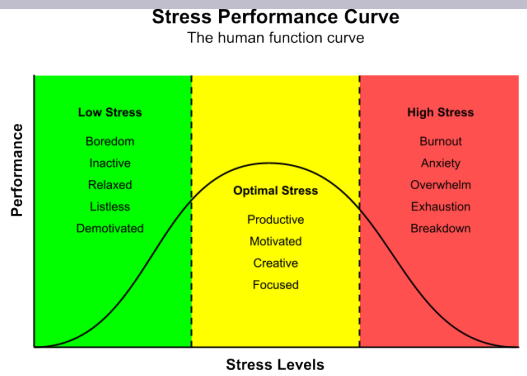
A more famous mistaken correlation was that between unpleasant odors and disease. Until the late 19th century, before people fully understood microbiology and disease processes, it was believed that bad odors actually caused disease—unpleasant-smelling air appeared to make people sick, so the two occurrences were correlated. Of course, we now understand that it's not the odor that makes people sick, but rather the factors leading to the odor that do. (ex. It's not the smell of spoiled milk that will make you sick, but the bacteria in the milk that produces the smell that will.)

Causation describes a relationship among two or more variables in which one occurs as the **direct result** of another. One thing causes another. For example, the way that gravity causes things to fall toward the ground.

Even in the field of child development, there have been many examples of occurrences in which a correlational relationship was mistaken for a causational one; it's critical to recognize the difference between the two when drawing conclusions about children's development and behavior (Santrock, 2013).

Did you know...

A little stress can actually be good for you? Studies show that with a little bit of stress, people actually have improved performance on various tasks. We seem to work better when we are under just the right amount of pressure to succeed. A little stress helps to keep us focused and motivated, but too much can tip the scales and we can find ourselves fatigued, anxious, or even burnt out. Keep this in mind as you progress throughout this course and also as you work with children—it's healthy to strive for success and to be slightly out of your comfort zone. The graph below helps to illustrate this phenomenon.



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CHAPTER TWO: THEORISTS AND THEORIES OF DEVELOPMENT

After completing Chapter Two students will be able to:

- Explain the value of understanding child development theories
- Describe several developmental theories and the theorists who pioneered them including:
    - o Psychodynamic Theory
    - o Behaviorist Theory
    - o Social Cognitive Theory
    - o Cognitive Theory
    - o Sociocultural Theory
    - o Humanist Theory
    - o Ecological Theory
    - o Multiple Intelligence Theory
    - o Growth Mindset Theory
    - o Bloom's Taxonomy
- Understand the educational implications of each theory

Theories of Development

The study of child growth and development is a rich and varied subject. Child development theories focus on explaining how children grow and change from conception through childhood. Theories of development provide a framework for thinking about child growth and learning.

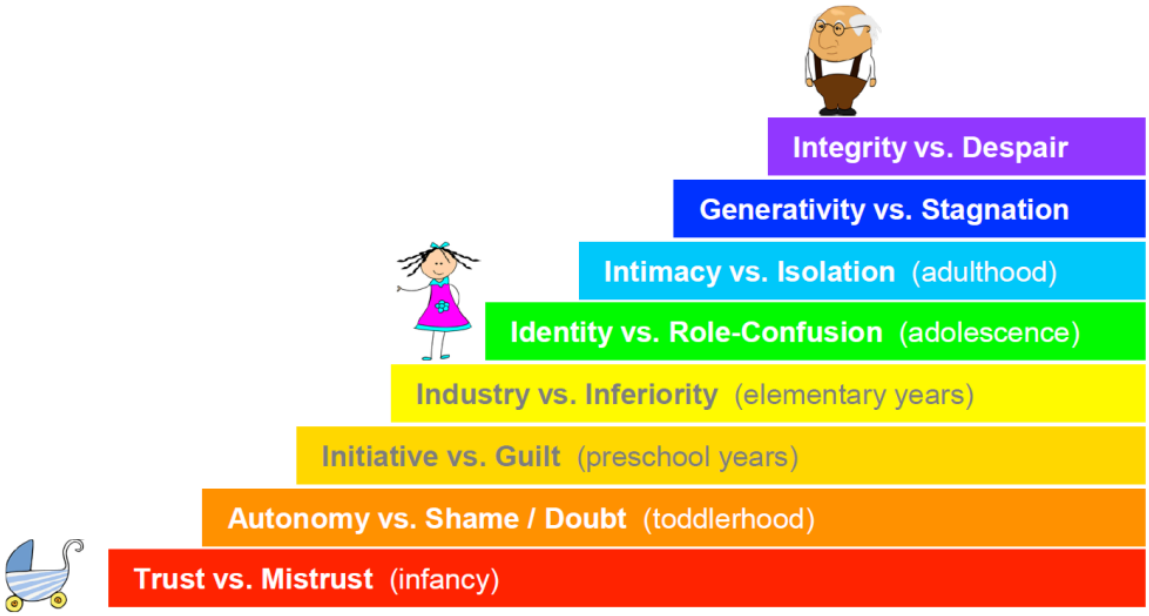
Why do children behave in certain ways? How can we as educators better understand and support children's behavior? It is important to study how children develop. An understanding of child development allows us to gain a deeper understanding of the physical, cognitive, social, and emotional growth that children experience. This chapter will focus on psychosocial, behaviorist, social cognitive, cognitive, sociocultural, humanistic, ecological, growth mindset, and multiple intelligence theories and their impact on a child's development, with an emphasis on strengthening teaching and learning.

Psychosocial Theory

Erik H. Erikson (1902-1994), was a German-born, world-renowned scholar of the behavioral sciences. Erikson is one of the few theorists of his time to address development through the entire lifespan, not just childhood. As our society as a whole is becoming increasingly older, and thus there is an increasing need to understand individuals as they advance into old age, Erikson's views are even more valuable and relevant today than when he first proposed them. Erikson is, perhaps, best known for his theory of psychosocial development. Having studied psychoanalysis (the prevailing theory of personality development at the time) Erikson began to shift from Freud's emphasis on psychosexual crises to one of psychosocial conflicts. Drawing upon Sigmund Freud's basic psychosexual theories, Anna Freud's explorations in the psychological development of children, and his own experience as an educator, he developed a theory which outlined eight distinct stages of development over the lifespan.

According to Erikson's theory, each of the eight stages of his **psychosocial theory** is characterized by a different psychosocial crisis of two conflicting forces. Because each stage builds upon the successful completion of earlier stages, any unresolved challenges of a particular stage will most likely resurface as problems later in an individual's development. In this way, the outcomes of each stage are not permanent and can be modified by later experiences as challenges are re-confronted. Although his stages seem to align with periods of development, they are not necessarily perfectly sequential; it is possible to move from one stage up to another, and then at some point, move back down to a previous stage. For example, imagine a scenario in which you are an adult in the generativity vs. stagnation stage, having successfully resolved all the previous stages, when you find out that your spouse has cheated on you, and you decide to get a divorce. In this case, it would be perfectly expected that you would again be struggling with issues of trust, intimacy, and possibly even identity. Your success or failure at resolving these struggles previously will, in part, determine your resilience during this challenge.

Beginning in infancy, his eight stages (from bottom to top) are:



Trust vs. Mistrust (Infancy)

The first stage of Erik Erikson's theory centers around an infant's basic needs being met by its caregivers, and this interaction leads to **trust** or **mistrust**. Trust, as defined by Erikson, is an essential belief in the reliability of others, as well as a fundamental sense of one's own trustworthiness. The infant depends on its caregivers, typically its mother, for sustenance and comfort. At this stage, the child's relative understanding of the world and society comes directly from its caregivers and their interaction with the child. A child's first trust is always with its caregiver, whoever that might be. If caregivers expose an infant to warmth, regularity, and dependable affection, the infant's view of the world will be one of trust. Should caregivers fail to provide a secure environment or to meet the child's basic needs, a sense of mistrust will result (Bee & Boyd, 2009). Development of mistrust can lead to feelings of frustration, suspicion, withdrawal, and a lack of confidence throughout childhood, as well as later in life.

According to Erik Erikson, the major developmental task in infancy is to learn whether or not other people, especially primary caregivers, regularly satisfy basic needs. If caregivers are consistent sources of food, comfort, and affection, an infant learns trust (i.e., others are dependable and reliable). If they are neglectful, or perhaps even abusive, the infant instead learns mistrust (i.e., the world is an undependable, unpredictable, and possibly a dangerous place). The child's number one need in this stage is to feel safe, comforted, and well cared for (Bee & Boyd, 2009).

Autonomy vs. Shame/Doubt (Toddlerhood)

As children gain increasing control over their motor abilities, they begin to move around and explore their surroundings. Trusting caregivers provide a strong, secure base from which children can venture out to assert their will and newfound independence. Caregivers' patience and encouragement help to foster a sense of **autonomy**—or independence. Highly restrictive caregivers, caregivers who demand too much self-regulation too soon, caregivers who refuse to let children perform tasks of which they are capable, or discourage early attempts at self-sufficiency, instill in children a sense of **shame and doubt** in their ability to handle new challenges. As a result, children learn to withdraw from their world.

Initiative vs. Guilt (Preschool Years)

The development of courage and independence are what set preschoolers, ages three to six years of age, apart from other age groups. Young children in this category face the challenge of initiative versus guilt. As described by Bee and Boyd (2009), the child during this stage faces the complexities of planning and developing a sense of judgment. Because this sense of planning and judgment is still developing, along with initiative, sometimes negative behaviors (such as throwing objects, hitting, or yelling) can also emerge. These behaviors are often the result of the child's frustration in not being able to achieve a goal as planned. Sometimes preschoolers take on projects they can readily accomplish, but at other times they undertake projects that are beyond their capabilities or that interfere with other people's plans and activities. If caregivers and preschool teachers encourage and support children's efforts, while also helping them make realistic and appropriate choices, children develop a healthy sense of initiative in planning and undertaking activities. If, instead, adults discourage the pursuit of independent activities or dismiss them as silly and bothersome, children develop guilt about their needs and desires.

Industry vs. Inferiority (Elementary Years)

The failure to master trust, autonomy, and initiative may cause the child to doubt themselves, leading to feelings of shame, guilt, defeat, and/or inferiority. Children at this age are becoming more aware of themselves as individuals; they work hard at being responsible, being good, and "doing it right." At this stage, children are very eager to learn and accomplish progressively complex skills, such as reading, writing, telling time, etc. Erikson viewed the elementary school years as particularly critical for the development of self-confidence. Ideally, elementary school provides many opportunities to achieve the recognition of teachers, caregivers, and peers by producing things—drawing pictures, solving addition problems, writing sentences, and so on. If children are encouraged to make and do things and are then praised for their accomplishments, they begin to demonstrate industry by being diligent, persevering at tasks until completed, and putting work before pleasure. If children are, instead, ridiculed or punished for their efforts or if they find they are incapable of meeting their teachers' and caregivers' expectations, they develop feelings of inferiority about their capabilities (Crain, 2011).

Identity vs. Role-Confusion (Adolescence)

As adolescents become newly concerned with how they appear to others, the need to settle on an identity becomes an increasing priority. As they make the transition from childhood to adulthood, adolescents ponder the roles they will play in the adult world. Initially, they are apt to experience some role-confusion—mixed ideas and feelings about the specific ways in which they will fit into society, and they may experiment with a variety of behaviors, social groups, and activities. Erikson is credited with coining the term identity crisis to explain the negotiation of this particular challenge. Eventually, Erikson proposed, most adolescents achieve a sense of identity regarding who they are and where their lives are headed. The teenager must achieve a sense of identity in career, gender roles, politics, and religion, among others. This stage is considered to be a turning point in human development because it marks the transition from childhood to adulthood, and more specifically, seems to be the reconciliation between the person one has come to be and the person society expects one to become. In relation to the eight life stages as a whole, the fifth stage corresponds to a crossroads.

Intimacy vs. Isolation (Early Adulthood)

At the start of this stage, identity vs. role confusion is coming to an end though it still lingers at the foundation of this stage (Erikson, 1950). Young adults are still eager to blend their identities with friends; they want to fit in. Once people have established their identities, they are ready to make long-term commitments to others. They become capable of forming intimate, reciprocal relationships (for example, through close friendships or marriage) and willingly make the sacrifices and compromises that such relationships require. If people cannot form these relationships of **intimacy** (perhaps because of their own needs), a sense of isolation may result, provoking feelings of darkness and angst.

Generativity vs. Stagnation (Middle Adulthood)

The stage of **generativity** has broad applications for family relationships, work, and society. "Generativity, then,

is primarily the concern in establishing and guiding the next generation. . . the concept is meant to include. . . productivity and creativity" (Erikson, 1950, p. 240). In other words, during middle adulthood, the primary developmental task is one of contributing to society and helping to guide future generations. Socially-valued work and disciplines are expressions of generativity. As a person experiences successes during this stage, perhaps by raising a family or working toward the betterment of society, a sense of generativity—of productivity and accomplishment—results. In contrast, a person who is self-centered and unable or unwilling to help society move forward develops a feeling of **stagnation** or dissatisfaction with his or her relative lack of productivity Berk, 2017).

Integrity vs. Despair (Older Adulthood)

As we grow older and become senior citizens, we tend to slow down our productivity and explore life as retired people. It is during this time that we contemplate our accomplishments and are able to develop **integrity** if we see ourselves as leading a successful life. If we see our life as unproductive or feel that we did not accomplish our life goals, we become dissatisfied with life and develop a sense of **despair**, often leading to depression and hopelessness. This stage may manifest itself out of sequence when individuals feel they are near the end of their lives (such as when receiving a terminal disease diagnosis) (Santrock, 2013).



Criticism of Psychosocial Theory

Erikson's theory may be questioned as to whether his stages must be regarded as sequential and only occurring within the age ranges he suggests. There is debate as to whether people only search for identity during the

adolescent years or if one stage needs to happen before other stages can be completed. Erikson himself states that each of these processes occurs throughout the lifetime in one form or another, and he emphasizes these periods only because it is at these times that the conflicts become most prominent (Erikson, 1956).

Educational Implications

Teachers who apply psychosocial development in the classroom create an environment where each child feels appreciated and is comfortable with learning new things and building relationships with peers.

At the preschool level, teachers want to focus on helping children develop healthy personalities and

- Find out what students are interested in and create projects that incorporate their area of interest.
- Make sure to point out and praise students for good choices.
- Offer continuous, authentic feedback.
- Not ridicule or criticize students. They should find a private place to talk with a child about a poor choice or behavior.
- Help students formulate their own alternate choices by guiding them to a more positive solution and outcome.
- When children experiment, they should not be punished for trying something that may turn out differently from what the teacher had planned.

At the elementary level, teachers should focus on achievement and peer relationships and

- Create a list of classroom duties that need to be completed on a scheduled basis. Ask students for their input when creating the list, as well as giving them a say in who will be in charge of what.
- Discuss and post classroom rules.
- Make sure to include students in the decision-making process when discussing rules.
- Encourage students to think outside of their day-to-day routine by role-playing different situations.
- Let students know that striving for perfection is not as important as learning from mistakes.
- Teach children resilience.
- Encourage children to help students who may be having trouble socially and/or academically.
- Never allow any child to make fun of or bully another child.
- Build confidence by recognizing success in what children do best.
- Provide a variety of choices when making an assignment so that students can express

themselves with a focus on their strengths.

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Behaviorist Theory

Behaviorism is primarily concerned with observable and measurable aspects of human behavior. In defining behavior, behaviorist learning theories emphasize changes in behavior that result from **stimulus–response** associations made by the learner. Behaviorists assert that the only behaviors worthy of study are those that can be directly observed; thus, it is actions, rather than thoughts or emotions, which are the legitimate object of study. Behaviorist theory does not explain abnormal behavior in terms of the brain or its inner workings. Rather, it posits that all behavior is learned habits, and attempts to account for how these habits are formed. In assuming that human behavior is learned, behaviorists also hold that all behaviors can also be unlearned and replaced by new behaviors; that is, when a behavior becomes unacceptable, it can be replaced by an acceptable one. A key element of this theory of learning is the rewarded response. The desired response must be rewarded for learning to take place (Parkay & Hass, 2000). **John B. Watson** (1878-1958) and **B. F. Skinner** (1904-1990) are the two principal originators of behaviorist approaches to learning.

Watson's basic premise was that conclusions about human development should be based on observation of overt behavior rather than speculation about subconscious motives or latent cognitive processes (Shaffer, 2000). Watson's view of learning was based in part on the studies of **Ivan Pavlov** (1849-1936). Pavlov was well known for his research on a learning process called **classical conditioning**. Classical conditioning refers to learning that occurs when a neutral stimulus (an unassociated signal) becomes associated with a stimulus that naturally produces a behavior, such as a reflex or innate behavior. Pavlov noticed that dogs salivated shortly before they were given food. He discovered that when the bell was rung at repeated feedings, the sound of the bell alone (a conditioned stimulus) would cause the dogs to salivate (a conditioned response).

Skinner believed that human behavior is predictable, just like a chemical reaction. He believed that people don't shape the world, but instead, the world shapes them. Expanding on Watson's basic stimulus-response model, Skinner developed a more comprehensive view of conditioning, known as **operant conditioning**. His model was based on the premise that satisfying responses are conditioned, while unsatisfying ones are not. Operant conditioning is the rewarding of a desired behavior or act that approaches it. Skinner remarked that "the things we call pleasant have an energizing or strengthening effect on our behavior" (Skinner, 1972, p. 74). Through Skinner's research on animals, he concluded that both animals and humans would repeat acts that led to favorable outcomes and suppress those that produced unfavorable results (Shaffer, 2000). If a rat presses a bar and receives a food pellet, he will be likely to press it again. Skinner defined the bar-pressing response as operant (the learned voluntary response), and the food pellet as a **positive reinforcer**. **Punishments,** on the other hand, are consequences that suppress a response and decrease the likelihood that it will occur in the future. If the rat had been shocked every time it pressed the bar, that behavior would cease. Skinner believed the habits that each of us develop result from our unique operant learning experiences (Shaffer, 2000).

Negative reinforcement can be used as a strategy to encourage certain behaviors. Defined, negative reinforcement is the encouragement of certain behaviors by removing or avoiding a negative outcome or stimuli. An alarm clock is an example of a negative reinforcer. In order to stop the buzzing, you need to wake up! Another example is the beeping car manufacturers install that go off until you fasten your seatbelt (Jordan, 2022).

Criticisms of Behaviorism

Behaviorism can be critiqued as an overly deterministic view of human behavior that ignores internal psychological and mental processes; behaviorism oversimplifies the complexity of human behavior. The

behaviorist approach has also been criticized for its inability to account for learning or changes in behavior that occur in the absence of environmental input. Lastly, research has shown that the principles of conditioning are not universal; the link between stimulus and response is not just a simple, direct, cause-and-effect relationship. Factors beyond the stimulus are involved in determining the response. A complete understanding of human behavior would need to include not just actions, but the inner life of the mind as well.

Educational Implications

Behaviorist techniques have long been employed in education to promote behavior that is desirable and discourage that which is not. Among the methods derived from behaviorist theory for practical classroom application are contracts, consequences, reinforcement, extinction, and behavior modification. Using behaviorist theory in the classroom can be rewarding for both students and teachers. Behavioral change occurs for a reason; students work for things that bring them positive feelings approval from people they admire. They change behaviors to satisfy the desires they have learned to value. They generally avoid behaviors they associate with unpleasantness and develop habitual behaviors from those that are repeated often (Parkay & Hass, 2000). The entire rationale of behavior modification is that most behavior is learned. If behaviors can be learned, then they can also be unlearned or relearned. A behavior that goes unrewarded will be extinguished. Consistently ignoring an undesirable behavior will go far toward eliminating it. Other successful classroom strategies are contracts, consequences, punishment, and others that have been described in detail earlier. Behaviorist learning theory is not only important in achieving desired behavior in mainstream education but also in other behavior.

Advocates of behaviorism have effectively adopted this system of rewards and punishments in their classrooms by rewarding desired behaviors and punishing inappropriate ones. Rewards can vary widely and must be important to the learner in some way. As with all teaching methods, success depends on each student's individual stimulus and response.



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Social Cognitive Theory

Albert Bandura (1925-) is perhaps most famous for his Bobo Doll experiments in the 1960s. At the time there was a popular belief that learning was a result of reinforcement. In the Bobo Doll experiments, Bandura presented children with examples of violent behavior or non-violent behavior towards the inflatable Bobo Doll. Children who viewed the violent behavior were in turn violent towards the doll; the control group was rarely violent towards the doll. That became Bandura's **social learning theory** in the 1960s, a learning theory based on the idea that people learn by observing and interacting with others. It is often called a bridge between behaviorist and cognitive learning theories because it encompasses attention, memory, and motivation. Social learning is also commonly referred to as observational learning, because it comes about as a result of observing models. Bandura became interested in social aspects of learning at the beginning of his career. Early theories considered behavior to be a function of the interaction between a person and their environment. Bandura believed that behavior itself influences both the person and the environment, each of which in turn affects behavior and each other; the result is a complex interplay of factors. Social learning theory emphasizes that behavior, personal factors, and environmental factors are all equal, interlocking determinants of each other.



The top four images above show scenes of adults acting aggressively toward Bandura's doll. Children were shown these scenes, then left in a room with the doll and observed. The center and bottom rows of images show how two children emulated the behaviors they had just seen.

Bandura and his colleagues continued to show that social modeling is a very effective way of learning and went on to expand motivational and cognitive processes on social learning theory. In 1986, Bandura published his second book Social Foundations of Thought and Action: A Social Cognitive Theory, which expanded and renamed his original theory. He called the new theory **Social Cognitive Theory (SCT)**. Bandura changed the name social learning theory to social cognitive theory to emphasize the major role cognition plays in encoding and performing behaviors. In this book, Bandura (1986) argued that human behavior is caused by personal, behavioral, and environmental influences. The theory states that when people observe a model performing a behavior, along with the consequences of that behavior, they remember the sequence of events and use this information to guide subsequent behaviors. Depending on whether people are rewarded or punished for their

behavior and the outcome of the behavior, the observer may choose to replicate behavior modeled (Berk, 2017; Crain, 2011; Santrock, 2013).

Media provides models for a vast array of people in many different environmental settings.

HOT TOPIC: *Violence in Media*

There is still much debate over the influence exposure to media violence has on behavior, especially for children. These articles offer views on both sides of the discussion:

https://www.futurity.org/media-violence-aggression-1402632-2/

The American Psychological Association's Policy Statement regarding media violence:

http://www.apa.org/about/policy/violent-video-games.aspx

Criticism of Social Cognitive Theory

One of the main criticisms of the social cognitive theory is that it is not a unified theory, meaning that the different aspects of the theory may not be connected. The theory is so broad that not all of its component parts are fully understood and integrated into a single explanation of learning. The findings associated with this theory are still, for the most part, preliminary. The theory is limited in that not all social learning can be directly observed. Because of this, it can be difficult to measure the effect that social cognition has on development. Finally, this theory tends to ignore maturation throughout the lifespan. Because of this, the understanding of how a child learns through observation and how an adult learns through observation are not differentiated, and factors of development are not included.

Educational Implications of Social Cognitive Theory

People can consciously change and develop their cognitive functioning. This is important to the proposition that how we view ourselves can also be changed or enhanced. From this perspective, people are capable of influencing their own motivation and performance. Improving performance, therefore, depends on changing some of these influences. In teaching and learning, the challenge upfront is to

- Get the learner to believe in his or her personal capabilities to successfully perform a designated task
- Provide environmental conditions, such as instructional strategies and appropriate technology, that improve the strategies and self-efficacy of the learner
- Provide opportunities for the learner to experience successful learning as a result of appropriate action

Social Cognitive Theory has numerous implications in classroom teaching and learning practices

- Students learn a great deal simply by observing others.
- Describing the consequences of behavior increases appropriate behaviors, and decreases inappropriate ones
- Modeling provides an alternative to teaching new behaviors.
- Teachers must model only appropriate behaviors and not model inappropriate behaviors.
- Teachers should expose students to a variety of models, including peers and other adult models.
- Students must believe that they are capable of accomplishing a task; it is important for students to develop a sense of self-efficacy.
- Teachers should help students set realistic expectations, while ensuring that expectations are realistically challenging.

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Cognitive Theory

Jean Piaget (1896-1980), a Swiss psychologist, is best known for his pioneering work on the development of intelligence in children. His studies have had a major impact on the fields of psychology and education. Piaget was the first to conduct systematic observations of children in order to study **cognition**. Piaget was primarily interested in the nature of knowledge and how it could be seen as a form of adaptation to the environment. He described his work as **genetic epistemology** – the study of the origins and development of knowledge. Piaget based many of his ideas on observations of his own children–Jacqueline, Lucienne, and Laurent. From his observations of children, Piaget concluded that children were actively constructing their own knowledge; they were not limited to receiving knowledge from caregivers or teachers.

In studying the cognitive development of children and adolescents, Piaget identified four major stages: **sensorimotor**, **preoperational**, **concrete operational,** and **formal operational**. In each stage, children demonstrate new intellectual abilities and increasingly complex understanding of the world. According to Piaget, these stages cannot be skipped—cognitive development always follows this precise sequence. The ages at which children progress through the stages are approximations, varying with the environment and background of individual children. Further, at any given time, a child may exhibit behaviors characteristic of more than one stage. Piaget's work provides the foundation on which **constructivist theories** are based. Constructivists believe that knowledge is individually constructed and that each person constructs their own understanding of concepts, which may vary from person to person (Berk, 2017; Crain, 2011; Santrock, 2013.

Sensorimotor Development

In the **Sensorimotor Stage**, occurring from birth to age 2, the child is concerned with gaining motor control and learning about physical objects. Piaget proposed that an infant's intelligence is essentially practical in that all interactions with its environment are either sensory (i.e., seeing, hearing, etc.) or motor (i.e., grasping, pulling, etc.). Thus, the first stage of development is known as the sensorimotor stage. Knowledge is limited in this stage because it is based on physical interactions and experiences. Infants cannot predict reactions, and, therefore, must constantly experiment and learn through trial and error. Such exploration might include shaking a rattle or putting objects in the mouth. As they become more mobile, infants' ability to develop cognitively increases, and early language development begins during this stage.

Piaget's Observations of Infant Jacqueline

Jacqueline tries to grasp a celluloid duck on top of her quilt. She almost catches it, shakes herself, and the duck slides down beside her. It falls very close to her hand but behind a fold in the sheet. Jacqueline's eyes have followed the movement, and she has even followed it with her outstretched hand. But as soon as the duck has disappeared—nothing more! It does not occur to her to search behind the fold of the sheet, which would be very easy to do (she twists it mechanically without

searching at all). But, curiously, she again begins to stir about as she did when trying to get the duck and again glances at the top of the quilt.

I then take the duck from its hiding place and place it near her hand three times. All three times she tries to grasp it, but when she is about to touch it, I replace it very obviously under the sheet. Jacqueline immediately withdraws her hand and gives up. The second and third times, I make her grasp the duck through the sheet, and she shakes it for a brief moment, but it does not occur to her to raise the cloth.

Then I recommence the initial experiment. The duck is on the quilt. In trying to get it, she again causes it to slide behind the fold in the sheet; after having looked at this fold for a moment (it is near her hand), she turns over and sucks her thumb.

(Source: Piaget, 1955, pp. 36–7)

From such observations, Piaget concluded that infants lack an understanding of object permanence—the concept that objects continue to exist when they are out of sight. The fact that something as fundamental as object permanence does not appear to be innate illustrates how deeply and how early the child begins to build an understanding of the world, at least according to Piaget's theory.

Preoperational Development

In the **Preoperational Stage**, from ages 2 to 7, the child is preoccupied with verbal skills. At this point, the child can name objects and reason intuitively. In this stage, children can use symbols to represent words, images, and ideas, demonstrated by children in this stage by engaging in pretend play. A child's arms might become airplane wings as he zooms around the room, or a child with a stick might become a brave knight with a sword. Children also begin to use language in the preoperational stage, but they cannot understand adult logic or mentally manipulate information (the term operational refers to logical manipulation of information, so children at this stage are pre-operational). Children's logic is based on their own personal knowledge of the world so far, rather than on conventional knowledge. More complex concepts, such as cause and effect relationships, have not been learned. During this stage, we also expect children to display egocentrism, which means that the child is not able to take the perspective of others. A child at this stage thinks that everyone sees, thinks, and feels just as they do.

Concrete Operational Development

In the **Concrete Operational Stage**, from ages 7 to 11, the child begins to deal with abstract concepts such as numbers and relationships. In this stage, children can think logically about real (concrete) events; they have a firm grasp on the use of numbers and start to employ memory strategies. They can perform mathematical operations and understand transformations, such as addition is the opposite of subtraction, and multiplication is the opposite of division. Thinking at this stage becomes less egocentric, and children come to understand the

concept of **conservation**—even if something changes shape, its mass, volume, and number stay the same. For example, if you pour water from a tall, thin glass into a short, fat glass, you still have the same amount of water.

Formal Operational Development



The period from adolescence through adulthood is the Formal Operational Stage. During this stage, adolescents and adults begin to reason logically and systematically. Adolescents and adults in this stage are able to use symbols related to abstract concepts. Adolescents can think about multiple variables in systematic ways, can formulate hypotheses, and think about abstract relationships and concepts. Piaget believed that intellectual development was a lifelong process, but that when formal operational thought was attained, no new structures were needed. Intellectual development in adults involves developing more complex thoughts through the addition of knowledge (Berk, 2017; Crain, 2011; Santrock, 2013).

"Play is the work of childhood." – Jean Piaget

Criticisms of Piaget's Cognitive Development Theory

As with other major contributors to theories of development, several of Piaget's ideas have come under criticism based on the results of further research. For example, several contemporary studies support a model of development that is more continuous than Piaget's discrete stages (Courage & Howe, 2002). Many others suggest that children reach cognitive milestones earlier than Piaget describes. Piaget's theory also predicts that thinking within a particular stage would be similar across tasks. In other words, preschool children should perform at the preoperational level in all cognitive tasks. Research has shown diversity in children's thinking across cognitive tasks. Researchers now believe that children may be more competent than Piaget originally thought, especially in their practical knowledge.

Lastly, according to Piaget, the highest level of cognitive development is formal operational thought, which develops between 11 and 20 years old. However, many developmental psychologists disagree with Piaget, suggesting a fifth stage of cognitive development, known as the postformal stage (Commons & Bresette, 2006). In postformal thinking, decisions are made based on situations and circumstances, and logic is integrated with emotion as adults develop principles that depend on contexts. One way that we can see the difference between an adult in postformal thought and an adolescent in formal operations is in terms of how they handle emotionally- charged issues.

Educational Implications

An important implication of Piaget's theory is the adaptation of instruction to the learner's developmental level. The content of instruction needs to be consistent with the developmental level of the learner. The teacher's role is to facilitate learning by providing a variety of experiences. Opportunities that allow students of differing cognitive levels to work together often encourage less mature students to advance to a more mature understanding. Perhaps the most significant implication for instruction is the use of concrete "hands-on" experiences to help children learn.

Additional Piagetian suggestions include

- Continue to provide concrete props and visual aids
- Use familiar examples to facilitate learning more complex ideas
- Allow opportunities to classify and group information with increasing complexity
- Present problems that require logical analytic thinking, such as “brain teasers”
- Provide opportunities to discuss social, political, and cultural issues
- Teach broad concepts rather than facts
- Ground concepts in a context that’s meaningful and relevant to the learner

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Sociocultural Theory

Sociocultural Theory has a unique history. Russian-born **Lev Semyonovich Vygotsky** (1896-1934) was one of the most notable theorists of his time. A remarkable and brilliant researcher and theoretician who died young, Vygotsky has been called the "Mozart of psychology" (Toulmin, 1978). In his very short life (He died at the age of 37 from tuberculosis), he received a law degree and studied literature, linguistics, sociology, psychology, philosophy, and the arts. He is best known for his contribution to the understanding of the relationship between the social world and cognitive development—specifically, his work focused on the significance of culture and the role of language.

Vygotsky's fundamental insight was that children need social interaction with adults and older children to advance their psychological development. However, his work was rejected in the Soviet Union under Joseph Stalin's leadership and was not released in the West until decades after his death. In the latter part of the twentieth century, his theories became widely respected and influential within the fields of developmental psychology, education, and child development, advancing human understanding of how best to support the growth and development of children to reach their fullest potential as mature human beings.

Vygotsky believed that language is what makes thought possible and is, thus, the basis of consciousness.

According to Vygotsky, children learn by internalizing the results of interactions with adults. The first important concept he developed is the zone of proximal development *(*ZPD), referring to the difference between a child's existing abilities and what he or she can learn under the guidance of an adult or a more capable peer. In other words, it's the gap between what children are already able to do and what they are not quite ready to accomplish by themselves. Vygotsky suggested that interactive learning with adults is most effective in helping children cross this zone. According to Vygotsky, adults and more advanced peers must help direct and organize a child's learning before the child can master and internalize it. This idea of a significant adult guiding a child through the ZPD is known as **scaffolding**, or structuring learning encounters in order to support and foster a child's emerging capabilities. Scaffolding can be provided in a few ways: in the form of a mentor, by the use of objects or experiences, or by a child's past learning.

Vygotsky described human cognitive development as a "collaborative process," which means that the learning process of individuals takes place through social interactions. Children acquire cognitive skills as part of their orientation into a way of life. Shared activities help them internalize their society's modes of thinking and behaving. Moreover, social interaction not only helps children remember. It may also even be the key to memory formation. In addition to these ideas, Vygotsky also forwarded the notion that culture and community play decisive roles in early development (Berk, 2017; Crain, 2011; Santrock, 2013).

Criticisms of Sociocultural Theory

One criticism is Vygotsky's view of active construction of knowledge. Some critics suggest that learning is not always a result of active construction. Rather, learning can sometimes result passively.

Another criticism is that Vygotsky's theory of language is not well-developed. Vygotsky, unfortunately, died before he had a chance to fully develop his theories. His theories rely a lot on cultural influences, for it is culture that helps to develop learners' language acquisition and cognitive development. Vygotsky believed that very little language acquisition and cognitive development result from biological factors. However, some psychologists dismiss the idea that cultural influences play a dominant role in the development of language.

This lends credence to Piaget's view of cognitive development occurring in stages and children not being able to learn some concepts until they reach a certain level of maturation.

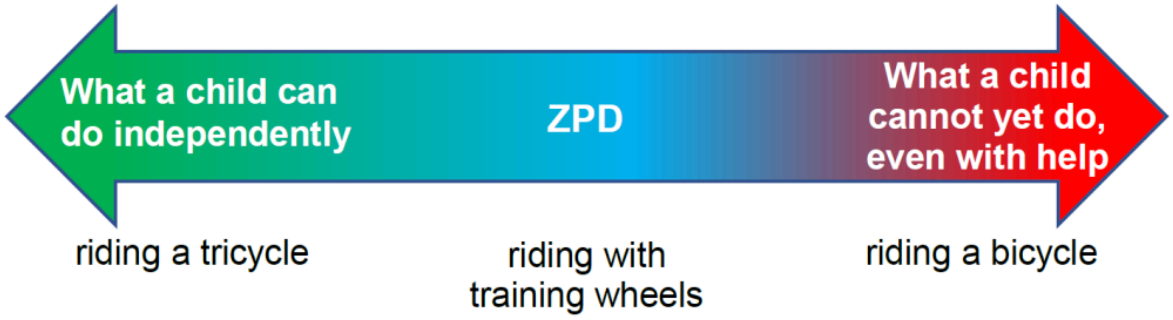
Perhaps the main criticism of Vygotsky's work concerns the assumption that it is relevant to all cultures. Some dismiss the idea that Vygotsky's ideas are culturally universal and believe the concept of scaffolding, which is heavily dependent on verbal instruction, may not be equally useful in all cultures and for all types of learning. Indeed, in some instances, observation and practice may be more effective ways of learning certain skills.

Educational Implications

Although the social influences on cognitive development have been considered by other researchers, such as Piaget and Bandura, Vygotsky emphasized that individual development is inherently integrated with cultural, historical, and interpersonal factors, which is foundational to developmentally appropriate practice.

Some general implications of Vygotsky's ideas can be summarized as

- the central role of the teacher-student relationship in learning;
- the inherent cultural and social influences on students' attitudes and beliefs
- the importance and power of language as a primary tool for the transference of knowledge and thought
- the benefits of a student-centered curriculum



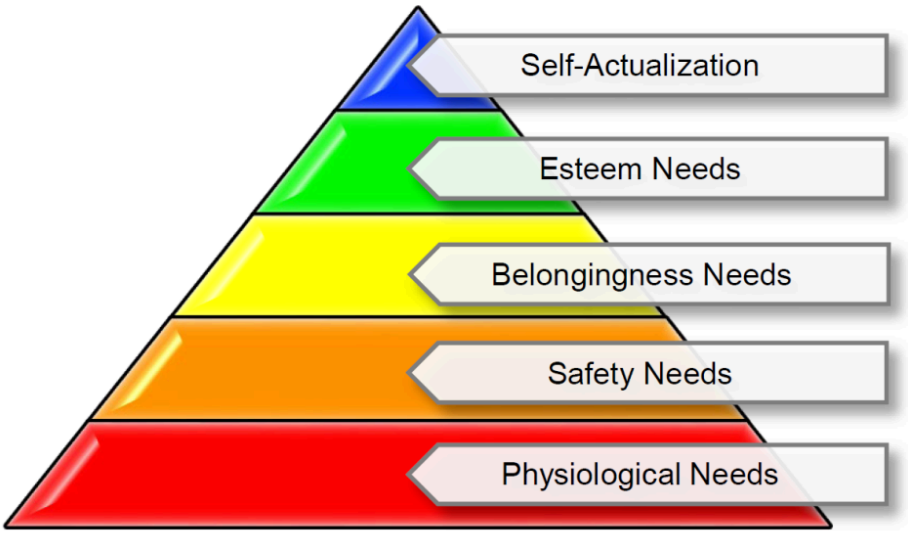
Think of scaffolding as providing training wheels for children. Training wheels provide just enough assistance to let the child be successful, until he/she is able to ride independently.

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Humanistic Theory

Abraham Harold Maslow (1908-1970) has made a major contribution to teaching and classroom management in schools. **Humanistic theory** is an approach to development that examines the "whole person"—taking into consideration all aspects of human existence—and the uniqueness of all individuals. Maslow believed that people are motivated to meet certain basic needs and that some needs take precedence over others. Our most basic need is for physical survival, and this will be the first thing that motivates our behavior. Once that level is fulfilled, the next level up is what motivates us, and so on. His theory is also called the Theory of Hierarchical Needs and is often depicted as a pyramid with five distinct levels. Needs lower down in the hierarchy must be satisfied before individuals can attend to needs higher up. From the bottom of the hierarchy upwards, the needs are physiological, safety, love and belonging, esteem, and self-actualization.



Maslow believed that while every person is capable and has the desire to move up the hierarchy toward a level of self-actualization, unfortunately, progress is often disrupted by a failure to meet lower-level needs. Life experiences, including divorce and the loss of a job, may cause an individual to fluctuate between levels of the hierarchy. Therefore, not everyone will move through the hierarchy in a one-directional manner but may move back and forth between the different types of needs, depending on each person's specific life circumstances.

The first level of **physiological needs** is related to survival. These are biological requirements for human sustenance (for example, air, food, drink, shelter, clothing, warmth, sex, and sleep.) The human body cannot function normally if these needs are not satisfied. Maslow considered physiological needs the most important as all the other needs become secondary until these needs are met.

Safety needs appear when physiological needs are fulfilled. These include the need for structure and predictability, protection from elements, security—physical and emotional, law and order, stability, and freedom from fear. Reducing uncertainty is the chief objective at this stage. Individuals are free from danger, fear, and chaos when their safety needs are adequately met.

After physiological and safety needs have been fulfilled, the third level of human needs is social and involves feelings of **belongingness**. The need for interpersonal relationships motivates behavior.

Examples include friendship, intimacy, trust, acceptance, receiving and giving affection and love, affiliation, or being part of a group (family, friends, work, etc.). In this stage, approval must come from earned respect, not fame or social status.

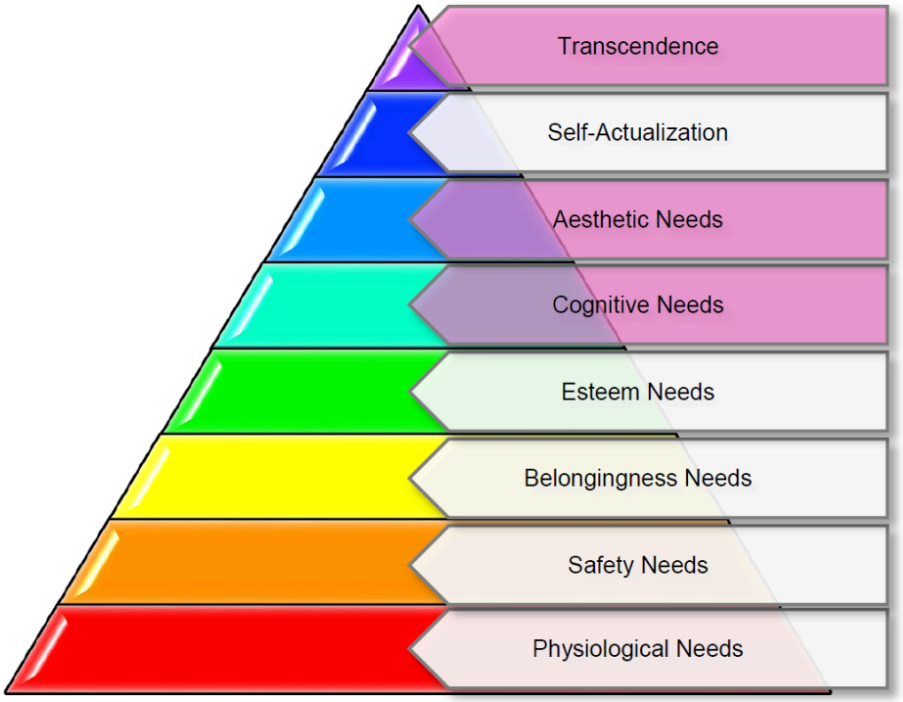
Maslow classified the next level, **esteem needs**, into two categories: **esteem for oneself** (for example, dignity, achievement, mastery, and independence) and the **desire for reputation or respect from others** (for example, status, and prestige). Maslow indicated that the need for respect or reputation is most important for children and adolescents and precedes real self-esteem or dignity.

If the previous needs are sufficiently met, a person now has the opportunity to reach **self-actualization**—realizing personal potential, self-fulfillment, seeking personal growth and peak experiences–the ability "to become everything one is capable of becoming" (Maslow, 1987, p. 64). Maslow believed this to be an exceptional feat since it so rarely occurs. A person who reaches this stage strives for growth and self-improvement—like Gandhi or Oprah.

It is important to note that Maslow himself continued to refine his theory over several decades (Maslow, 1987), and proposed that the order in the hierarchy "is not nearly as rigid" (p. 68) as he may have implied in his earlier description. Maslow also noted that the order of needs might be flexible based on external circumstances or individual differences. For example, he notes that for some individuals, the need for self-esteem is more important than the need for love. For others, the need for creative fulfillment may supersede even the most basic needs.

Maslow (1987) also pointed out that most behavior is multi-motivated and noted that "any behavior tends to be determined by several or all of the basic needs simultaneously rather than by only one of them" (p. 71). His revised model includes levels of:

- **Cognitive needs**: knowledge and understanding, curiosity, exploration, need for meaning and predictability.
- **Aesthetic needs**: appreciation and search for beauty, balance, form, etc.
- **Transcendence needs**: A person is motivated by values which transcend the personal self (e.g., service to others, mystical experiences, religious faith, etc.)—like the Dalai Lama or the Pope (Berk, 2017; Crain, 2011; Santrock, 2013).



Educational Implications

Applications of Maslow's hierarchical needs theory to the work of the classroom teacher are obvious. Before a student's cognitive needs can be met, they must first fulfill their basic physiological needs. For example, a tired and hungry student will find it difficult to focus on learning. Students need to feel emotionally and physically safe and accepted within the classroom to progress and reach their full potential. He suggests students must be shown that they are valued and respected in the classroom and the teacher should create a supportive environment. Students with low self-esteem will not progress academically at an optimal rate until their self-esteem is strengthened.

Criticisms of Humanistic Theory

The most significant limitation of Maslow's theory concerns his methodology. He looked at the biographies and writings of 18 people he identified as being self-actualized. From these sources, he developed a list of qualities that seemed characteristic of this specific group of people, as opposed to humanity in general. From a scientific perspective, there are numerous problems with this particular approach. First, it could be argued that this type of analysis is extremely subjective, as it is based entirely on the opinion of the researcher. Therefore, Maslow's operational definition of self-actualization must not be blindly accepted as scientific fact. Additionally, Maslow's analysis focused on a biased sample of self-actualized individuals, limited to highly educated white males (such as Thomas Jefferson, Abraham Lincoln, Albert Einstein, William James, Aldous Huxley, Beethoven).

Although Maslow (1970) studied self-actualized females, such as Eleanor Roosevelt and Mother Teresa, they

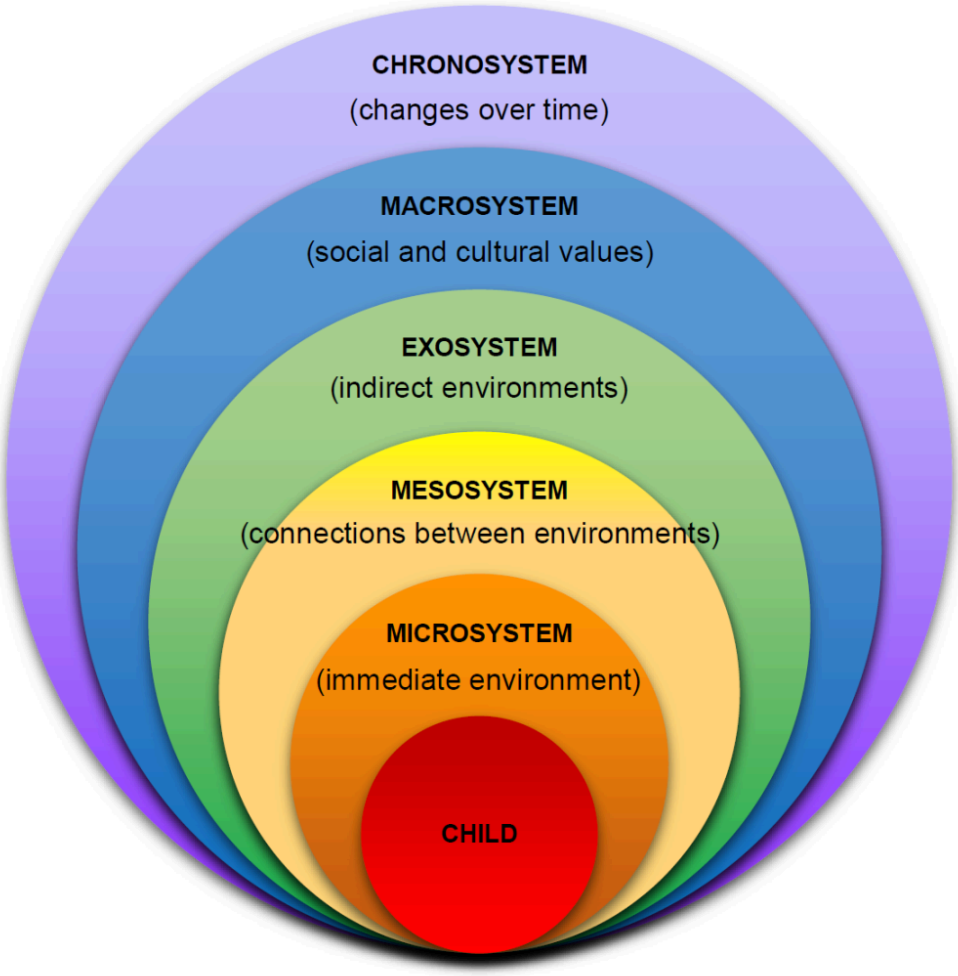
comprised a small proportion of his sample; this makes it difficult to generalize his theory to females and individuals from lower social classes or different ethnicities.

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Ecological Theory

Also known as the Human Ecology Theory, **Ecological Theory** states that human development is influenced by the different types of environmental systems. Formulated by famous psychologist **Urie Bronfenbrenner** (1917-2005), this theory helps us understand why we may behave differently when we compare our behavior in the presence of our family and our behavior when we are in school or at work. The ecological systems theory holds that we encounter different environments throughout our lifespan that may influence our behavior in varying degrees. These systems include the **microsystem**, the **mesosystem**, the **exosystem**, the **macrosystem**, and the **chronosystem**, and are usually depicted by nesting spheres of influence.



The **microsystem** is the setting in which we have direct social interactions with people and social agents. Family, friends, classmates, teachers, neighbors and other people with whom we have direct contact are included in the microsystem. The theory states that we are not simply recipients of experiences, rather we are contributing to the construction of such environments; we have influence over the people and systems in our lives, as they have influence over us.

The **mesosystem** involves the **relationships between the microsystems** in one's life. This means that your family experience may be related to your school experience. For example, if a child is neglected by his parents,

he may have a low chance of developing a positive attitude toward his teachers. Also, this child may feel awkward in the presence of peers and may resort to withdrawal from a group of classmates.

The **exosystem** is a system of indirect influences and includes systems that have influence but are those with which a child doesn't have any direct contact. For example, a parent who has been demoted at work may bring home feelings of frustration or anger—the child may never have any interaction with the parent's boss, but that boss may, nonetheless, have influence over how that parent interacts with the child. Ecological Theory

The **macrosystem** setting is the actual culture of an individual. These cultural contexts include the socioeconomic status of a child, his/her ethnicity or race, and the specific society in which a child lives.

The **chronosystem** adds the dimension of time and includes the transitions and shifts in one's lifespan. One classic example of this is how divorce, as a major life transition, may affect not only the couple's relationship but also their children's behavior. According to the majority of research, children are negatively affected in the first year after divorce. The next years after the divorce might reveal that the interaction within the family becomes more stable and agreeable (Berk, 2017; Crain, 2011; Santrock, 2013).

Educational Implications

Bronfenbrenner looked at patterns of development across time as well as the interactions between the child and the environment. The educational implications of his model include the social and political policies and practices affecting children, families, and caregiving. As teachers and educators strive to become evidence-based practitioners, the goal then becomes to identify those factors such as caregivers, family, peers, culture, historical perspectives that influence students' learning and development.

In that regard, Bronfenbrenner's theory encourages much consideration of what constitutes supportive interactions in fostering development. It goes beyond identifying what might influence development, and, more importantly, assists in considering how and why it influences development. Furthermore, Bronfenbrenner's theory also assists in considering how an interaction might be added or taken away or improved to foster development and, especially, how a face-to-face interaction between a developing individual and an agent within his or her environment might be changed. Although Bronfenbrenner's multi-system model has value in identifying the resources that influence development, it is more likely of value in assisting consideration of how those resources might be used. Inherent within this idea is the emphasis Bronfenbrenner places on the understanding that interactions nearest to the child have the greatest influence on the development of that child. The ecological systems theory has also become an important foundation for other theorists' work. (Sincero, 2012)

Criticisms of Educational Theory

A criticism of Bronfenbrenner has been that the model focuses too much on the biological and cognitive aspects of human development, but not much on the socio-emotional aspect of human development. A more comprehensive view of human development, one with the domains of human development at the center, has been developed. This ecological model is called the Integrated Ecological Systems Framework (Sincero, 2012).

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Other Contemporary Theories to Consider

Theory of Multiple Intelligences

Howard Gardner (1943-) contends that previously accepted ideas of human intellectual capacity are all based on the belief that intelligence is fixed throughout one's lifetime and that intelligence can be measured through an individual's logical and language abilities. Gardner's theory challenges this traditional, narrow view of intelligence. According to Gardner's theory, intelligence encompasses the ability to create and solve problems,as well as create products or provide services that are valued within a culture or society. His original theory proposed seven separate intelligences. He has since revised this thinking and has added an eighth intelligence, and a proposed ninth intelligence that has yet to experience full acceptance. The nine intelligences are Verbal/Linguistic, Logical/ Mathematical, Visual/Spatial, Bodily-Kinesthetic, Musical, Interpersonal, Intrapersonal, Naturalistic, and Existential. Key tenets of Gardner's theory are

- All human beings possess all nine intelligences in varying degrees.
- Each individual has a different intelligence profile.
- Education can be improved by assessment of students' intelligence profiles and designing activities accordingly.
- Each intelligence occupies a different area of the brain.
- The nine intelligences may operate in consort or independently from one another.
- These nine intelligences may define the human species (Armstrong, 2018; Gardner, 1999; Gardner, 2006).

The Nine Intelligences

Verbal/Linguistic intelligence refers to an individual's ability to understand and manipulate words and languages. Everyone is thought to possess this intelligence at some level. This includes reading, writing, speaking, and other forms of verbal and written communication. Traditionally, linguistic intelligence and logical/ mathematical intelligence have been highly valued in education and learning environments.

Logical/Mathematical intelligence refers to an individual's ability to do things with data: collect and organize, analyze and interpret, conclude and predict. Individuals strong in this intelligence see patterns and relationships. These individuals are oriented toward thinking: inductive and deductive logic, numeration, and abstract patterns. This is the kind of intelligence studied and documented by Piaget.

Visual/Spatial intelligence refers to the ability to form and manipulate a mental model. Individuals with strength in this area depend on visual thinking and are very imaginative. People with this kind of intelligence tend to learn most readily from visual presentations such as movies, pictures, videos, and demonstrations using models and props. They like to draw, paint, or sculpt their ideas and often express their feelings and moods through art. These individuals often daydream, imagine and pretend.

Bodily/Kinesthetic intelligence refers to people who process information through the sensations they feel in their bodies. These people like to move around, touch the people they are talking to and act things out. They are good at small and large muscle skills; they enjoy all types of sports and physical activities. They often express themselves through dance.

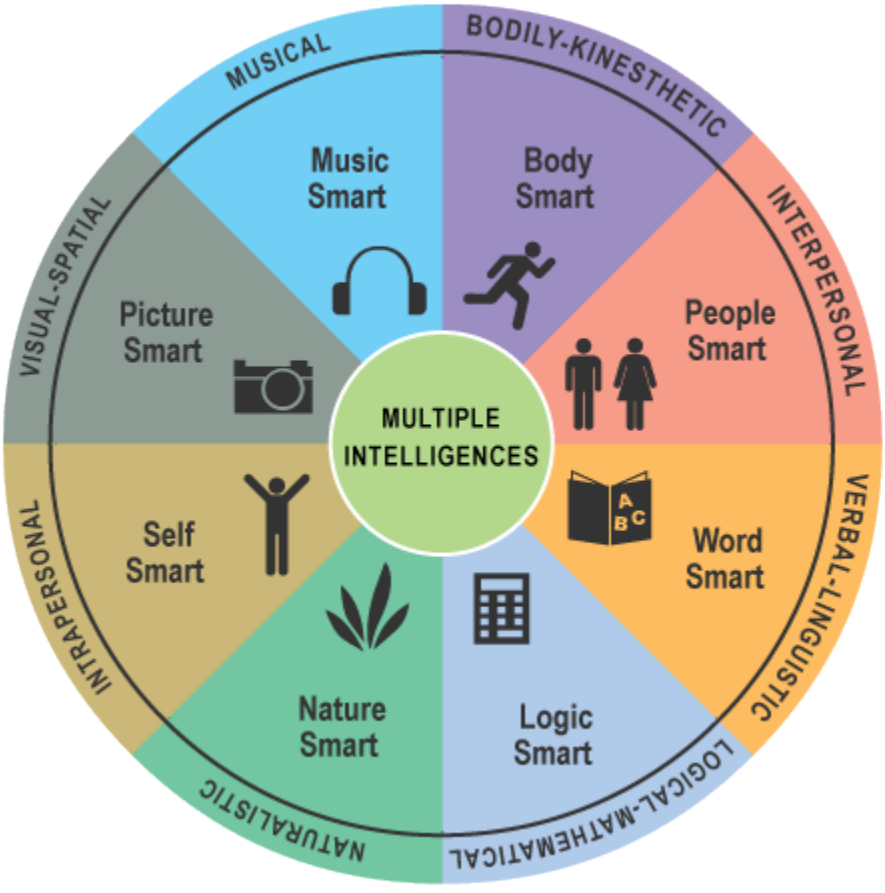
Musical intelligence refers to the ability to understand, create, and interpret musical rhythm and tones, and the capability to compose music. Composers and instrumentalists are individuals with strength in this area.

Interpersonal Although Gardner classifies interpersonal and intrapersonal intelligences separately, there is a lot of interplay between the two, and they are often grouped together. Interpersonal intelligence is the ability to interpret and respond to the moods, emotions, motivations, and actions of others. Interpersonal intelligence also requires good communication and interaction skills, and the ability to show empathy toward the feelings of other individuals. Counselors and social workers are professionals that require strength in this area.

Intrapersonal intelligence, simply put, is the ability to know oneself. It is an internalized version of interpersonal intelligence. To exhibit strength in intrapersonal intelligence, an individual must be able to understand their own emotions, and motivations, and be aware of their own strengths and weaknesses. It's important to note that this intelligence involves the use of all others.

Naturalistic intelligence describes the ability to both identify and distinguish between different types of things found in the natural world. Naturalistic thinkers are people who value order and notice relationships and patterns.

Existential Intelligence encompasses the ability to pose and ponder questions regarding existence—including life and death. This would be in the domain of philosophers and religious leaders (Armstrong, 2018; Gardner, 1999; Gardner, 2006).



Although Gardner's theory was not originally designed for use in a classroom application, it has been widely embraced by educators and enjoyed numerous adaptations in a variety of educational settings. Teachers have always known that students had different strengths and weaknesses in the classroom. Gardner's research was able to articulate that and provide direction as to how to improve a student's ability in any given intelligence.

Match the terms on the left column with the correct definitions on the right.



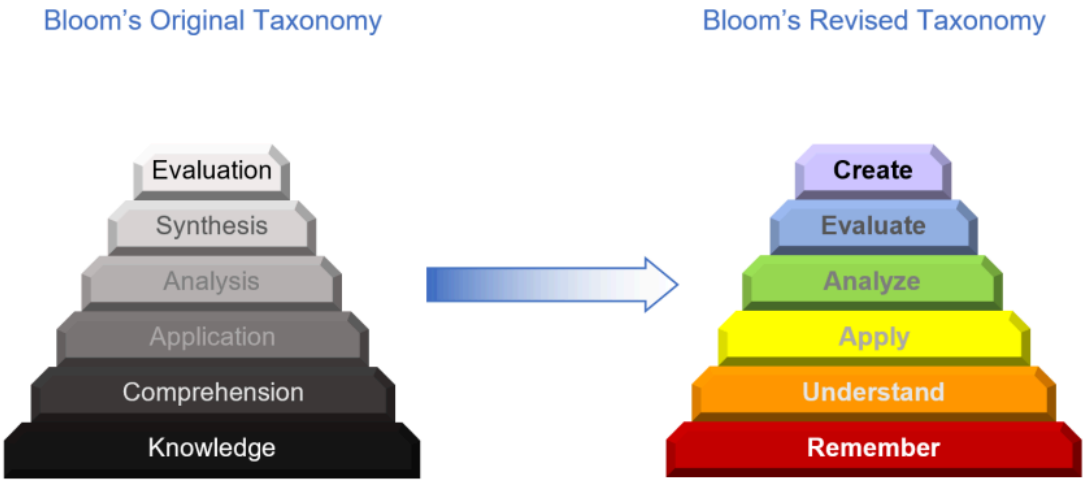
An interactive H5P element has been excluded from this version of the text. You can view it online here: *https://rotel.pressbooks.pub/whole-child/?p=719#h5p-2*

Bloom's Taxonomy

Benjamin Bloom (1913-1999) was an influential psychological researcher and child activist. In 1956, Bloom, with collaborators Max Englehart, Edward Furst, Walter Hill, and David Krathwohl, published a framework for categorizing educational goals: The Taxonomy of Educational Objectives. Familiarly known as Bloom's Taxonomy, this framework has been applied by generations of K-12 teachers and college instructors in their teaching.

The framework devised by Bloom and his collaborators consisted of six major categories of goals, in order of complexity: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. Those categories after Knowledge were presented as "skills and abilities," with the understanding that knowledge was the necessary precondition for putting these skills and abilities into practice.

In 2001, a group of cognitive psychologists, curriculum theorists, instructional researchers, and testing and assessment specialists published a revision of Bloom's Taxonomy with the title *A Taxonomy for Teaching, Learning, and Assessment*. This title draws attention away from the somewhat static notion of "educational objectives" (in Bloom's original title) and points to a more dynamic conception of the classifications of critical thinking. The authors of the revised taxonomy underscore this dynamism, using verbs to label their categories and subcategories (rather than the nouns of the original taxonomy). These "action words" describe the cognitive processes by which thinkers encounter and work with knowledge:



The following chart lists verbs for student objective at each of Bloom's levels. Educators often find it helpful to use such a chart to be sure that they are both focusing their lessons, as well as targeting a variety of levels when planning lessons. This chart can be particularly useful in differentiation instruction for the varied needs of learners. It is important to keep in mind that children of nearly any age are capable of functioning at each level, as long as they are provided with the proper support to help scaffold their learning. Notice that some verbs can be applied to more than one level, depending on how the lesson is structured.

Mindset Theory

The concept of Mindset Theory was developed by psychologist Carol Dweck (1946-) and popularized in her book, Mindset: The New Psychology of Success (2016). In recent years, many schools and educators have started using Dweck's theories to inform how they teach students.

A **mindset**, according to Dweck, is a self-perception or self-theory that people hold about themselves. Believing that you are either *intelligent* or *unintelligent* is a simple example of a mindset. People may also have a mindset related to their personal or professional lives— "I'm a good teacher" or "I'm a bad parent," for example. People can be aware or unaware of their mindsets, according to Dweck, but they can have a profound effect on learning achievement, skill acquisition, personal relationships, professional success, and many other dimensions of life.

Dweck's educational work centers on the distinction between a **fixed mindset** and **growth mindset**. According to Dweck, in a **fixed mindset**, people believe their basic qualities, like their intelligence or talent, are simply fixed traits. They spend their time documenting their intelligence or talent instead of developing them. They also believe that talent alone creates success—without effort. Dweck's research suggests that students who have adopted a fixed mindset believe that they are either *smart* or *dumb,* and there is no way to change this. For example, they may learn less than they could or learn at a slower rate, while also shying away from challenges, since poor performance might either confirm they can't learn if they believe they are *dumb* or indicate that they are less intelligent than they think if they believe they are *smart*. Dweck's findings also suggest that when students with **fixed mindsets** fail at something, as they inevitably will, they tend to tell themselves they can't or won't be able to do it ("I just can't learn Algebra"), or they make excuses to rationalize the failure ("I would have passed the test if I had had more time to study").

Alternatively, in a **growth mindset**, people believe that their most basic abilities can be developed through dedication and hard work—brains and talent are just the starting point. This view creates a love of learning and a resilience that is essential for great accomplishment. Students who embrace **growth mindsets**—the belief

that they can learn more or become smarter if they work hard and persevere—may learn more, learn it more quickly, and view challenges and failures as opportunities to improve their learning and skills.

Dweck's delineation of fixed and growth mindsets has potentially far-reaching implications for schools and teachers since the ways in which students think about learning, intelligence, and their own abilities can have a significant effect on learning progress and academic improvement. If teachers encourage students to believe that they can learn more and become smarter if they work hard and practice, Dweck's findings suggest, it is more likely that students will, in fact, learn more, and learn it faster and more thoroughly than if they believe that learning is not determined by how intelligent or unintelligent they are. Her work has also shown that a **growth mindset** can be intentionally taught to students. Teachers might, for example, intentionally praise student effort and perseverance instead of ascribing learning achievements to innate qualities or talents (for example, giving feedback such as "You must have worked very hard" rather than "You are so smart."

Read more about mindset in Christine Gross-Loh's interview with Dweck for the Atlantic, titled Don't Let Praise Become the Consolation Prize. In the interview, Dweck clarifies some common misconceptions which are often made. The interview can be found by following this link: https://www.theatlantic.com/education/archive/2016/12/how-praise-became-a-consolation-prize/510845/

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CHAPTER THREE: DOMAINS IN DEVELOPMENT

After completing Chapter Three students will be able to:

- Describe the two major themes of child development: nature vs. nurture and continuity vs. discontinuity
- Define the four domains of development

When studying development, there is a lot to learn! As you read in Chapter 1, Child Development can be approached in a number of ways: time, domains, theorists, themes, cultural perspectives, and appropriate practice. Chapter 2 helped you to understand the theoretical perspectives, and most of the other chapters in this textbook will tackle time, cultural perspectives, and appropriate practice. Here, we are going to take a closer look at the four domains of development, and how they are related to the themes of "nature versus nurture" and "continuity versus discontinuity."

In Chapter 1, you read briefly about four domains of children's development that we will discuss in this textbook: physical/biological, cognitive, social, and emotional. Before we start, it is important to recognize that other authors may separate development into more or less than four domains. For example, in other textbooks, you may see social and emotional development combined into a single domain; other sources identify as many as seven individual domains. In this textbook, you will read about four domains; we, the authors, chose these four because we feel they best represent the major areas that educators, psychologists, and researchers agree on. Plus, without too many distinctions between domains, we will be able to better explain how the domains are interconnected.

Themes of Development

Before exploring the four domains, let's take a moment to review the two major themes of Child Development.

Nature versus Nurture

As you read in Chapter 1, developmental psychologists have gone back and forth about what drives growth and change in children. Is it the environment (nurture) or is it built-in (nature)? A nurture-based perspective would argue that children are wholly influenced by the world around them, including the physical, social, and educational environments. On the other hand, a nature-based theory would state that children grow and change based on their genetic code, and there is little if anything that can be done to change that from the outside world.

By now, you have probably come to realize that both perspectives are correct, in their own way. There are certainly aspects of development that are influenced by the environment, but there are just as many things that are genetically determined. Language is a fantastic example of this: the environment determines which language or languages a child speaks, but there are important biological factors that ensure a child CAN speak a language. For many aspects of child development, nature and nurture cannot be separated.

Continuity versus Discontinuity

In Chapter 1, you also learned that psychologists debate whether development occurs in a continuous or a discontinuous manner. Some theories, such as Erikson's psychosocial model, explain development in stages; this is an example of a discontinuous theory and is often visually represented as a staircase. A child needs to "step up" to the next stage. Just like when you yourself walk up a set of stairs, it is not your whole body moving – you have to go one leg at a time and that is "discontinuous." In terms of what discontinuous development actually looks like, imagine the difference between an infant who cannot walk and a toddler who can. These are two distinct stages and you can literally observe when a child moves from one to the other. A baby's first steps are a huge developmental milestone that moves them from infant to toddler!

On the other hand, continuous development can be seen in models such as Vygotsky's sociocultural theory. Continuous theories do not make clear distinctions between stages or phases. Instead of a staircase, you could imagine continuous development like a ramp. Over time, you can tell that a child has moved up along the ramp, but the small changes along the way can be hard to see. A great deal of physical development is continuous; children grow and change over time, but often that change is only easy to see when you look at the difference over months, rather than over days. Going back to Vygotsky's theory, the concept of the Zone of Proximal Development is an example of continuous development; through interaction with others, children gradually change their level of ability relative to a task.

Universal versus Individual Development

Within each domain of development, there will be things which are universal, meaning they happen to all

children and things that are individual, meaning they may or may not happen to any particular child. Very little about child development – or any development for that matter – is universal, but there are a few things that happen to almost all children, regardless of geographical location, race, ethnicity, socioeconomic status, or culture. In each section, there will be an example of something that is universal, to help you think about how little of development is the same for every child!

Development versus Growth

When discussing physical development, it is sometimes difficult to separate the concepts of "development" and "growth." In everyday language, we typically use the word "develop" to mean the same as grow, improve, or get bigger. However, in psychology we use the word "development" whenever we are talking about change of any kind; it may or may not have to do with an increase, and there are plenty of examples from adult development where the concept actually refers to a decline or loss of something. In this section, and throughout the textbook, we will be discussing child development. Since children are at the beginning of their lifespan, nearly all of their development is a gain of some sort: they grow bigger, they learn language, they improve their social skills. Physical development is no different, but there are a few exceptions, which we will get to. So, as you read this section and move through the textbook learning about physical development in children, keep in mind that some of that development will mean physical growth, but some of it will refer to invisible processes and could include losses and declines.

As you read more about the domains of development, try to pay attention to aspects that may develop continuously or discontinuously; look for aspects of development that may be more or less influenced by nature or nurture.

The Four Domains of Development

As you just learned, there are many domains in which children develop from infancy through school age. For this chapter, we are going to discuss four overarching domains: physical, cognitive, social, and emotional. The physical domain has to do with growth and changes in the body; the cognitive domain includes the functions of the brain, intelligence, and language; the social domain looks at how children develop skills for managing interactions with others; and the emotional domain covers internal states, such as feelings and personality.

Physical/Biological Development

Of all the domains of development, physical development is the most obvious and possibly easiest to measure with modern medical techniques. Some aspects of physical development are universal, biological processes that all children experience, but there is a great deal of variation. For example, most children get taller and stronger as they grow, but the range of what is "normal" is vast, and can be influenced by a range of factors including nutrition, genetics, and experience. Here we will look at physical development such as changes in children's height and weight, the development of gross and fine motor skills, and losing teeth.

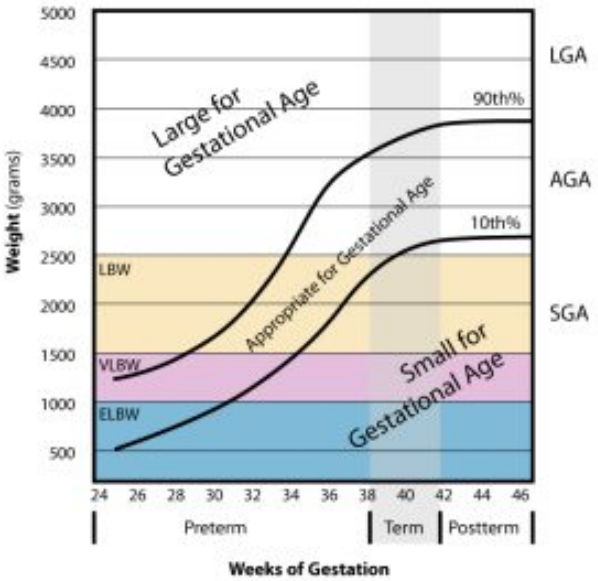
Height and Weight

Typically, children grow physically larger in two ways: they get taller and they get heavier. It is considered normal, healthy development if these two things increase in ratio to one another; as height increases, so should weight. Often, we think of weight as being how much fat we are carrying around, but most of the human body is made up of other things which weigh a lot!

As children grow, their height and weight are increasing because their bones are increasing in both size and density. On top of those bones are muscles, which are connected by ligaments and tendons. Internal organs, such as the lungs and heart, are also growing as they have more space to fill inside the ribcage. Throughout the body there are veins, arteries, and capillaries; all of these help to move fluid around for transporting nutrients and gases.

If you have ever sat in the doctor's waiting room, perhaps you have noticed a chart on the wall that indicates a "normal" weight range according to your height and age. Although these charts become less helpful in adulthood, for infants and young children they can be a quick way to determine if a child is physically developing along a normal trajectory.

The chart below is one example that shows the normal distribution for the weight of a fetus during gestation up to 46 weeks.



If you pay attention to the percentages on the far right side, you might notice that "normal" is a big range – 80% variance! This is because physical development – like most forms of development – can be widely varied across individuals yet still within a range that is considered healthy. Even at the 10th percentile, weight is considered appropriate; it is not unless the fetus weighs less than 2500 grams at term that the baby is considered low birth-weight (LBW).

This image also indicates when and how much growth should increase over the span of gestation. As you can see from the two dark lines, a normally developing fetus should steadily gain weight for the duration of gestation, and then that growth should taper off around week 42.

Throughout the chapters of this book, you will encounter additional charts and diagrams similar to this one which indicate the typical pattern of growth

for children from infancy through age 8. As you read through each chapter, keep these things in mind about the development of height and weight across childhood:

1. There is a wide range of variance within what is considered "normal" development. Children come in all sizes, and grow at different rates depending on a range of biological and environmental factors.
2. Not every scale is going to be the same in a depiction of growth, so pay careful attention to the numbers on the outside of the graph, which will help you to understand what is being measured. Some charts, such as this one, are considering weight compared to week of gestation. After birth, these variables may change to include length (for infants), height, weight, age (in days, weeks, months, or years), or possibly Body Mass Index (BMI).

Gross and Fine Motor Skills

Gross motor movements are those associated with the large muscles of the body: arms, legs, torso, etc. while fine motor skills are those completed with the smaller muscles such as those in your hands and fingers.

As you will read in an upcoming chapter, control of your body depends on a good connection throughout your central nervous system (CNS). At birth, infants' are still developing, and there is not yet a strong signal between the brain and the muscles. Additionally, in the compact environment of the womb, the fetus did not have much opportunity to stretch or strengthen muscles. For the first few months of life, the infant will be developing the brain-body coordination and basic muscle control necessary for both gross and fine motor skills. Once that foundation is set, however, physical development moves forward rapidly! At birth, infants cannot move on their own and yet by age 8 a child is able to walk, run, jump, and skip which takes an enormous amount of muscular strength and control!

Fine motor skills take more time to develop than gross motor skills, because the smaller muscles of the body are generally more difficult to learn to control. While it is relatively easy to learn how to control a whole limb in space, it can be challenging to figure out how to work the tiny digits at the end of your arm! Have you ever tried to manipulate something very small, and found that it was hard to get your fingers to cooperate? Tiny movements, such as picking up a Cheerio in a pincer grip, or controlling the movement of your tongue in the back of your mouth to distinguish between /ch/ and /ch/ requires an enormous amount of control. This only comes with practice, which allows both the brain and the muscles to become familiar with the movement.

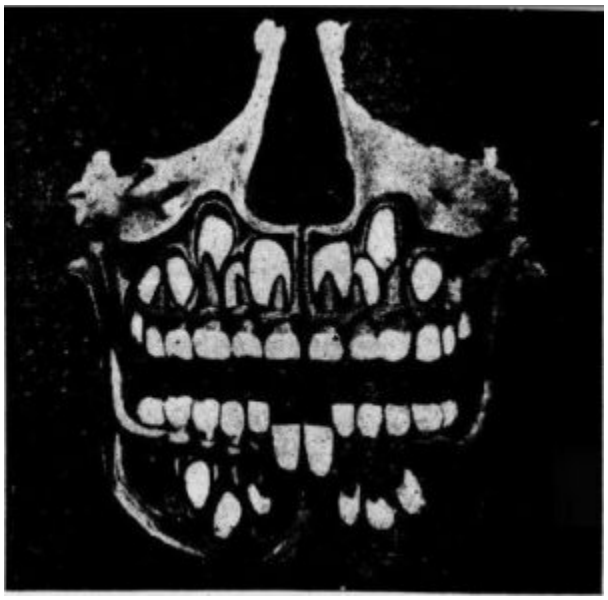
Throughout the chapters of this book which detail each stage of early childhood (infancy, toddlerhood, preschool age, and school age), you will read in more detail about the specific milestones for physical development associated with each age.

Universals in Physical Development

Although there are always exceptions to every rule when it comes to human development, most of us are born without teeth, and then throughout our childhood we grow and lose one set before our adult teeth come in. Teeth are not the only universal physical development, but they might be the weirdest! Have you ever wondered where those teeth come from, and why we lose our baby teeth?

As it turns out, we are born with all of our teeth; they are simply embedded in our skull until it is time for them to emerge! Most babies are born without any teeth (although neonatal and natal teeth are a thing!). The most common explanation for this is simply that in general human babies are born very early compared to every other mammal species; they are simply too young to have their teeth erupt yet. Human infants are born at a

point at which they are most likely to survive, but are not yet so large that they will get stuck in the birth canal. To make that happen, the head can only be so large, and that includes the bones of the jaw.



In utero, the teeth themselves have formed, along with the bones of the skull. Check out the exceptionally creepy picture to the right – that is what a child's skull looks like under an x-ray! In this picture, the first set of teeth have already erupted, but the "adult teeth" are still embedded in the upper and lower jaw bones.

After birth, it takes approximately 6 months before the first set of "baby teeth" will start to come through the gums. In the meantime, most infants are able to "chew" soft foods without issue. Teeth are not essential for eating but do increase the range of foods that an infant can manage. Children keep this first set of teeth for somewhere between 5-7 years, depending on their rate of growth, and their overall health. These teeth are smaller simply because they must fit within the small jawbone of the baby. As a child's skeletal structure grows, it creates more space for the teeth and actually widens the opening where new teeth can come in. Teeth start to feel loose when the socket they sit in starts to widen; when it becomes too large, the baby tooth will fall out and the adult tooth can move in.

Remember, although we have discussed this as a universal piece of development, there are going to be exceptions. Some children do not develop teeth, or their teeth are problematic for some reason. Like everything, the environment can affect dental development. Anything that can influence how the skeleton develops can also impact the teeth. Additionally, oral hygiene in toddlers and young children can impact dental and cardiovascular health throughout life.

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Cognitive Development

Cognition is the word psychologists use to describe the varied mental activities of your brain. Cognitive development, therefore, is the development of the processes of memory, intelligence, and attention. Additionally, language is usually described and measured as a cognitive process although it is connected to physical, social, and emotional development in important ways. Here, you will learn a bit about each one, and each chapter will provide more in-depth information.

Memory

In the next chapter on brain development, you will learn more about the physical mechanisms that create memories, but for now, it is enough to know that within your brain are millions of neurons, and many of them are designed especially to store memories.

Memory is essential for navigating the world around us because it allows us to store vital information from past experiences, and things that other people have taught us. We know facts (semantic memory); we have experiences (episodic memory); we know how to do things (procedural memory); and we even remember things that haven't happened yet (prospective memory) such as what you need to buy at the grocery store tomorrow.

You have two kinds of memory: short-term memory and long-term memory. Working memory is an aspect of short –term memory. It is everything you are actively thinking about; long-term memory is everything you know but aren't necessarily thinking about right away. Working memory has a very limited amount of space; as children develop the amount increases but even in adulthood, most people can only remember about seven distinct pieces of information. Our long-term memory, on the other hand, is extensive and we are able to store and recall a seemingly endless amount of information.

So, if our working memory is so amazing, why can't we remember being a baby! After all, that is when we were learning new things all the time, and our brain wasn't cluttered with a lifetime of memories yet! There are a couple of possible answers to that question, but most evidence suggests that those early memories simply get buried as life continues to happen (Sneed, 2014) https://science.howstuffworks.com/life/inside-the-mind/why-not-remember-babies.htm

Intelligence

What does it mean to you when you hear the word intelligence? Perhaps you thought of "school smarts" – being good at particular academic subjects, for example. Or maybe you thought first of "street smarts" – having good common sense, and being able to get along in the "real world." Some people think of Emotional Intelligence, which is the ability to understand your own and other people's feelings.

All of these things are right! Intelligence is both a cognitive and a social construct. This means that while there are very real mental processes that are related to intelligence, what gets valued or measured might differ among cultural groups.

Intelligence is typically measured on a number of scales, that when added together provide a numerical representation of general cognitive ability: the IQ score. Typically, IQ is assessed once children reach school age, Cognitive Development

and so you will read more about IQ testing and alternative ways to understand intelligence in later chapters. For now, let's quickly review the scales that are used for measuring intelligence:

- Working memory: how much information can be retained and recalled;
- Processing speed: how quickly information is used to generate an action or decision
- Visual-spatial processing: how accurately a person can create a 3D representation of a 2D image (typically done with building blocks)
- Language use, both productive and receptive
- Mathematical reasoning

These are the underlying cognitive processes that are assumed to give rise to intelligence, but they are all just approximations of the kind of mental tasks that people do every day as they interact with the world around them (Bee & Boys, 2009; Berk, 2017). Intelligence is more than these processes; it is the behaviors and choices that come from having these processes working efficiently behind the scenes.

In real life, intelligence tends to look more like problem-solving, critical thinking, and creativity. You are probably familiar with the concept of critical thinking because it is a major focus in school in recent years. How often do you hear about creative thinking, though? Creativity is a significant factor in the cognitive ability of young children, and it is only once formal schooling starts that creativity tends to take a backseat to critical thinking.

Creativity allows children to manipulate objects or ideas in ways that are not necessarily their intended use. Sometimes we talk about "thinking outside the box", and perhaps you have done a lateral thinking task. These are other ways to talk about creativity. But most of the time, we see evidence of creativity in the ways that children play: f` or example, using a hairbrush as a microphone, or turning a few household items into a fort.

It is important to note that creativity is more than just calling something by another name. Creativity's products are useful and fill a need or gap. In pretend play, that means standing in for an object that is not available which allows the game to continue. In later life, it means being able to see potential solutions to problems that no one else has seen yet.

Previously in this book, you learned about intelligence, as well as different ways that intelligence has been defined to be more inclusive than just what is taught in school. Gardner's theory of Multiple Intelligences is one example that is used frequently in schools. As you read, think about the ways in which you are intelligent, and what that tells you about how your brain works. Do you learn quickly or prefer lots of repetition? Are things easier for you when you do them yourself or do you like to watch videos of others trying things, so you know how it is done? Are there certain school subjects you are more drawn to or do you think you put more cognitive effort into the things you learn on your own time? There is no one way to be intelligent! One of the best parts of working with young children is that no one has ever told them how to be smart, so they engage with the world in ways that make sense to them, which gives adults such as caregivers and teachers a unique view into their true cognitive processes.

Language

Language is generally considered a part of the cognitive domain of development, as it is closely tied to the ways in which children process information about the world around them and how they share their thoughts with others. Throughout this textbook, you will read more about how language develops at specific life stages, but here let's briefly look at the importance of having spoken and written language in the first place.

Language is one of the first cognitive tasks that an infant's brain tries to tackle, even before the physical structures of the mouth, teeth, and tongue are coordinated enough for babies to talk. Starting shortly after

birth, infants show more interest in language sounds than in other ambient noises, such as barking dogs and the vacuum cleaner. Babies babble endlessly, practicing the language sounds they hear around them. As children grow, their language use becomes increasingly mature until they are able to pronounce words, make long sentences, and use language to get their way!

Language is special in that it is more than a cognitive process. Of course, there are certain areas of the temporal lobe that are specially designed to process and create language, but those areas – like all areas of the brain – need input to fully develop. That means that in order to learn language, we need other people to talk to! Our social and emotional interactions are mediated through language, and we actively teach children to "use your words" to help navigate conflicts and express their feelings.

Language is also an important way for parents, caregivers, and teachers to understand the internal states of children. In infancy, it can be frustrating for parents as they try to decipher the meaning behind an infant's crying; is the baby hungry or tired or wet? As children develop language, this frustration is eased because the children can tell their parents exactly what is wrong and that allows the parent to ease the child's discomfort that much more quickly. For a long time, parents had to wait well into their baby's second year of life to gain access to these inner thoughts, but in recent years there has been a push to teach infants sign language. As it turns out, infants often can understand language long before they can speak it, meaning they can respond to direct requests from parents and caregivers, such as "Do you need a bottle?" Infants can also produce thoughts that express their desires long before they can give them voice; infants can use sign language to answer "Yes, bottle!" enthusiastically, or "No, no more" if they are done. This helps strengthen the parent-child bond because it removes the guessing game and frustration of not being able to communicate.

Of course, as children learn to talk and share their inner thoughts, they also learn how to influence the inner thoughts of others through language.

An Interesting Example of Cognitive Development: Lying

It may seem counterintuitive, but telling a lie is a major developmental step in the domain of cognition! Let's take a quick look at what mental processes are necessary for lying, and why that ability is an indicator of successful development.

To tell a lie requires that the liar is able to hold multiple stories in working memory, as well as consider the knowledge available to each person who will hear the lie. Additionally, the liar has to be able to consider the range of possible outcomes and consequences of the behavior. Let's try to pick this apart with an example.

Sammy has been told to go brush his teeth, but when he gets upstairs he gets distracted by a toy and starts to play with that instead. When his father comes up a few minutes later, he asks Sammy, "Did you brush your teeth?" Before Sammy says "yes!" there are several things that happen in his mind.

First, Sammy has to consider what is actually true (he did not brush his teeth), and whether or not his father has access to that information (no, because he was downstairs and could not see what Sammy was doing the whole time). This means Sammy is actively processing his experience and his father's experience, and drawing a conclusion about what is different.

Second, Sammy has to consider past experiences with this exact situation. Is this the first time he has forgotten to brush his teeth, or the 20th? If it is the first, Dad is not expecting him to have forgotten, but if Sammy always forgets, then he has to consider that Dad is expecting him to have forgotten. So now Sammy is adding relevant episodic memory to his working memory stores.

Third, Sammy has to consider the possibility of either a truthful or a dishonest answer. If he tells the truth, will he get in trouble? If he lies, will Dad know? So now Sammy is working with knowledge of the present from two perspectives, knowledge of the past, and knowledge of the future all at the same time. It requires a ton of cognitive flexibility (Santrock, 2013).

It is worth it to mention here that this cognitive flexibility is by far the hardest and most risky part of learning how to tell a good lie, and the place where most young children (and teens!) go wrong. As our brains develop, one of the executive functions that has to slowly develop is the ability to anticipate all the potential consequences of an action, how likely each is to occur, and what the cost of each might be. Typically, we are not masters of this until our midtwenties, so it's reasonable to expect that Sammy might not be right in his assessment of this situation!

Admittedly, at first, children are not always great at this, which is why parents and caregivers often know when young children are lying. Also, there are very real social and emotional aspects of lying that need to be addressed with young children. But, from a purely cognitive perspective, when children begin to tell lies, it is a significant cognitive milestone.

Social and emotional development are often combined into a single domain, social-emotional development. For this textbook, we will consider the two domains separately, although they are very closely related. However, picking them apart will allow us to have a deeper discussion about each, so that we can look at a few key concepts that have become important in the study of Child Development and Early Childhood Education recently.

Social Development

As we talk about social development, you will be reading mainly about how children develop their social interactions with other people, from infancy through age 8.

Friendship in Early Childhood



When you hear the term “social development”, what do you think of? A lot of people think first of friends – the people who we are social with. Friends and friendship are essential to healthy emotional and physical development in childhood.

In infancy, friendship is about exposure that parents and other caregivers orchestrate. Infants are often curious about other babies, and typically will play with anyone they are put down next to. However, infants lack the social knowledge or language ability to navigate these interactions the way that older child do; infant “friendship” is really more of being in the same place at the same time than it is about an emotional bond.

For example, infants playing together often explore their environment without any coordinated effort. If you have ever watched two babies playing, you may have noticed that their play is very individual and typically focused on an object that one or both of them wish to control. When babies interact, their play is often very exploratory as well. They smile at one another and react positively when they get a smile in return. They may touch each other, and it is common for babies to babble to one another in a conversational pattern. These behaviors all demonstrate the first steps towards understanding social interactions and what the range of possibilities are.

As children mature into toddlerhood, their friendships start to become more about one another although the ways in which children meet and the types of interactions they have are still very different from what you experience as an adult. Once a baby becomes mobile, she is no longer stuck playing with the baby next to her; she can get up and walk away, and find someone else to play with. However, she still is limited to playing with the other children who are in her immediate environment – whether that is home, day care, or a playdate.



As children begin preschool and then K-12 schooling, they are exposed to a much wider range of peers with whom to form friendships. In this exposure to new environments, children learn to manage social interactions and learn about people with different backgrounds, languages, and ideas. Meeting new people who don’t look like them is an important piece of social development for young children. It helps them to understand that not everyone thinks the same things, and that each one of us is an individual. It also plays an important role in helping children to understand which characteristics about themselves are changeable (cutting your hair, for example), and which are not (racial identity).

Theory of Mind

One example of where domains overlap is in the development of Theory of Mind. This ability is based on factors of cognitive development but allows children to have a wider range of social interactions.

Theory of Mind is, in the most simple terms, the ability to understand that what is in your mind is different from what other people have in their mind. It means understanding that your thoughts are private and that unless you share them through some means, such as language, other people do not have access to them. It also means understanding that you can think about your own point of view and another person's point of view simultaneously, and are able to separate what you know / are thinking from what they know / are thinking. It helps children to move from seeing the world as true/false and come to understand that there are shades of gray everywhere.

It might be easiest to understand this concept if we use a scenario:

> Susie's mother gives her a chocolate bar as a snack. Susie eats a few squares, then wraps it back up and puts it in the refrigerator. Then, she goes outside to play.
>
> While she is outside, her mother is making chocolate chip cookies but realizes that she doesn't have enough chocolate chips. She gets the chocolate bar from the refrigerator, and uses all of it in the cookies. When Susie comes back inside from playing, she looks for her chocolate bar. Where does she look?

Because you have a fully developed Theory of Mind, you know that Susie will look in the refrigerator, where she left her chocolate bar before going outside. Since she was gone, there is no way for her to know that her mother took it out and used it all.

When this task is given to very young children, younger than 4, they typically will say that Susie will not look in the refrigerator, because the chocolate isn't there anymore. Prior to the development of Theory of Mind, children treat all knowledge as universal: everyone knows the same thing. However, as they have more experience with social interactions, they will come to understand that is not true. This becomes essential for negotiating social interactions that involve the transmission of information and may require one person to make calculated choices about how much information to share with the other person: for example, knowing when you need to give extra information about context for someone to understand your story, or knowing when it is better not to share something that you shouldn't know, or that might upset someone else!

Going back to our discussion of lying, Theory of Mind can be related to children's ability to tell lies and play tricks on people; the cognitive ability to hold multiple perspectives in mind simultaneously comes from Theory of Mind, and allows behaviors such as hiding things and other jokes that require one person to have more information than another (Crain, 2011).

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Emotional Development

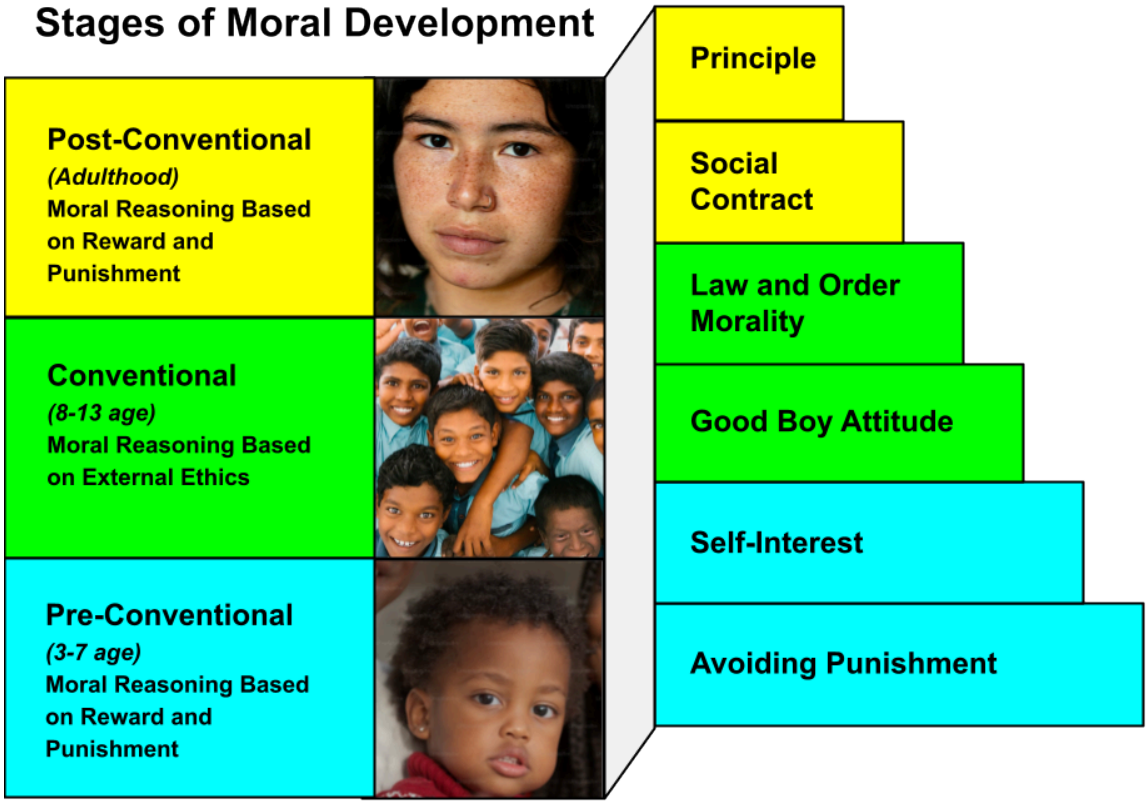
Social interactions help babies and children to gain important information about how their actions influence other people, including the feelings of others. This, in turn, can help children to understand their own feelings and learn how to manage them. Emotional development, however, is not purely a function of nurture. Important structures of the brain related to emotional regulation, attention, and self-regulation are actively developing throughout childhood and into adolescence. This means that emotional development may be a slow process that continues well into school-age.

In early language development, the conversational pattern between infant and caregiver contains not only phonological information, but also non-verbal information such as tone of voice, facial expressions, and body language. These all provide clues about internal emotional states, onto which get mapped specific words that describe those emotions.

There are only a few universal emotions, and they are the ones we see almost immediately in babies: sadness, fear, happiness, disgust, anger, and surprise. Infants are limited in how they can express these emotions, so they mostly cry. However, it does not take long before babies and toddler, develop a wider range of emotional behaviors. Fear may be expressed in tears, by hiding, or in issues with control of the bowel and bladder. Surprise may provoke fear or happiness, depending on the child's temperament and the situation. Sadness and anger sometimes get wrapped up together in a temper tantrum when a toddler doesn't get her way.

As children grow, they become better able to describe and respond to their own emotions and the emotions of others. Even babies and toddlers can display empathy when they realize a peer is sad or afraid. Empathy and emotional intelligence are an important piece of moral development: the process by which children understand right from wrong, and how their actions influence the well-being of others. Kohlberg's theory of moral development is a beautiful example of a stage theory in which children move from having a very limited, internal focus to understanding that emotions and actions can impact everyone.

As you can read in this chart, as individuals grow from infancy to adulthood, their sense of morality also develops. In early childhood, most children's morality is defined by adults around them, and avoiding punishment or gaining rewards (both internal objectives) are the driving force behind moral behavior. Not until later in life do we start to make moral choices based on people other than ourselves.



Self-Regulation

If you have ever been intensely happy or sad, you know that feelings are more than just emotional states: they also exist in our body as sensory experiences, and impact the way we interact with the people around us. In early childhood, emotions can be intense and confusing for infants and babies. They are not able to cognitively process the causes of their feelings, they just know that things are happening, and they cannot control them.

Self-regulation is the ability to identify your emotions, understand what is causing them and how they are impacting your behavior, and taking steps to manage what is happening because of your emotions. In children, this takes several years – often well into adolescence – before they are able to do this consistently. For early childhood educators, helping children to learn words for their feelings and teaching strategies for helping children manage their emotions in healthy ways is important.

Emotional Development



Have you ever seen the movie *Inside Out*? It is a great representation of the "life" of our emotions inside our body! Perhaps you noticed in this movie that the emotions of the main character, who is a school-age girl, are much more dramatic than the emotions of her parents. This is exactly how our emotions operate! In children, feelings are intense and often cause problems without meaning to – just like Joy and the other emotions do in Inside Out. As we grow up, our emotions mature as well, and as adults we are much better at managing how we feel, and what we do to manage those feelings.

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CHAPTER FOUR: BRAIN DEVELOPMENT FROM CONCEPTION TO AGE 8

After completing Chapter Four students will be able to:

- Identify the primary functions of the major areas of the brain
- Identify the primary functions of neurons
- Discuss the normal development of fetal brains
- Identify the six neural processes of development: cell proliferation: cell differentiation, cell migration, synaptogenesis, cell pruning, and myelination
- Discuss the normal trajectory of brain development from birth to age eight
- Discuss the concept of brain plasticity and its role in mediating non-normative events that hinder brain development

The human brain is the most unique thing about each of us. It is home to our memories and our plans; we use it also for essential activities such as breathing and regulating our heartbeat, but we can also use it for making up bad jokes and excuses. Our brains help define who we are as individuals as our biology interacts with our environments.

During the first eight years of life, the brain of a child is doing an enormous amount of work, day and night. In this chapter, we will explore the typical development of the human brain, starting at conception. To understand this development, we will need to delve into the inner workings of the brain, from the smallest parts of the neuron all the way up the four lobes of the cerebral cortex, where so much of our daily experience takes place.

The brain plays an important role in all aspects of early development, and the experiences that happen early in life lay the foundation for how the brain will operate across the lifespan. For that reason, it is essential for anyone who is planning to work with infants, toddlers, and young children to understand the earliest stages and milestones of brain development. Ensuring that children's brains get high quality input right from the start is the best way to ensure a lifetime of brain functionality.

Earlier, we talked about the four domains of development: physical, cognitive, social, and emotional. The brain develops in each of these domains, just as every other part of the child does. Typically, the brain is most closely associated with cognitive development. Cognition, after all, is largely about brain functions such as memory, attention, processing speeds, and intelligence. When we talk about people who are smart, we often refer to them as having a "big brain" or being a "brainiac." As will be discussed through this book, one of the most impressive cognitive feats of the brain is the development of spoken (and later written) language.

But our brains also develop – and help guide development – in the other three domains as well. One of the primary functions of the somatosensory cortex of the brain is to accept, integrate, and act upon sensory information in the form of physical sensation. This narrow strip of the cerebral cortex is essential in nearly everything we do each day, helping us to know when we are touching objects, which in turn informs the systems that maintain our balance and orientation in space. These parts of the brain are necessary for learning to stand, walk, run, jump, and maybe even surf! Without the brain's constant integration of important sensory information, our physical development would be significantly delayed (Jensen, 2019).

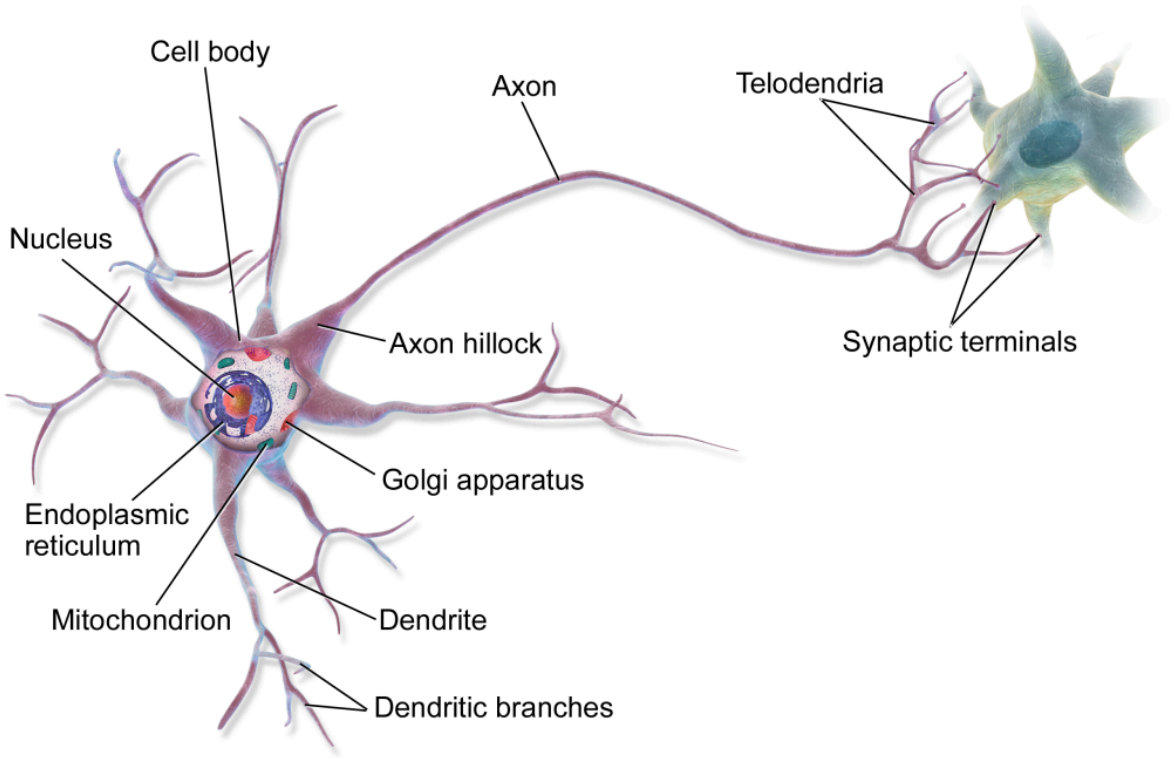
Biology of the Brain

In order to understand what a child's brain can do, it is important to first understand how the brain is built. Throughout gestation and into the first months of life, the brain of the infant is growing. Perhaps you have heard that the human brain is not fully developed until age 25? This is true, but the majority of the cellular development takes place in the first three years of life so that the next 22 years can be spent refining how those cells are used. In this section, we will explore the smallest part of the brain – the cells – and how networks between cells develop and become the brain from a biological perspective.

There are six essential growth functions of your neural cells: cell proliferation, cell differentiation, cell migration, synaptogenesis, cell pruning, and myelination. In this section, you will learn the fundamentals of each of these processes, and throughout this textbook you will learn more about how these processes support children's development in specific ages and stages. But first, let's discuss what makes neural cells special, and how they work together to form the brain.

Brain Cells: Neurons

Like all living things, the brain is made of cells; brain cells are called neurons. Neurons are highly specialized cells that have three main parts: an axon, the cell body, and multiple dendrites. Electrical impulses run through these three structures in a specific pattern, causing chemical reactions which are our thoughts and feelings. These impulses also control our physical actions.



The cell body is just like any other cell in the human body: it has a nucleus that houses DNA and RNA, which is surrounded by cytoplasm that contains organelles. In this picture, do you recognize any of the cellular structures from biology class?

> If it has been a while since you took Biology, or you just want a little more information, check out this Boundless Anatomy and Physiology course from Lumen!

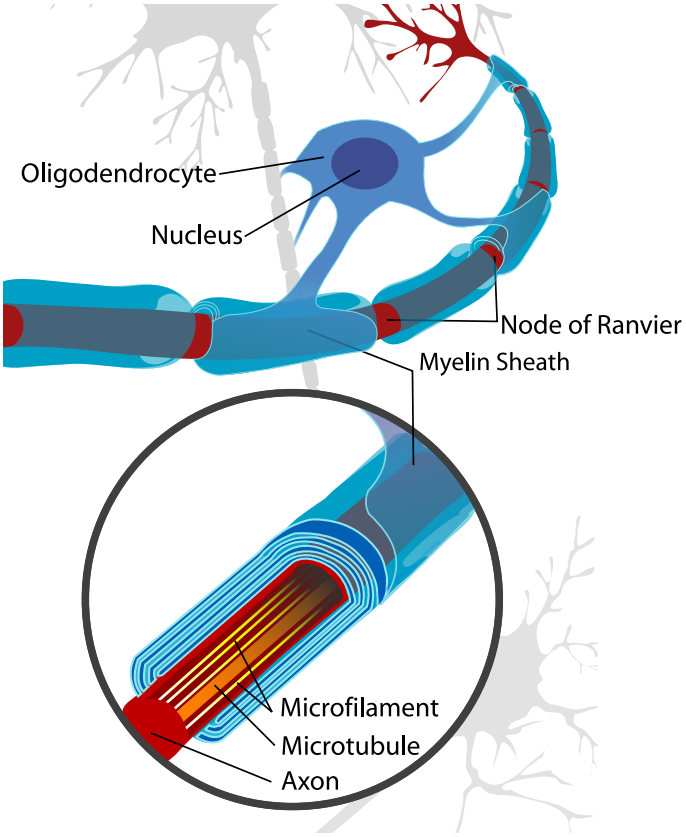
From this image, you may also be noticing several differences between a brain cell and other cells in the body. The most obvious characteristics of neurons that set them apart from other cells are their dendrites and long axons.

In this illustration, the dendrites are the red branch-like structures extending from the main cell body. The dendrites are responsible for "touching" other cells – usually the axons of neighboring cells. You can see this depicted here where red branches are connecting to yellow branches, which come from a neighbor cell. Cells communicate with one another, passing along an electrical current that stimulates a chemical reaction. We perceive our thoughts and actions as instantaneous and smooth, but in reality our brains are constantly turning signals on and off in a wave like pattern!

At the site where the two cells meet, a gap called the synapse, electrical currents pass from one cell to another. This is simply the name for the junction site between an axon and a neighboring dendrite, but a lot of important works takes place at a synapse! Electrical impulses move along an axon and when it reaches the synaptic cleft, it needs to "jump" from one neuron to another. The electrical current is moved across through a chemical reaction that produces a neurotransmitter – literally a chemical that transmits impulses between neurons. This electrical impulse travels from the dendrite, through the cell body, and down the axon to the next neurons. This is what we refer to as brain cells "firing."

Axons can be long relative to the size of an individual cell, allowing them to reach dendrites on neurons all around them. This can also make them fragile, so they need special protection (Konkel, 2018).

Imagine wires in your own home, constantly moving electricity around to where it needs to be. There are places where two wires meet and electricity is transmitted from one to the next, just like between two neurons. Also, like the wires in your house, the physical structure that contains the electricity needs to be insulated to keep the electrical current inside the system and moving to where it needs to go. Axons are insulated by means of a myelin sheath, which is a thin layer of lipids (fatty substance) that protects the axon and helps insulate the electrical impulse as it moves. Without a healthy myelin sheath, it is possible for impulses to be slowed down or even lost altogether.



Electrical currents run the length of the axon with the help of the myelin sheath (Jensen, 2019). This image shows two neurons: the one on the left does not have a myelin sheath, while the one on the right does. Axons without myelin can still conduct signals, but the impulses move much more slowly. Follow this link to see an animated version of these two neurons conducting an impulse.

Did you notice how much more slowly the impulse on the left was moving?

Imagine you and your friend are walking down the sidewalk; each square of pavement is a myelin node. If one of you walks while the other one jumps from square to square, who will get to the end of the block first? The person who is jumping! This is how myelin nodes are able to move electrical impulses so much more quickly.

They allow the current to "jump" along the axon, rather than moving in a slow, continuous wave.

Neural Networks

In the brain, single cells do have independent functions, but most neurons work in small clusters to accomplish a task or in larger clusters to control major functions of the body. For example, you have small but specialized areas of the brain that accept sensory information for each of the different parts of your body (see "temporal lobe" below) as well as an entire lobe that is devoted to visual information (see "occipital lobe" below). The size of an area and its density of neurons is related to how much work it needs to do. Generally speaking, we actively process and respond to significantly more visual information every day than we do to touch sensations.

Neural cells gather together to form brain structures automatically, following a genetic blueprint that is almost universal. This is called "experience independent" development (Berninger & Richards, 2002) because it

doesn't require any sort of environmental input or experience. However, large portions of the brain grow only through experience, either "expected" or "dependent."

Expected experiences are those that the brain anticipates encountering – such as seeing the world for the first time- so it lays a foundation of neurons and then development continues based on what actually happens.

in the child's life. "Experience dependent" neural networks are those which only develop if and when a child has an experience that leads to their creation.

For example, each person will develop a unique set of neural networks for their pets, their family members, their favorite ice cream sundae, and so on. While many of us might have similar networks, they will never be identical because not only do those networks consist of the memory of the specific thing (dog, mom, ice cream) they also consist of all of the emotions, language, and episodic memories that go with it.

> Episodic memories are memories of things that have happened to us; they are narrative in nature (they are a story) and often are tied to strong visual, olfactory, and sensory memories.

As brain cells develop in utero, they become specialized for certain areas of the brain and follow genetically laid plans to move to the right areas and connect to other cells. You will read more about this later in this chapter, where we specifically talk about brain development in utero, but first it is important to understand what the areas of the brain actually are!

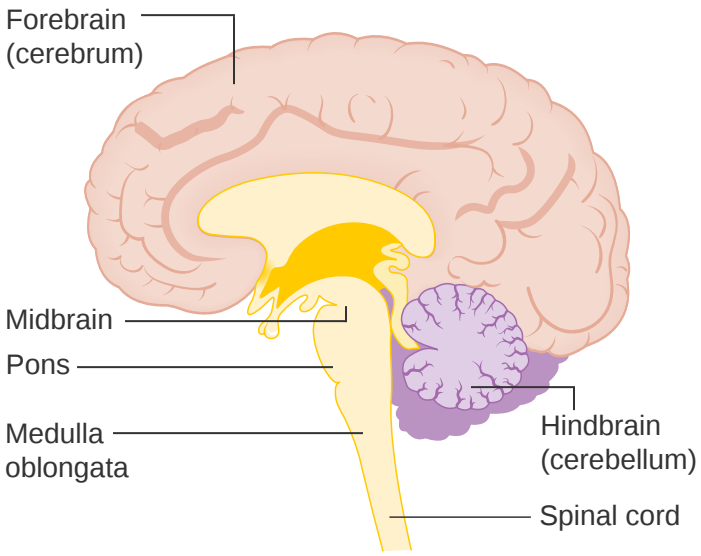
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The Main Structures of the Brain

Although we think of the brain as a single organ that floats in our skull all day, in reality the brain is made up of several distinct structures that have specialized jobs and that develop somewhat independently. As brain cells proliferate, they also become specialized for their future jobs as the place for making decisions in the brain. This is the process of cell differentiation. As cells become differentiated, they also must be located in the correct area: this is the process of cell migration. Once cells are in their specific area they become embedded in the physical structure as well as the functional structure of those areas (Berninger & Richards, 2002).

The image below highlights the primary structures of the brain which are needed for full functioning: the spinal cord, the medulla oblongata, the cerebellum, the midbrain, and the cerebrum.



Spinal Cord

The spinal cord connects the brain to the rest of the body.

Medulla Oblongata

This part of the brain is primarily responsible for life functions, including breathing, digestion, heart and blood vessel functioning, and swallowing. The medulla oblongata controls most of the involuntary actions that keep us alive, and damage to this part of the brain can be catastrophic.

From its position at the top of the brainstem, the medulla oblongata helps connect the automatic portion of the central nervous system to the parts of the brain that process sensory, emotional, and memory input (Berninger & Richards, 2002).

Cerebellum

The cerebellum, sometimes called the “little brain”, may be one of the smaller parts of the brain, but it contains the most neurons and plays an important role in how we interact with the world! It is a dense, butterfly-shaped organ at the base of the brain. If you place your hand on the back of your head and feel the area where your skull curves into your cervical spine, you are running your hand over your cerebellum.

While the medulla oblongata controls involuntary functions, the cerebellum coordinates voluntary functions throughout your body, particularly motor functions. It takes in sensory information from the spinal cord and uses that to manage gross and fine motor control. Your cerebellum helps to keep you standing upright and helps you coordinate your motor skills in space and time. It is essential for walking and talking, and its health plays a significant role in how well children develop coordination as they grow (Berninger & Richards, 2002; Santrock, 2013).

Normally, a cerebellum is considered essential to living a normal life; people who damage their cerebellum often experience dramatic declines in their coordination, balance, and ability to time their movements appropriately. It can be like losing control over all of your voluntary motor functions and always feeling uncoordinated. However, there have been cases reported of people who live completely normal lives without a cerebellum – if they are born that way! (Thomson, 2014)

Pons

Between the upper and lower parts of the brain is the Pons – a small area of brain that is responsible for relaying messages between the cerebellum and the cerebrum. Given what you have already learned about the function of the cerebellum, it should be no surprise that the pons is responsible for relaying information related to the voluntary functions that the cerebellum controls, as well as information about involuntary actions like sleep and respiration.

Midbrain

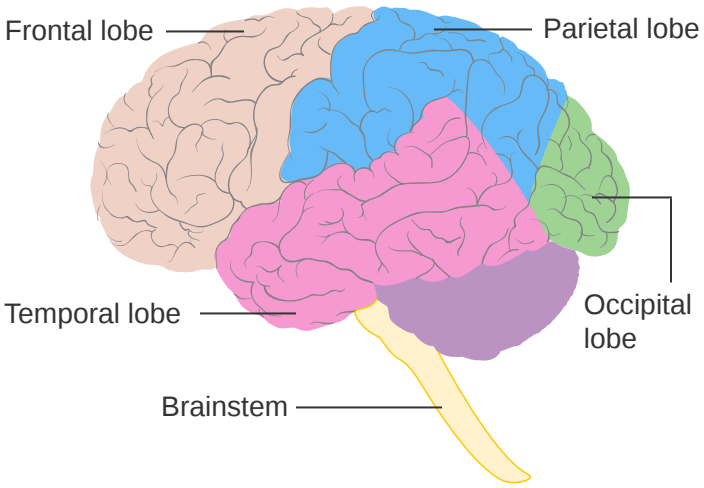
Sitting atop the pons is the midbrain, which is also a small area that plays an important role in relaying information around the brain, and ensuring proper functioning and communication.

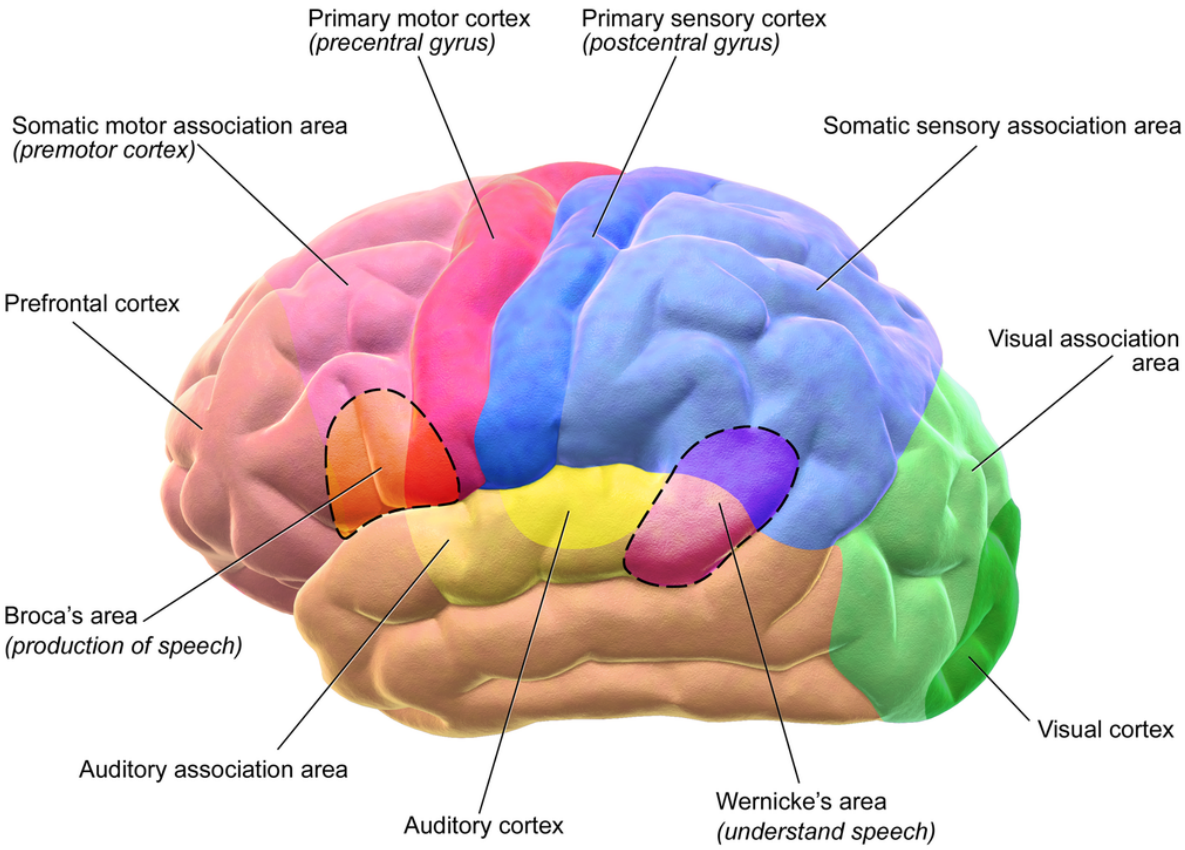
Cerebrum

First, it is important to understand that the cerebrum is made up of two distinct hemispheres that mirror each other. The two hemispheres – right and left – process information from and exert control over opposite sides of the body. Your right hemisphere talks to the left side of your body, and vice versa. The main lobes of the brain are duplicated on each side, such that both the right and left hemisphere have the same areas (vision, sensory information, information processing, and speech) but the sides are complementary, not exact copies, meaning they do the same jobs but with different types of information.

Cerebral Cortex

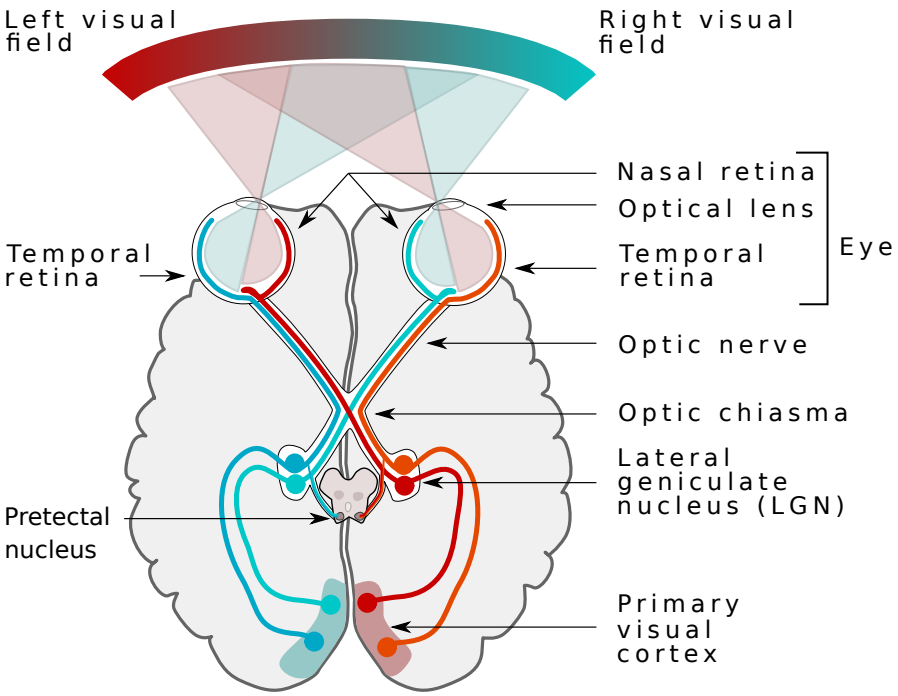
When you think of the brain, you are probably imagining the outermost layer, but this is only a portion of what makes up the human brain! Of course, that portion is responsible for a lot. The cerebral cortex is represented by the wrinkled layer in this picture of the brain that is primarily responsible for how we interact with the world around us.





These two images both show the lobes of the brain, sometimes with added italicized labels. The ones above give you more details, so that you can have a better sense of what areas are associated with each lobe or what functions the areas have. The ones in italics show the functions of some areas.

Let's take a look at what each of the lobes of the brain is responsible for.

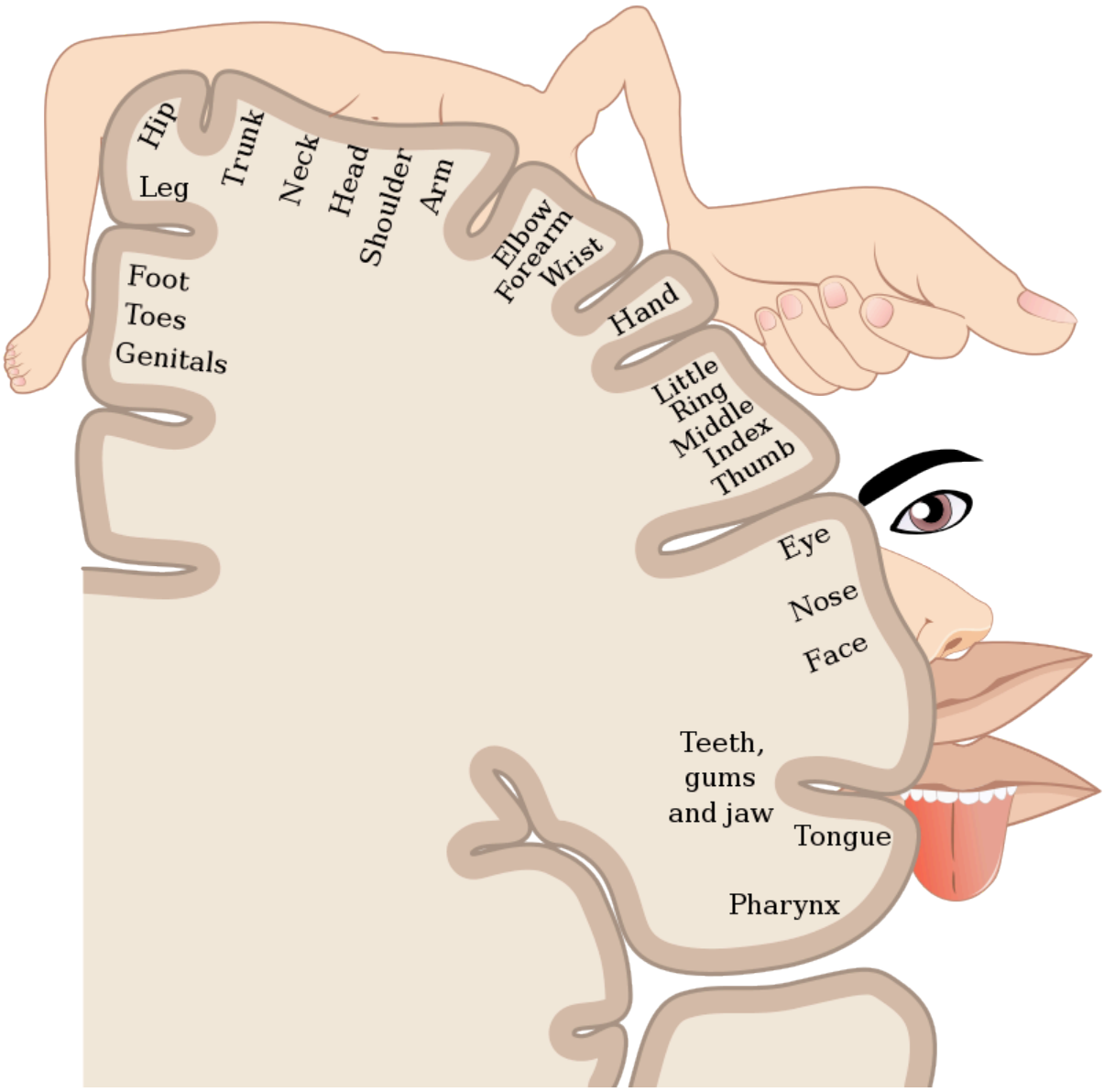


Occipital Lobe

The occipital lobe is primarily responsible for integrating visual information. It may seem strange that the back of your brain is where information from your eyes is processed, but that is how your brain works! Even stranger still is that the left side of your brain is responsible for processing information from your right eye, and vice versa. Each eyeball has its own visual field from which information is gathered. This information is then sent across the midline of the brain, and into the occipital lobe where it is processed. People who have lost the connection between the two hemispheres of their brain experience significant changes to their visual field, and their ability to talk about what they see!

Parietal Lobe

The parietal lobe runs along the top of the brain just below where a headband might sit. It is where the majority of our sensory input is processed, including our senses of touch, taste, and temperature – all things that are essential for babies as they interact with the world around them!



The parietal lobe includes a specific strip known as the somatosensory cortex. Along this strip, the brain has designated areas that integrate sensory information from specific parts of the body. The name that has been given to this "body map" is the homunculus. As you can see in the image above, the somatosensory cortex is not an exact map, and there are some areas of the body that take up more areas of the brain than others. Remember: each hemisphere of the brain processes information from the opposite side of the body. That means that you have a map on either side of your brain, but each map coordinates information from the other half of your body (Berninger & Richards, 2002).

Look carefully at the brain map; what do you notice about the amount of space given to different body parts?

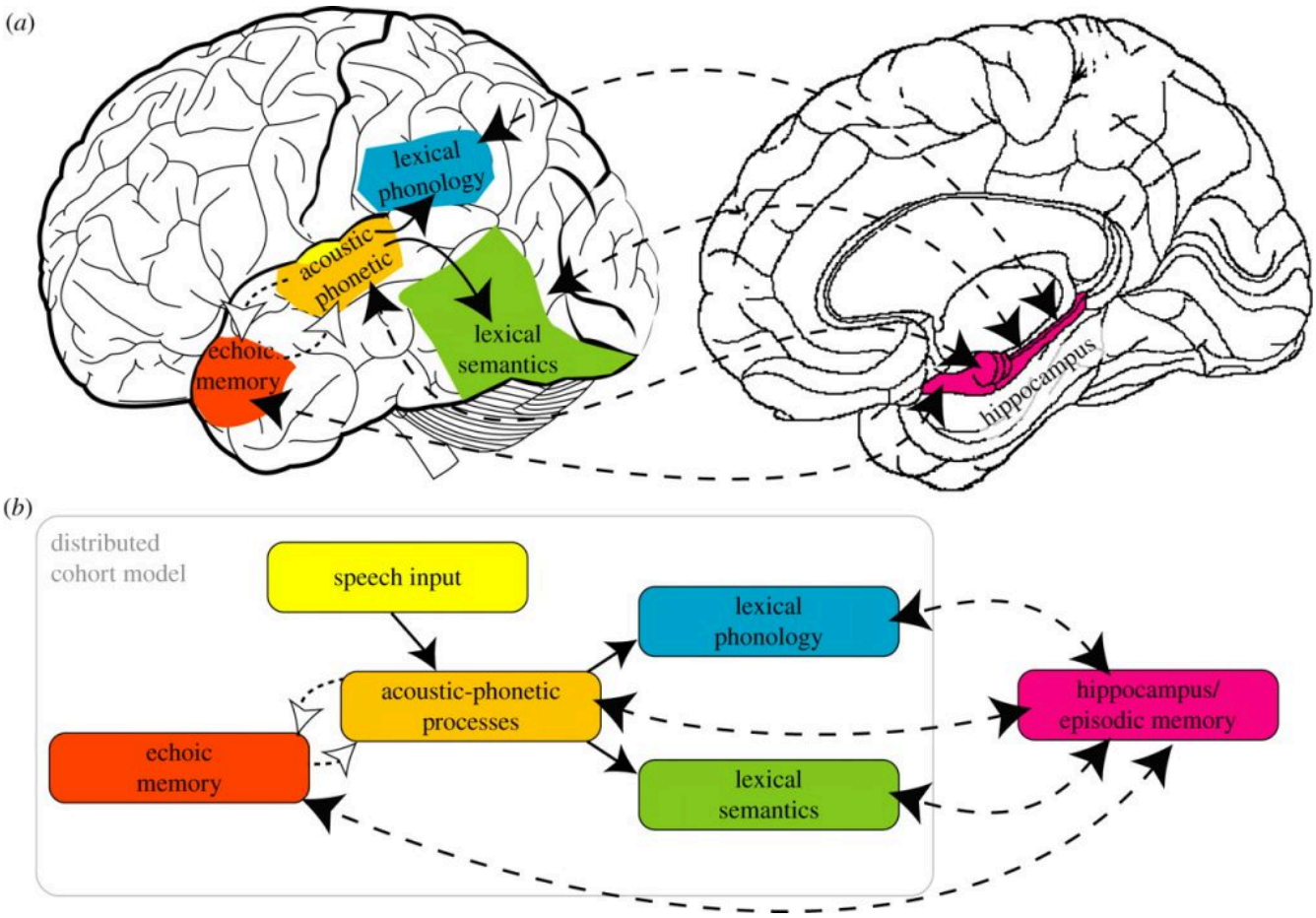
You probably noticed that your hands and face – especially your lips – take up a lot of space on the somatosensory cortex! Although it makes for a strange looking body map, this is actually very important to understand. Our face and our hands are essential for interacting with the world around us safely and accurately. Have you ever said "let me see that" but meant "Let me hold that in my hand" – that is because we "see" with our hands just as much as with our eyes, in terms of sensory information. Touching things tells us about the weight,

texture, and temperature of objects, as well as many other things. Our face is extremely sensitive because our head is where our eyes, ears, and brain all live – and we want to keep those things safe. Other areas of our body, such as our torso, get less neural space simply because this area tends to give us less essential information. It is also worth noticing that parts of the body where we often wear clothes tend to be areas with less sensory nerves. Think about how rarely you notice your clothes on your body compared to noticing a stray hair on your face!

Temporal Lobe

Located along the sides of your head, just above your ears, is your temporal lobe. Unlike the other three lobes of the brain, which obviously connect to one another across the midline of the brain, the temporal lobe appears to be two separate pieces, but is in fact connected through the middle of the brain and crosses the midline deep inside the cerebrum. It does this with the help of specific structures deep inside the brain, including the hippocampus (Berninger & Richards, 2002).

It is not a coincidence that the temporal lobe is situated so close to the ear; it is in this part of the brain that speech and other sounds are processed. The image below shows the pathway of sounds, particularly language, around the temporal lobe. As you can see, once a word is "heard" (the acoustic phonetics) that sound information is split between parts of the temporal lobe that process sound information (lexical phonology) and a part that processes the meaning (lexical semantics) before all of that information makes it way into the hippocampus, where it is attached to memories and emotions, which help us to make sense of what we have heard!



Perhaps the most important aspect of the temporal lobe is the role that it plays in the reception and production of language. As you can see in the brain image above (motor and sensory regions), it is home to Wernicke's and Broca's areas – both regions of the brain that specialize in language. These two regions of the brain are located only in the left hemisphere of the temporal lobe, and work together to ensure speech production and comprehension. Wernicke's area is important in the understanding of speech, while Broca's area is related to speech production. For more information about each of these areas, check out these short videos about Wernicke's Wernike's and Broca's areas respectively (Berninger & Richards, 2002; Berk, 2017).

Frontal Lobe

The frontal lobe is the last portion of the brain to fully develop, and that is largely because it is so dependent on experience. This is the part of your brain that is the "you." Located in the front and center of your brain, this is where you make decisions, solve complex problems, interpret social cues, and monitor your own behavior. Although this part of the brain is present from birth, the vast neural networks that make up the frontal lobe are under construction for years – up to 25!

Your frontal lobe is where most of the functions that translate into behaviors originate. While the three lobes of the brain are busy interpreting information from the body and the world, the frontal lobe allows us to make choices about what we do with that information and then to act based on those choices. This is referred to as executive functioning and the development of this part of the brain is essential for success in many aspects of life, including school. A significant piece of executive functioning is attention. Our attention system allows us to focus on a single thing or to divide our attention if necessary. Paying attention often means being able to block out information that is not important, often sensory information in the form of touch, sight, or sound. This means that before the attention system can fully develop, it is necessary for the sensory-information processing lobes in the brain to develop and learn to separate important from unimportant input. In infants, these systems are not yet developed, and it can take years until the attention system is fully functional. In the meantime, children may be easily distracted by sensory information that an adult would not notice, or would be able to ignore.

As you will read later, not all children develop their attention system in the same way. Attention Deficit Disorder is a common diagnosis in childhood, and it is identified when a child has an underdeveloped attention system making it difficult to direct sustained focus on a single task.

The executive function of the frontal lobe also includes our working memory. While our long-term memories are stored deep in the brain, our short term, or work, memory operates in the frontal lobe. This makes sense, since we want our working memory to be able to quickly and efficiently connect with our attention, problem solving, and social processes. That allows us to make decisions and monitor our behavior in the moment.

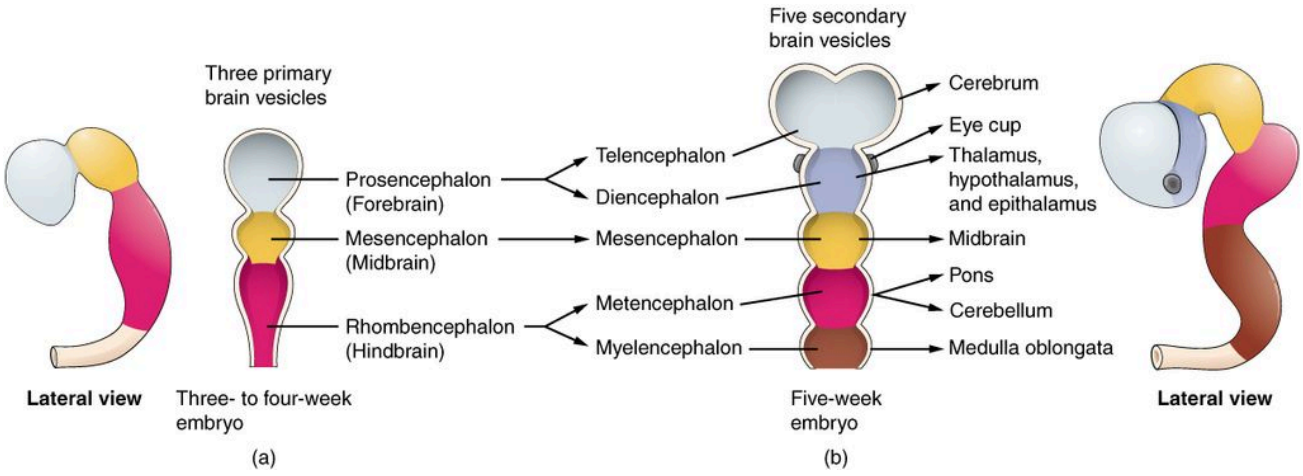
Buried within the cerebral cortex are several areas that are responsible for managing memory and emotion. Without these parts of the brain, our emotional development would not be possible. The hippocampus, thalamus, and hypothalamus work together to help us remember emotional events and to make sense of the feelings that we have throughout the day. A major piece of early development is learning what feelings are, how to express them appropriately, and how to control them when necessary. The brain plays a significant role in all of this (Berninger & Richards, 2002).

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Brain Development During Gestation



Over the course of gestation, the brain grows rapidly and new neural cells grow at a rate of 50,000 to 100,000 per second between the 5th and 20th weeks. (Berninger & Richards, 2002; p79) This is where the six processes of neural development begin. At full-term birth, much of the neural foundation is complete and what comes next is to add on to the existing structure through experience. During the first three years of life, the brain will grow rapidly, adding millions of neuronal connections as it stores information from nearly every sensory, emotional, or cognitive experience.

The brainstem, midbrain, and cerebral cortex will visibly develop during gestation. First, the brain stem develops, and it can be clearly distinguished from the other areas of the brain within the first month of gestation. At only four weeks into gestation, it is already possible to distinguish what will become the primary structures of the brain. This is due to rapid cell proliferation and differentiation. Proliferation is the generation of new neurons and their supporting cells, called glial cells. Differentiation refers to the shape and function of those cells, which become apparent as they grow.

As they grow, neurons move around in the brain so that they are physically located in the areas where they are functionally compatible. This process is called cell migration. Genetic information within the nucleus of each cell determines what its function will be and tells it where to move. Cells move by attaching to tracks created by glial cells (helper cells) that provide a track for the neurons' journey. (Berninger & Richards, 2002; p 80) Typically, cells in the cerebral cortex migrate from the inner layers of the brain outward, building the brain from the inside/out – which should help to explain why the frontal lobe, somatosensory cortex, and even some areas related to language develop later than other areas of the brain.

The brainstem, the bottom-most section in the lateral view, is responsible for moving information between the body – where sensory information originates – and the brain – where it is processed and commands are given to the body. It connects the body to the three primary information processing areas of the brain: the cerebellum, the midbrain, and the cerebrum.

Brain development during gestation is influenced by a number of genetic and environmental factors. The overarching structure of the brain is independent of experience, being guided by genetic information from the beginning. Cell proliferation (the dividing of cells from a single cell into the trillions of cells that make up the human body) begins as soon as a fertilized egg embeds itself in the lining of the uterus, and cells continue to proliferate according to the instructions in each cell's DNA. Of course, it is possible for DNA to give bad directions, and when this happens, the brain does not develop in the expected way. Environmental

influences can damage DNA and cause irregularities in brain development. Perhaps one of the more well-known environmental causes of impaired brain development is from alcohol. Fetal Alcohol Spectrum Disorders are a family of diagnosable conditions that occur as a result of alcohol consumption during pregnancy. Although there are several physiological markers of FASDs, there are also many known cognitive side-effects due to the damage alcohol does to developing brain cells.

Alcohol consumption is not the only way a pregnant woman can influence the brain development of her child. General health and nutrition are important to ensure that the mother's body is able to direct adequate resources to fueling cell proliferation and the building of fetal organs, including the brain. As we mentioned above, the long axons on the end of neurons are covered by a fatty sheath called myelin. The developing brain needs fat to build this sheath, so mothers need to supply this through their own diet.

Myelination of neural axons begins before birth, and at full gestation most of the spinal cord and brainstem are fully myelinated. However, myelination is not complete until adolescence! This means that although you may have the most neurons early in childhood, your brain works the quickest and most efficiently in your late teens and 20s. Throughout infancy, the midbrain and cerebellum are used regularly as infants learn to walk and talk; therefore, these areas receive the most myelination during the first two years of life. Yet the areas of the cerebral cortex, including the structures related to attention, language, and memory take up to ten years to be completely myelinated. Recall when you learned about the Emotional Domain of development, you read that the brain structures that underlie emotional regulation are not fully developed until later in life. This is because those areas are not fully myelinated, and myelination helps to strengthen their connections.

Myelination requires a healthy diet with plenty of healthy fats. You may already know that infants need a full fat diet, but since myelination continues for nearly 18 years, nutrition is important at all stages of life. Now, let's think about how this relates to infants and their brain development. Have you ever seen a baby explore the world? What are some of the strategies that they use?

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Brain Development in Infants and Toddlers

Once infants enter the world, their brain is bombarded with information that fuels neural growth. During the first three years of life, cells proliferate, differentiate, and migrate at an incredible rate! As they arrive in their permanent network, they build connections with neighboring cells, and synaptogenesis occurs at each junction. Synaptogenesis is the building of connections between the end of one axon and the receptor of a neighboring dendrite. It is an essential part of cell growth, and as new cells proliferate and migrate into place, they are quick to find neighbors to connect with.

Well into toddlerhood, neural cell proliferation continues to happen quickly and abundantly. Every experience for an infant or toddler is new, and therefore the brain chooses to use nearly all of them to build new network connections. It cannot be sure what will and what will not turn out to be important. Around age 3, the brain is as dense with neurons and neural connections as it will ever be throughout the lifespan! Creating a strong connection at a synaptic juncture is important to the lifespan of a neuron. Neurons that make weak or no connections cannot transfer impulses efficiently and tend to be removed in a process called pruning.

But this density is hard to sustain, both in terms of keeping connections accessible and in terms of fueling the brain with nutrients and oxygen. Therefore, the brain needs to start disconnecting some of these neurons. This process is called pruning, because it is similar to what a gardener might do with a plant – carefully removing selected neurons in an effort to ensure better health for the most important ones. Pruning of neural networks continues throughout childhood and adolescence with different areas of the brain experiencing greater intensity of pruning at different times (Courage & Howe, 2002).

In upcoming chapters, you will read more about the experiences that infants and toddlers have which help to support their brain development. As you learn about those important stages of childhood, keep in mind what is happening behind the scenes in each child's brain!

Brain Development in Preschool and School-Age Children

As was mentioned previously, the brain processes which begin before birth continue well into childhood, and some go until adolescence as well. Much of the brain's rapid growth can be attributed to the experiences that children are having each day as they explore the world around them, interact with parents and caregivers, and grow physically. These early experiences are often informal in nature. This all changes when children enter more formal educational settings such as preschool and K-12 classes.

Experiences once children begin to attend preschool become more intentionally designed to activate growth by providing children with experiences deemed essential for cognitive, social, and emotional development. For example, teaching children letter sounds and word meanings supports neural growth in their temporal lobe as it stimulates areas related to both receptive and productive language use. In preschool settings, children have opportunities to interact with peers of their own age, perhaps for the first time if they have been at home with a parent or caregiver since birth. These interactions are essential for triggering the synaptogenesis of neurons in the areas of the brain that help navigate social spaces, such as playing with friends. And as you just read, during this time myelination of the brain areas associated with better emotional control is taking place.

Not all preschool age children attend a formal preschool class, but many do. For the ones who do not, brain development is still occuring at a furious rate, as children have other experiences with parents, caregivers, and peers in other settings. Even children who remain at home until Kindergarten have plenty of opportunities that fuel their neural growth – provided the adults in their life create such opportunities. As you will learn in upcoming chapters, many cognitive functions have critical periods for their development – times when the right experiences must occur in order for a function to develop. Language is one example of this; children who are not exposed to spoken or sign language in the first years of life will always struggle to learn the sounds and grammar of their language. Vision also has a critical period, and children with vision issues such as a "lazy eye" or non-binocular vision (meaning the two eyes don't coordinate what they see across the midline of the brain) can only benefit from interventions up until about age 4. (Berninger & Richards, 2002; p 88)

By school age, most children have had enough experiences to at least have fully functional brains and a healthy amount of connected neural networks. Children enter Kindergarten with a wide range of cognitive, social, and emotional abilities, but typically the physical structure of the brain is nearly identical to an adult's brain. In school, children will learn to use their neural networks in the act of learning.

As brain research continues to evolve, so does what and how much educators know about children's brains. A great deal of "best practice" in early and elementary education is based on what we know about how the brain works and how to teach to that. For example, in this book you will learn more about multiple intelligences and learning styles, both based on brain research that recognizes that the four areas of the cerebral cortex take in different types of information (visual, sensory, auditory, and social-emotional). The best practice for educators that are associated with MI and learning styles is based on the idea that designing curriculum that matches how the brain already wants to process information is much more effective than trying to make children's brains learn in less efficient ways.

CHAPTER FIVE: PRENATAL DEVELOPMENT AND BIRTH

After completing Chapter Five students will be able to:

- Discuss the evolutionary perspective on development
- Describe how genes impact human development
- Describe important reproductive challenges and choices
- Characterize how heredity and environment interact to produce individual changes in development
- Describe the three periods of prenatal development
- Describe potential hazards during prenatal development
- Discuss the stages, transitions and decisions involved in birth
- Characterize the development of low-birth-weight infants
- Describe three measures of neonatal health and responsiveness
- Explain the physical and psychological aspects of the postpartum period

The Role of Genetics



Jim Springer and Jim Lewis were identical twins separated at 4 weeks of age.

CBS NEWS: Twin brothers separated at birth reveal striking genetic similarities

When they were reunited at the age of 39, they discovered that they possessed striking similarities. Both worked as deputy sheriffs, suffered from tension headaches, vacationed in Florida, were prone to nail biting, smoked Salem cigarettes, drove Chevrolets, had dogs named Toy and married and divorced women named Betty. One twin named his son James Allan, and the other named his son James Alan. Both preferred math over spelling and enjoyed carpentry and mechanical drawing. The study of the "Jim twins" brings up the debate of nature vs. nurture and which has a greater impact on a child's Image: Ripley's Believe It or Not! development-their environment or their genetics.

Jim Springer and Jim Lewis were part of a landmark study, The Minnesota Twin Family Study, conducted from 1979 to 1999, which followed identical and fraternal twins who were separated at an early age. Researchers at the University of Minnesota, led by Thomas Bouchard, launched the landmark study. Over the course of 20 years, they studied 137 pairs of twins: 81 pairs of identical twins (twins who developed from one egg that split in two), and 56 pairs of fraternal twins (twins who developed from two eggs fertilized by two different sperm). The study set out to determine the impact of nature (genes) vs. nurture (environment) on a child's development.

This topic has also come up in a 2018 film entitled "Three Identical Strangers." The film follows triplets separated at birth and grapples with the question of whether nature or nurture had a greater impact on their long-term development. In this case, the triplets born in 1961 were studied extensively, not knowing that they had each other until adulthood. The case is tragic in many ways. Many siblings separated by the Louise Wise Adoption Services have since found each other. The intricacies of the research that was done remains in closed files (Wardle et al; 2018).

When genetically identical twins separated as infants show such striking similarities, can we conclude that their genes caused these similarities? The Minnesota study of identical twins points to both the importance of the genetic basis of human development and the need for further research on genetic and environmental factors (Bouchard, Lykken et. al. 1990). Certainly, genes play a crucial role in the way a child develops. In this chapter, we will discuss the impact genes have on a child's development.

Natural selection is the evolutionary process that favors individuals best adapted to survive and reproduce. Evolutionary psychology emphasizes adaptation, reproduction, and "survival of the fittest" in shaping behavior. Just as evolution shapes our physical features, it also influences how we make decisions, how aggressive we are, and our mating patterns. For example, if our ancestors were hunters and gatherers and the men did most of the hunting and the women gathered seeds and plants for food, the men would have to possess certain physical traits to travel long distances and hunt and kill animals. Those born with these traits would be more likely to gather more food, attract stronger mates and reproduce. Evolutionary developmental psychologists believe in the importance of childhood. They believe that an extended "juvenile" period for learning information is crucial. What is learned in childhood prepares children for adulthood.

It is important to understand how conception takes place to better understand genetic and chromosomal abnormalities that might impact a child's development. Reproduction occurs when the female gamete (ovum) is fertilized by the male gamete (sperm). They join to form the first cell of life (the zygote). This cell contains 23 pairs of chromosomes.

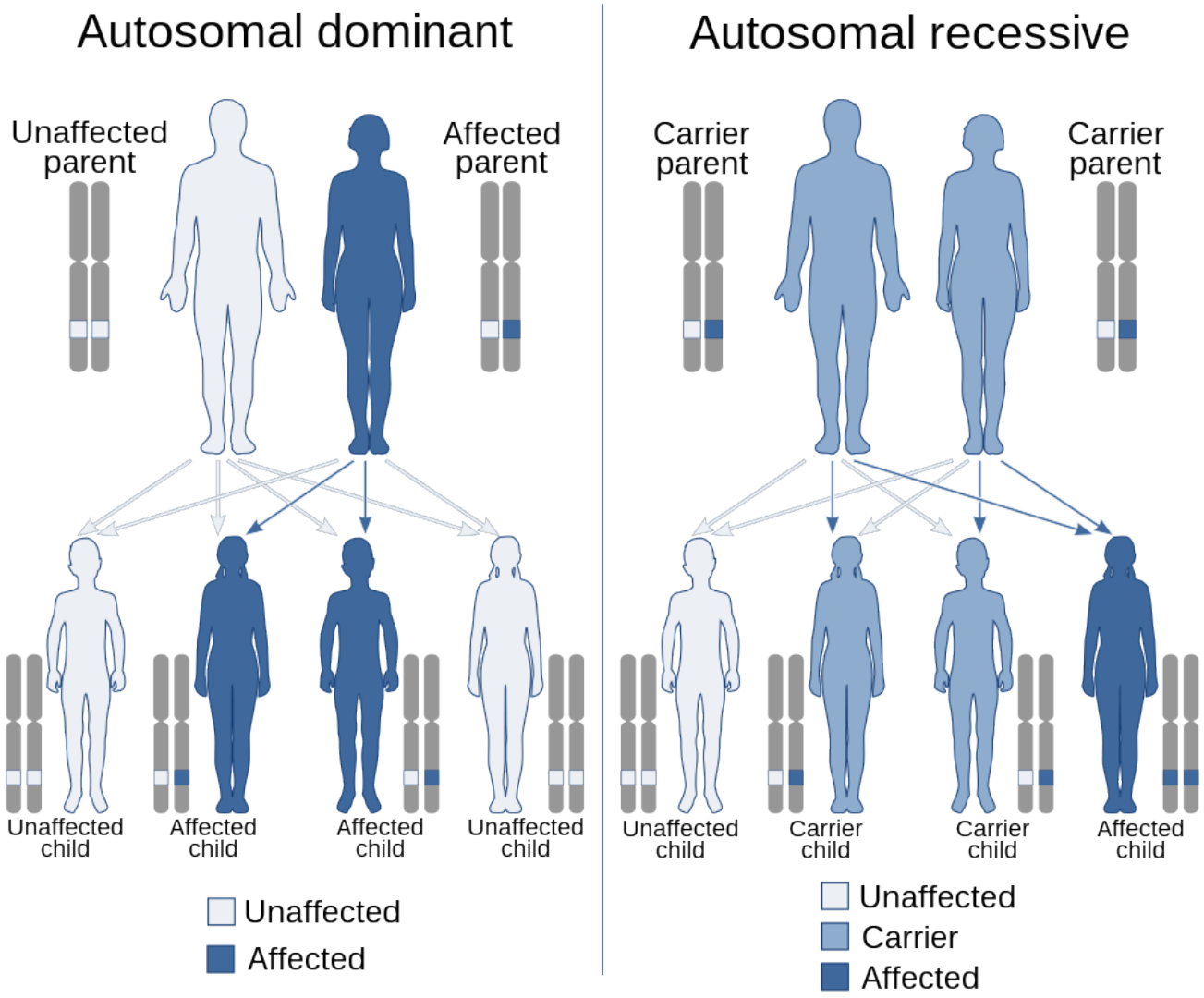
The zygote is the first cell of human life. Life begins as a single cell with a nucleus. Each nucleus has 23 pairs of chromosomes, one member of each pair coming from each parent.

DNA is a complex molecule that contains genetic information. Genes are the units of hereditary information composed of DNA.

Cells divide in two different ways. Mitosis is cellular reproduction in which the cell's nucleus duplicates itself with two new cells being formed. Each new cell contains the same DNA as the parent cell, with the same 23 pairs of chromosomes. Meiosis is a specialized form of cell division that occurs to form eggs and sperm (or gametes) (Santrock, 2013),

Genotype is the actual genetic material. Phenotype is the way an individual's genotype is expressed in measurable or observable characteristics (Berk, 2017).

Males have X and Y chromosomes. Females have two X chromosomes. In some cases, one gene of a pair always exerts its effects; it is dominant, overriding the potential influence of the other gene, called the recessive gene. A recessive gene exerts its influence only if the two genes of a pair are both recessive. If you inherit a recessive gene from both of your parents, you will inherit that recessive gene. If you inherit a recessive gene from just one of your parents, you may never know you carry the gene. Brown hair, farsightedness, and dimples rule over blond hair, nearsightedness, and freckles in the world of dominant-recessive genes. However, most characteristics are not caused by only one gene. Most are determined by the interaction of several genes. This is called polygenic inheritance. This is a picture of the dominant-recessive genes principle.



If a parent passes along a dominant gene for brown hair, their child will be born with brown hair. The only way they will have a blond-haired child is if both parents pass on a recessive gene for blond hair. Page URLs:

- https://www.cbsnews.com/news/twin-brothers-separated-at-birth-reveal-striking-genetic-similarities/
- https://www.businessinsider.com/three-identical-strangers-twin-studies-nature-vs-nurture-2018-7

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- Autosomal Dominant and Recessive © Wikimedia is licensed under a CC BY-SA (Attribution ShareAlike) license

Concerns in Conception

Once you have a basic understanding of what a typical cell includes (23 pairs of chromosomes), it is easier to understand how chromosomal abnormalities occur. A chromosomal abnormality occurs when a gamete does not have a normal set of 23 chromosomes. Down Syndrome is the most common chromosomal abnormality. It occurs when an extra chromosome causes mild to severe cognitive and physical delays. Advanced maternal age appears to have an impact on the likelihood of a woman giving birth to a child with Down Syndrome. If a mother is age 20, this syndrome occurs in 1 in 1,900 births. If a mother is 35, it occurs in 1 out of 300 births. If a mother is age 45, it occurs in 1 out of 30 births (National Institute of Health, 2018). Down Syndrome is interesting when considering the nature vs. nurture debate. Although the condition cannot be reversed, early intervention can lead to much more positive outcomes. Children with Down Syndrome can grow up to be adults who live independent, healthy, productive lives.

Some other common chromosomal conditions that may be encountered when working with young children:

Klinefelter Syndrome occurs when an extra X chromosome causes physical abnormalities. It occurs in one out of six hundred male births. Hormone therapy can be effective.

Fragile X Syndrome is an abnormality in the X chromosome that can cause cognitive delays, learning disabilities and a short attention span. It is more common in males than females.

Turner Syndrome, which occurs in one out of two thousand five hundred live births, develops when a female is missing an X chromosome. It causes cognitive delays and sexual underdevelopment. Hormone therapy in childhood and puberty can be beneficial.

XYY Syndrome occurs when an extra Y chromosome is present. It can cause above average height (Santrock, 2013).

Gene-Linked Abnormalities

Gene-linked abnormalities can be caused by harmful genes. Here are some examples of gene-linked abnormalities:

Phenylketonuria, or PKU occurs when an individual cannot properly metabolize an amino acid; a special diet can result in average intelligence and a normal life span. If left untreated, it causes mental retardation. This is an excellent example of how nurture (the environment) can positively impact nature (the results of genetic inheritance). If this condition is treated, a child goes on to live a perfectly normal, healthy life.

Sickle-cell anemia occurs mainly in the African American population. It is caused by a recessive gene. It is a blood disorder that limits the body's oxygen supply. It can cause heart and kidney failure, as well as joint swelling. There is no cure for sickle cell anemia.

Prenatal Testing for Genetic Abnormalities

There are several tests that can be performed prenatally to give women information about how the fetus is developing. An ultrasound is the most common prenatal test. High frequency sound waves are directed into the pregnant woman's abdomen. The echo from the sounds creates a picture. Ultrasounds can detect many abnormalities in the fetus, including microencephaly, a condition caused by an abnormally small brain. Ultrasounds can also determine the number of fetuses and give clues to the baby's sex. The ultrasound

procedure is non-invasive, meaning it is done outside the body. There is no risk to the mother or the fetus when this test is administered (Berk, 2017).

Between the 10th and 12th weeks of pregnancy, **chorionic villi sampling** may be performed. In this procedure, a sample of the placenta is taken to test for chromosomal or genetic abnormalities. There is a small risk of limb deformity, and this test can cause false positives if a woman does not know the exact date of conception.

Amniocentesis is another test that is administered to many women during pregnancy. During an amniocentesis, a sample of amniotic fluid is taken to test for chromosomal and metabolic disorders. This is an invasive procedure because the medical professional is going into the amniotic sac to take a sample of fluid. Amniocentesis provides a small risk of miscarriage but provides a great deal of accurate information regarding chromosomal and genetic conditions (Berk, 2017; Santrock, 2013).

Maternal blood screening (sometimes called the AFP test) identifies pregnancies that have an elevated risk for birth defects such as spina bifida. **Triple screen** measures three substances in the mother's blood. It is noninvasive because the doctor is not going into the amniotic sac. After an abnormal triple screen, the next step is usually an ultrasound. If an ultrasound does not explain the abnormal triple screen, amniocentesis is typically used.

All these prenatal tests give women important information about their developing fetus (Berk, 2017).

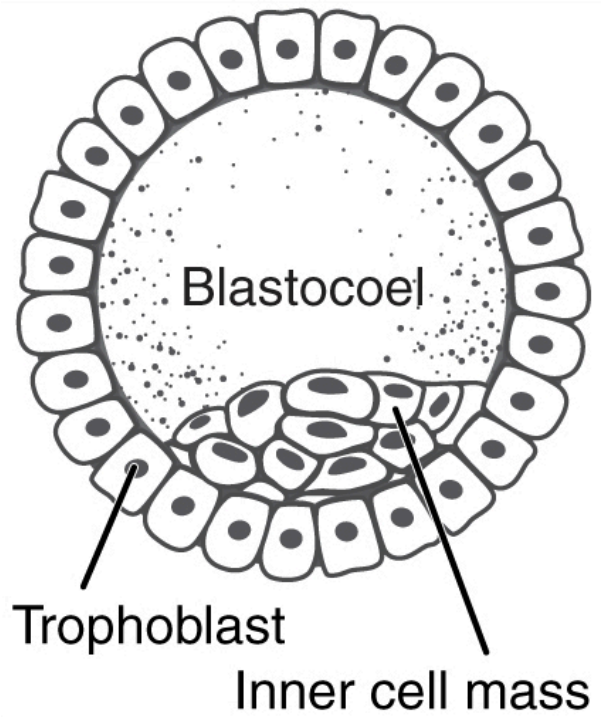
Other Concerns

For some women, conceiving a child can be extremely difficult. **Infertility** is an inability to conceive after 12 months of regular intercourse (Santrock, 2013). As women have chosen to have children later in life, the rates of infertility have risen, due in some part to advanced maternal age. There are several strategies to deal with infertility: in vitro fertilization (IVF), gamete intrafallopian transfer (GITF) and zygote intrafallopian transfer (ZIFT). IVF has a 31% success rate. GITF has a 24.5% success rate and ZIFT has a 29.2% success rate (Zarinara, 2021). People who continue to struggle with infertility often consider adoption.

The Germinal Period

Now that we understand the process of conception, let's explore what happens once the egg is fertilized and the zygote is created.

The Germinal Period is the first two weeks after conception. The **zygote** is created and cells continue to divide. At approximately 10 days after conception, the zygote attaches to the uterine wall. This is called implantation. Even at this early date, the differentiation of cells has begun.

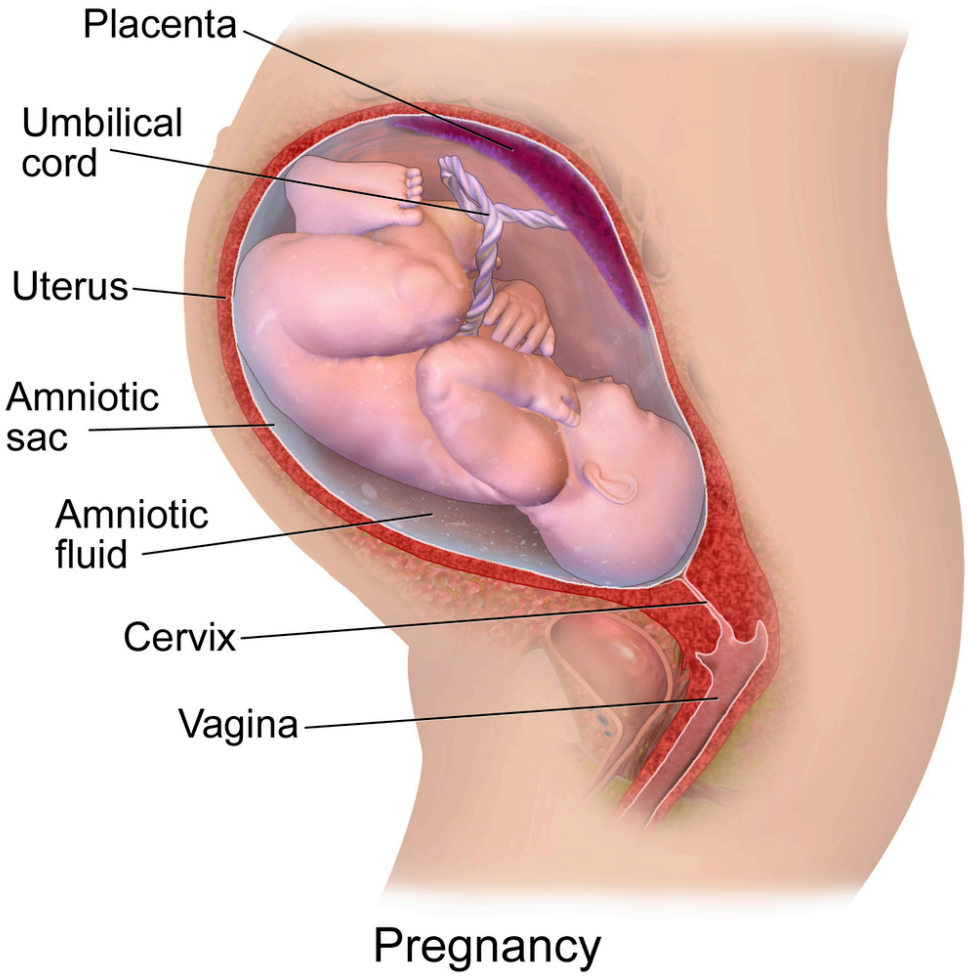


The **blastocyst** (blastocoel) is an inner layer of cells that later develops into the embryo. The **trophoblast** is the outer layer of cells that provides nutrition and support for the embryo.

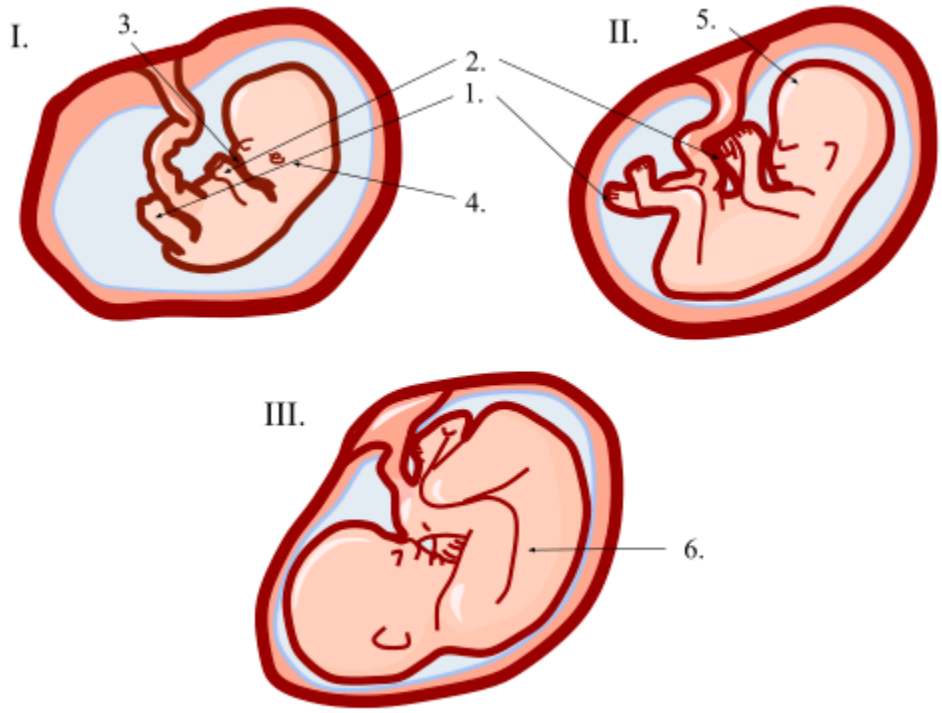
The embryonic period occurs two to eight weeks after conception. **Organogenesis**, or organ formation, begins and the support systems for cells form.

The embryo has three layers of cells. The **endoderm** is the inner layer of cells which becomes the digestive and respiratory systems. The **ectoderm** is the outer layer of cells which forms the nervous system, sensory receptors and skin. The **mesoderm** is the middle layer of cells which forms the circulatory, excretory and reproductive systems as well as bones and muscles.

The **embryo** has a complex life support system. The **placenta** provides nutrition for the embryo. The **umbilical cord** connects the baby to the placenta. The **amnion**, or amniotic sac, is an envelope in which the baby floats. It is temperature controlled, humidity controlled and virtually shock proof (Santrock, 2013).



The fetal period occurs two months after conception and lasts for approximately seven months until the baby is born. The largest prenatal weight gains occur during this period. Fingers, toes, skin, lungs and reflexes all develop as the baby prepares for birth. The three trimesters are different from the three prenatal periods. In fact, the embryonic period, the germinal period and the beginning of the fetal period all occur during the first trimester!



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Pregnancy Concerns

How long does a typical pregnancy last? People generally answer nine months, but that is not exactly true. Fetal life begins with ovum fertilization. Pregnancy is calculated from the first day of the woman's last menstrual period and generally lasts about 40 weeks, which is closer to ten months!

Some early signs and symptoms of pregnancy are missed menstrual period, breast changes, aching in lower abdomen, fatigue, nausea and frequent urination.

During the first trimester women feel extreme fatigue, nausea and emotional changes. During the second trimester they begin to feel less nauseous, and the uterus expands into the abdominal cavity. During the third trimester, women anticipate the end of pregnancy and the uterus expands to the point below the breastbone.

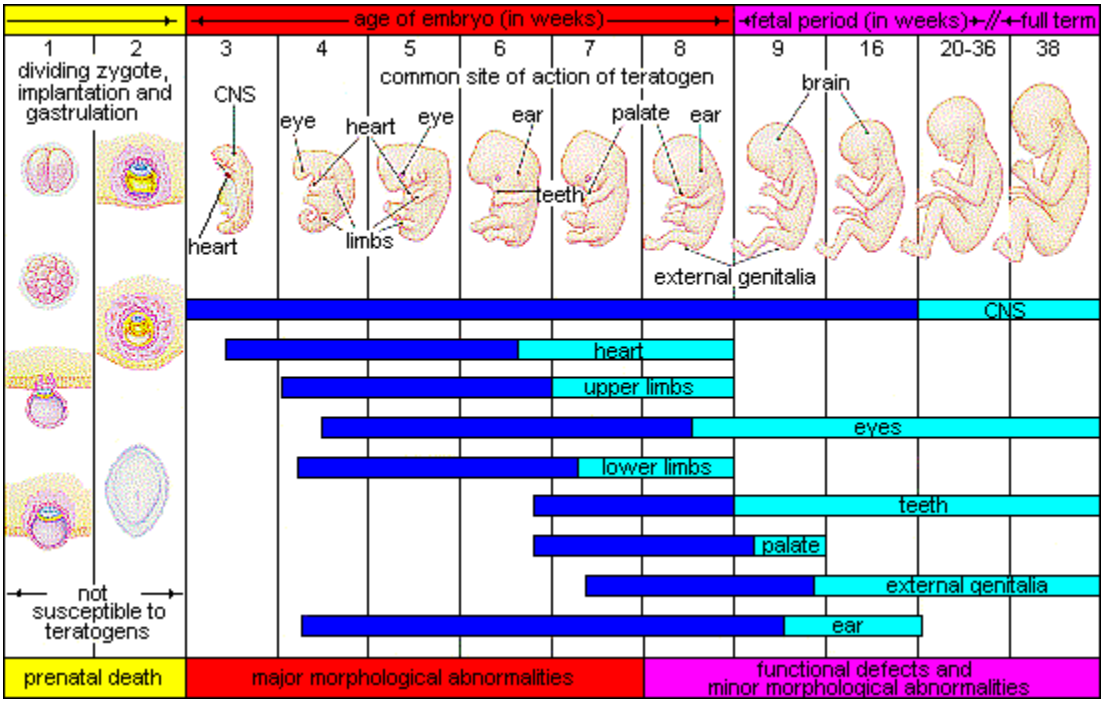
From the first sign of pregnancy a woman needs to be careful about what she eats, drinks, and how she takes care of her body. Many factors can have an impact on the health and well-being of the embryo/fetus.

Risk Factors

Teratogen

A teratogen is anything that causes a birth defect. The severity of the defect is determined by the dose, whether a child is genetically susceptible, and when they were exposed to the teratogen.

Antibiotics, some antidepressants, certain hormones, diet pills, aspirin and too much caffeine can all affect the fetus.



Psychoactive drugs act on the nervous system. They change moods and modify perceptions.

Alcohol can be extremely dangerous if it is abused when a woman is pregnant. Fetal Alcohol Syndrome (FAS) causes cognitive and physical delays which can be extremely severe. FAS refers to a range of disorders caused by drinking alcohol during pregnancy. Fetal alcohol syndrome can cause abnormal facial features, growth deficiency, and problems with the central nervous system. Children with fetal alcohol syndrome may also have learning disabilities, attention span disorders, and other physical disabilities, including vision and hearing problems. The only way to prevent Fetal Alcohol Syndrome is to refrain from drinking during pregnancy.

Smoking during pregnancy can lead to low birth-weight infants who often struggle with lung development.

Cocaine, marijuana, methamphetamine and heroin are all teratogens that pose a great risk to the fetus.

Cocaine: Babies born to women who used cocaine often have smaller heads and a lower IQ. They struggle with cognitive performance, information processing, and attention to tasks.

Marijuana: Babies born to mothers who smoke marijuana have a lower birth weight and underdeveloped lungs.

Methamphetamine: Women who use methamphetamines are more likely to miscarry or give birth to low birth-weight infants. Infants experience irritability, feeding issues and failure to thrive.

Heroin: Babies born to women who used heroin often experience serious withdrawal symptoms and are extremely irritable. Long term they can experience cognitive delays and attention issues.

Environmental Hazards

Environmental hazards also pose a great risk to the fetus. Fathers' exposure to lead and radiation, certain pesticides, petrochemicals, toxic waste, and manufactured chemicals are all cause for concern.

Medical Conditions

There are also many medical conditions that can pose a risk to the fetus. (CDC)

Rubella is very dangerous for a woman and her developing baby. Most Americans are now vaccinated against rubella (MMR vaccine) but if a woman contracts rubella during pregnancy, it can have an extremely negative impact on her infant including:

- Deafness
- Heart Defect
- Cataracts
- Intellectual Disabilities
- Liver and Spleen Damage
- Low Birth-weight
- Skin Rash

Syphilis is a sexually transmitted disease. It is especially important that women share their sexual history with their OB/GYN to help protect their unborn baby. If a woman has syphilis, she can give birth to a baby that has cognitive delays.

Genital Herpes is also a sexually transmitted disease. If a baby is born vaginally, the baby can be born blind or can tragically die during the birth process. If a baby is born by c-section, they will be absolutely fine.

AIDS is a sexually transmitted disease that can be passed from mother to child through blood, breast milk

and the birth canal. If a mother is being treated for AIDS, chooses to deliver by c- section and bottle feeds, the child's likelihood of contracting AIDS decreases dramatically (Santrock, 2013).

Other Concerns

Other parental factors that can affect a fetus are obesity, maternal nutrition, maternal age, paternal age, emotional states and stress and maternal hormone treatments.

On average, a woman gains 25 to 35 pounds during pregnancy. Pregnant women need to drink lots of water and increase protein, iron, vitamin D, calcium, phosphorous and magnesium.

Women should be careful about how much weight they gain. Maternal obesity can increase hypertension, diabetes, respiratory complications and infections.

It is fine to exercise during pregnancy. Women should exercise for shorter intervals and decrease intensity as pregnancy progresses.

Avoiding teratogens, eating healthy food, decreasing stress and participating in a frequent, low impact exercise routine can help ensure a healthy baby and an easier birth process.



One or more interactive elements has been excluded from this version of the text. You can view them online here: https://rotel.pressbooks.pub/whole-child/?p=778#oembed-1

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- Teratogens chart © Martha Lally and Suzanne Valentine-French. Provided by: College of Lake County Foundation is licensed under a CC BY-SA (Attribution ShareAlike) license

Birth

The experience of birth is a life changing event, especially for parents who are experiencing it for the first time.

As a woman prepares for the baby's birth, Braxton Hicks contractions increase, the cervix becomes thinner, and there is a strong desire for the pregnancy to end. Braxton Hicks contractions are a tightening in the abdomen that comes and goes. They are contractions of your uterus in preparation for giving birth. They tone the muscles in your uterus and may also help prepare the cervix for birth. Women may also begin nesting and experience bursts of energy as their due date approaches.

There are three stages of birth. The first lasts about 12 to 24 hours. Contractions begin about 15-20 minutes apart. They occur closer together as birth nears. The cervix dilates to about 4 inches. This allows the baby to move from the uterus to the birth canal.

The second stage lasts approximately 45 minutes to an hour. The baby moves through the cervix and the birth canal. Contractions come almost every minute. The baby is born!

The third stage lasts only minutes. The placenta, umbilical cord, and other membranes are detached and expelled.

Women can use medicine, birthing strategies, and people to help provide support during the birthing process.

Doulas are professionals trained in childbirth who assist a woman before, during, and after her pregnancy.

Mothers experience less pain, anxiety, and depression when provided with this support.

Midwives are medically trained professionals who assist the mother prenatally and throughout the entire birthing process. As midwives have gained popularity, many women choose to deliver in a birthing center with a midwife attending rather than in a sterile hospital room under a doctor's care.

There are three types of medications commonly used during the birthing process. **Analgesics** alleviate pain. **Anesthesia** blocks pain. **Oxytocics** are synthetic hormones used to stimulate contractions and speed up labor.

Natural childbirth tends to reduce a mother's pain by decreasing her fear. **Prepared childbirth** is like natural childbirth, but a special breathing technique is used in the final stage of labor. The **Lamaze** method is the most well-known method. Women are educated to understand what is happening with their bodies and to use breathing/relaxation techniques to help manage the pain.

Nearly one in four U.S. births are **c-sections**. The baby is removed from the uterus through an incision in the abdomen. C-sections are procedures that are performed when the baby is **breech** (feet first), the head is too large, vaginal bleeding has occurred, the baby is in distress, the mother is in distress, the mother has an STD, the mother has had a prior c section, or in the case of multiple births.

In today's world, many fathers are trained to coach the mother during labor and siblings are given information prior to the birth to help address the child's emotions and behaviors in an age-appropriate way. The most common method that places the father in the role of labor coach is the **Bradley Method** (Berk, 2017; Crain, 2011).

After Birth

A **low birth weight** infant weighs less than 5.5 pounds. An extremely low birth weight infant weighs less than 2 pounds. A **preterm** baby is born at least three weeks early. Both preterm and low birth weight infants struggle with lung development. Low-birth weight infants have more health and developmental problems and are more likely to have a learning disability, ADD or ADD and breathing problems. It is important to nurture preterm infants carefully. Massage has led to greater weight gain, improved skills, and better academic performance. Kangaroo **care** is extremely important for preterm infants. This skin-to-skin contact leads to better sleeping, more weight gain, less crying and longer periods of alertness.

The Apgar Scale is widely used to assess health at 1 and 5 minutes after birth. This is usually administered by the nurse and is one way to identify high-risk infants. The Apgar Scale tests skin color, pulse rate, reflexes, activity, and respiratory effort.

The Brazelton Neonatal Behavioral Assessment Scale is performed within 24 to 36 hours after birth. It tests neurological development, reflexes and reactions to people.

The Postpartum Period lasts approximately six weeks. It is the period after childbirth when the mother is adjusting physically and psychologically.

Involution is the time when the uterus returns to pre-pregnancy size. During the postpartum period, women experience emotional and psychological changes including anxiety, depression and coping difficulties. Postpartum depression is characterized by strong feelings of sadness, anxiety or despair in new mothers including depression, changes in appetite, crying spells and an inability to sleep.

After giving birth, a mother has a difficult decision to make–whether to stay at home or go back to work. Societal, career and financial pressures affect mothers' options. Fathers can have difficult adjustments as well. The father may feel the baby always comes first in the mother's mind. However, the postpartum reaction is improved if the father attended childbirth classes and was active in the delivery. It is important that both parents are committed to caring for the newborn. Both parents need to be aware of the young infant's developmental needs, including physical, psychological and emotional needs. This helps them to bond with their child. **Bonding** is a close physical bond between the infant and caregiver. **Rooming** in is one way to create a closer bond. **Rooming in** is the alternative parents take to have the newborn stay in the hospital room with them rather than the nursery to encourage closer bonding (Crain, 2011; Santrock, 2013).

Cross Cultural Childbirth Practices Around the World

The following are cross-cultural childbirth practices around the world. As you read about these practices, please consider the following questions:

- Were you familiar with any of the following birth practices?
- How do they differ from typical birth practices in the United States?
- Which did you find most interesting and why?
- Would you consider giving birth in the United States a natural occurrence or a medical occurrence?

West Africa: Women are expected to give birth without making any sounds; girls who cry out are called cowards and are expected to have longer labor.

Latin American peasants: Massaging to direct the baby down and using long pieces of cloth bound across the upper abdomen are used in the belief that babies might otherwise travel upward instead of descending into the vagina.

East Africa: Women experiencing long labor have their vaginas packed with cow dung to encourage the baby to want to be born (i.e., the baby will believe it is being born into a wealthy family).

Cuna Indians of Panama: The shaman sings the baby out of the woman's body.

Zuñi Indians: Birth takes place on a hot sand bed 20 inches across and 5 inches high covered by a sheepskin. The sand bed is symbolic of Mother Earth.

The Zia of New Mexico: The father dips eagle feathers in ashes and throws the ashes in the four directions. Then he draws the ashy feather down the pregnant woman's sides and center of the body while praying. The father's sister places an ear of corn near the pregnant woman's head and blows on it during the next contraction to aid the father's prayer.

India: A budded flower is placed near the pregnant woman, and her cervix is encouraged to dilate as the flower's petals open.

Manus of New Guinea: The parents confess any hidden anger toward each other so that the childbirth process can go ahead normally. A hot coconut soup is used to comfort the mother.

Dominican Republic: Parents put a small bracelet of beads on the child's ankle or wrist to ward off evil and to bring prosperity.

Puerto Rico: Puerto Ricans give their new babies a mano negra de azabache, like the tradition in Israel. It looks like a red-knotted bracelet to wear and ward off evil spirits.

(Gross-Loh, 2017; Montgomery, 2013).

CHAPTER SIX: INFANCY

After completing Chapter Six students will be able to:

- Discuss physical development and growth in infancy
- Outline the course of sensory and perceptual development
- Summarize Piaget's theory of infant development
- Describe how infants learn and remember
- Discuss the assessment of intelligence in infancy
- Characterize early environmental influences on cognitive development
- Describe the nature of language and how it develops in infancy
- Discuss emotional and personality development in infancy
- Describe how attachment develops in infancy
- Explain how social contexts influence the infant's social and emotional development

Children learn through play. They experience their world in a hands-on way. Infants are intrinsically motivated to explore their world and these multisensory experiences are the foundation of development in all domains: physical, cognitive, social and emotional.

"Play gives children a chance to practice what they are learning." Fred Rogers

Infants are curious and want to explore the world around them and connect with the people in it. They are "active participants in their own development, reflecting the intrinsic human drive to explore and master one's environment" (National Research Council and Institute of Medicine 2000, 1). In this chapter we will discuss the physical, cognitive, social, and emotional growth of infants.



One or more interactive elements has been excluded from this version of the text. You can view them online here: https://rotel.pressbooks.pub/whole-child/?p=784#oembed-1

Physical Development in Infancy



Healthy infants come in a range of sizes, and there is a wide range of "normal development". That said, infant growth tends to follow a predictable path. During infancy, children experience the largest percentage of growth in their entire life. Here are some general guidelines for growth in the first year of infancy:

- From birth to age 6 months, a baby typically grows 1/2 to 1 inch (about 1.5 to 2.5 centimeters) a month and gains 5 to 7 ounces (about 140 to 200 grams) a week. Most babies double their birth weight by 5 months old.
- From ages 6 to 12 months, a baby typically grows 3/8 inch (about 1 centimeter) a month and gains 3 to 5 ounces (about 85 to 140 grams) a week. Most babies triple their birth weight by their first birthday.

Imagine what that growth pattern would look like as an adult! An average sized woman (150 pounds) would be 450 pounds in twelve months! It is important to realize that as infants grow physically at an exponential rate, they also make great strides in their cognitive, social and emotional development.

Keep in mind that many healthy babies go through brief periods when they stop gaining weight or even lose a little weight. A doctor is only likely to be concerned if a baby doesn't gain weight from one well-baby exam to the next. A baby's position on the curve in a growth chart isn't as important as the trend of the curve overall.

The average North American newborn is 20 inches tall and weighs 7½ pounds. The average 2-year-old weighs 26 to 32 pounds and is 32 to 35 inches tall, almost half of their adult height. Growth slows considerably in the second year.

Children experience two growth patterns during infancy. The **cephalocaudal** pattern of growth is growth from the head down. Children often appear "top heavy" with their heads proportionally larger than their bodies. The **proximodistal** pattern of growth starts at the center of the body and moves toward extremities. Infants have control of the trunk of their body, then their arms, then their hands and fingers (Santrock, 2013).

The brain develops extensively in utero and during infancy. Neurons, or nerve cells, are present in the brain at birth. Shaken baby syndrome is a cause for concern. Shaking a baby causes brain swelling and hemorrhaging. Neurons help process information. The myelin sheath is a layer of fat that insulates nerve cells and makes information processing happen more quickly. Experience is like little bursts of electricity to the brain, igniting the neurons. Brain development occurs when certain areas bloom through experience. Experience helps to develop the brain., and an infant's brain is waiting for experiences to determine connections among neurons.

Sleep is extremely important during infancy because it helps to promote brain development. At about four months, the infant has more adult-like sleep patterns. The length of sleep patterns is related to sleeping arrangements and parental activities. Sharing a bed is common in many cultures; however, in the U.S. most infants sleep in a separate crib in a separate room. Co-sleeping is discouraged because of the risk of SIDS.

SIDS, or **Sudden Infant Death Syndrome**, is a condition in which an infant stops breathing, usually during the night, and dies without apparent cause. There are increased risks if a child is of lower birthweight, has sleep apnea, sleeps on their stomach, is exposed to cigarette smoke, has a sibling who died of SIDS, is sleeping in a very warm room, or is using soft bedding or bumpers.

Another crucial factor for healthy development in infants is nutrition. Healthy infants need 50 calories per day per pound of weight. Fat is especially important for growth and brain development. Infants should not be put

on a low-calorie diet. Breast milk is the ideal food for an infant although there are many healthy formula options as well. Breast feeding is recommended because it reduces allergies and infections, lowers obesity risk, is free, promotes cognitive growth, lowers the risk of SIDS, and fosters better visual acuity and bone density. It is often the only safe option in poor countries where unclean water makes mixing formula impossible. There are two serious conditions infants can develop if they are not receiving proper nutrition. They can develop marasmus, a wasting away of body tissues in an infant's first year caused by a severe lack of protein, or kwashiorkor, a deficiency in protein that causes the child's abdomen and feet to become swollen with water. The effects are extremely detrimental and can even cause death.

One way to help ensure an infant's health is to have them immunized. Immunization begins in infancy and prevents many diseases including measles, mumps, rubella, hepatitis, and chicken pox.

Infants' first actions are reflexes. The rooting reflex is the reaction when an infant's cheek is stroked. The infant turns towards a food source. The sucking reflex is automatic sucking when something is placed in the newborn's mouth. The moro reflex is a startle response that causes rapid closing of arms and legs. The grasping reflex occurs when something touches an infant's palm and they automatically hold onto it.



Infants develop **fine motor skills** and gross motor skills in infancy. Fine motor skills are small muscle activities, such as coordinating the thumb and forefinger and reaching for and grasping objects. **Gross motor skills** are large muscle activities, such as pulling toys, climbing stairs, walking and running.

Lorem Ipsum

Infant Gross Motor Skills

Months	Milestones
0 – 3 Months	• Raises head and chest when on stomach • Stretches and kicks on back • Opens and shuts hands • Brings hand to mouth
3 – 6 Months	• Rolls both ways • Plays with feet and brings feet to mouth when on back • Sits with support • Reaches with either hand • Transfers object from hand to hand • Supports whole weight on legs • Begins to pivot to left and right while on belly
6 – 9 Months	• Sits and plays with toys • Assumes hands-and-knees position • Gets from sitting to crawling position • Crawls forward on belly
9 – 12	• Gets to sitting position without help • Pulls self up to stand • Take steps holding on to furniture • May stand without support • May take some steps without support

Infant Fine Motor Skills

Months	Milestones
0 – 4 Months	• Turn her head toward sounds and voices • Stare at bright objects and follow them with his eyes • Move her arms together and apart • Bring his hands to his mouth and possibly suck on his own hands or fingers • By 4 months, lift his head and shoulders off the floor when laying on his tummy
4 – 8 Months	• Grab onto objects within her reach • Roll over to explore and get objects • Prop himself up on his arms when laying on his tummy • Sits independently for brief periods • Pass objects from one hand to the other hand
8 – 12 Months	• Reach, grab, and put objects in her mouth • Pinch small objects (e.g., Cheerios) with thumb and pointer finger • Move objects from one hand to the other • Drop and pick up toys • Bang two objects together • Let go of objects on purpose • Put things into containers (with large openings) and take them out again • Bite and chew toys • Hold a spoon (but not yet feed herself) • Hold his own bottle • Hold out an arm or leg to help with dressing • Wave hello or goodbye

Infants reach motor milestones in diverse cultures based on opportunities. However, the variations are not large. Milestones are reached within normal age ranges. During the sensorimotor stage (birth to 2 years), Piaget believed that infants learned through their five senses and fine and gross motor skills. Piaget argued that children need to have multi-sensory, hands-on experiences to better understand their world. Sensation is the actual feeling someone has. It occurs when information contacts sensory receptors-eyes, ears, tongue, nostrils and skin. Perception is the interpretation of sensation, what someone thinks about what they feel. The more sensory experiences an infant has, the stronger their perceptual development. Since infants cannot talk, it is sometimes difficult to understand how they are perceiving the world. It is known that when infants use all five senses: sight, hearing, taste, touch and smell, they create perceptions about their experience. The more infants interact with their world, the more they learn and grow. Caregivers can help foster a strong learning environment by observing how infants are responding to a particular situation. Habituation occurs when an infant becomes bored with a stimulus. Dishabituation occurs when an infant becomes reinterested after a change in stimulation. It is the job of a caregiver to recognize when an infant requires more stimulation or needs a break from a specific activity.

How young do infants begin to use their five senses? Young infants have depth perception. They perceive clear patterns as well as color. Their eyes are drawn to red as well as a clear black/white pattern. Hearing begins in the womb. Touch and pain are experienced at birth. Smell is present shortly after birth, while taste may exist even before birth. Since all five senses are engaged in early infancy or even before, the importance of sensory experiences cannot be underestimated. Creating an environment that incorporates all five senses and fine and gross motor experiences is crucial to infant development (Gordon & Browne, 2017).

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Cognitive Development in Infancy

"Children have real understanding only of that which they invent themselves, and each time that we try to teach them something too quickly, we keep them from reinventing it themselves." Jean Piaget

The term cognitive development refers to the process of growth and change in thinking, reasoning and understanding. Infants develop cognitively through social interactions and exploring their world. Parents, teachers, friends and caregivers play a vital role in the cognitive development of infants. Infants who are raised by caring, responsive adults develop cognitively at a quicker rate. Infants are "born to learn" (National Research Council and Institute of Medicine 2000, 148) and they actively seek out opportunities in their environment to assimilate new information.

Piaget believed that assimilation and accommodation operate in very young infants. Cognitive changes are qualitative at each stage. **Assimilation** is incorporating new information into existing schemes. **Accommodation** is adjusting schemes to fit new information and experiences. Piaget believed that children actively construct their own cognitive worlds, and providing infants with a safe, stimulating environment to explore will encourage them to develop cognitively.

Object permanence is an important cognitive milestone. It is the understanding that objects and events continue to exist even when they cannot be seen, heard or touched. An example is a child playing with a stuffed bear. When the stuffed bear is hidden, the infant begins to look for it. She realizes the object exists even though it is out of her sight. When the stuffed dog is hidden, the infant begins to look for it. She realizes the object exists even though it is out of her line of sight. Infants understand movement from a very early age, and if you show them a toy that is moving in a line, then goes behind a wall or screen, they will automatically shift their gaze to the other side of the wall to anticipate that object reappearing there!

Factors that Impact Cognitive Development

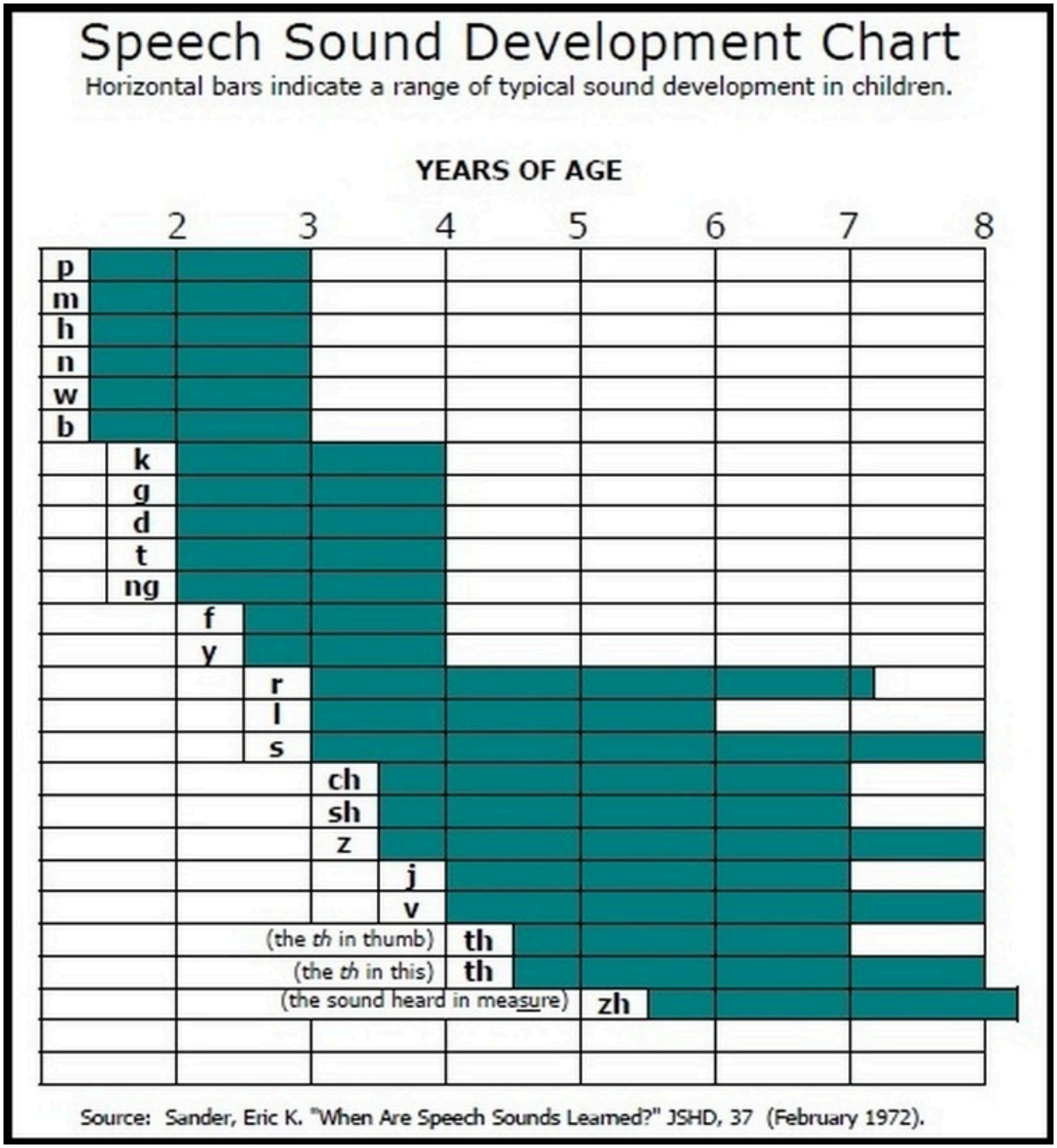
Nutrition is extremely important in infancy. It affects physical development and cognitive development. Malnutrition limits cognitive development. A diet rich in protein and fat can have positive long-term effects in infancy. Infants need a diet high in fat to help their brains develop. The first year of life is not the time to put an infant on a diet. Fat feeds the infant's brain. "The disparagement of dietary fat sometimes obscures the fact that children and adults need fat in their diets. It supplies essential fatty acids (EFA) and aids in the absorption of fat-soluble vitamins A, D, E and K. It is a substrate for the production of hormones and mediators. Fat, especially in infancy and early childhood, is essential for neurological development and brain function. Mother's milk and infant formula supply 40–50% of their energy as fat." (Fidler et al. 1998).

Universally, poverty presents a chronic stress for children and families that may interfere with successful adjustment to developmental tasks, including school achievement. Children raised in low-income families are at risk for academic and social problems as well as poor health and well-being, which can negatively impact educational achievement. (Hyson, 2014) Poverty can have a negative effect on an infant's cognitive development, but early intervention programs can prevent this negative effect. Many low-income parents cannot provide an intellectually stimulating environment because they are spending most of their time making sure their basic needs are met. Early Intervention and Head Start programs can help infants get the support and stimulation they need to develop normally (Hyson, 2014).

Language

A key component of cognitive development is language development. Several theories have attempted to explain our species' near-universal ability to learn spoken language, almost always in the absence of direct instruction. While most of our language development takes place after birth, there are important pieces of the puzzle that are laid down in utero. Components of spoken language:

- **Phonology**: the rules that govern the shared sounds of language; includes phones (the smallest units of sounds) and phonemes (the smallest units of sound that can signal meaning); example: hit and hat – four distinct phonemes: /h/, /t/, /i/ and /a/ – but the two vowels /i/ and /a/ are the distinct phonemes that change the word from hit to hat (approximately 45 phonemes in English)
    - o This is the first step of language development for infants;
    - o Attention to sound almost from birth – strong preference for language over other sounds in the environment; it is as if infants are born with a sense that it is important to pay attention to what people are saying
    - o As motor skill develops and babies can control their tongues more readily, they will begin to mimic sounds they have heard in their environment, often practicing them over and over.
    - o Typically, infants can make vowel sounds early on, as these do not require a lot of fine muscular control in the mouth (try it yourself – make the vowel sounds /a/ /e/ /i/ /o/ u/ and you will notice that it is only the shape of your mouth that changes.
    - o Usually, sounds that require less tongue control come first; back-to-front development in the mouth cavity "lip poppers" /b/ /p/ /m/, then sounds that involve tongue and front teeth /t/ /d/ , and then sounds that require specific control come later.
    - o Typically blends (bl, cr, etc.) are the hardest, and they usually develop later in toddlerhood through preschool and even school age (Gordon & Browne, 2017; Santrock, 2013).



- **Morphology** – is the study of morphemes in a language. Morphemes are the smallest sequences of phonemes (units of sound) in a language that have meaning; for example, the /s/ at the end of a noun indicates that it is plural;
    - o Theories of language development have their biggest challenge in describing how children develop morphological proficiency because there tends to be a common set of grammatical errors that children make that cannot be accounted for through experience
- **Syntax** – also known as grammar; the syntax of a language is the set of rules that determine word-order in sentences, grammatical correctness, and the acceptability of words, phrases, and clauses.
    - o This develops in a regular pattern: toddlers move from one-word utterances (**holophrase hypothesis**) to two (**telegraphic speech**), then three- and four-word utterances, all of which can have a range of

meanings (often interpreted by caregivers through the context and non-verbal language of the child)

- **Semantics** – the set of rules that govern the meaning of words and phrases; semantics bridges the gap between our perception of reality and the way we talk about that reality
    - o There are socially shared meanings of every word: dog, car, bird, running, taxes, etc.
    - o Semantic development entails learning the varied meanings of words and then also understanding how those meanings are related to the reality the speaker is trying to share (Gordon & Browne, 2017; Santrock, 2013)
- **Pragmatics** – the intentional use of language to achieve specific outcomes; this can include the purposeful breaking of the rules of phonology, morphology, syntax, or semantics to make a point, or produce an outcome (action or thought); because pragmatics is related to the context of spoken language, it is sometimes considered the overarching organizing principle of language (Owens, 27)
    - o Even with single word utterances from toddlers, we can see evidence of language pragmatics: any caregiver can tell you there are several interpretations of the word "cookie" from a 2-year-old- "I want a cookie." "Do we have any cookies." "I see a cookie." I see Cookie Monster. Is that a cookie you have? Etc.
    - o Pragmatics helps us learn how to lie – and that is not a bad thing. Although many parents are dismayed when they discover that their toddler has started to lie, in many ways this behavior is a positive sign of healthy cognitive and linguistic development! In order to lie, the speaker needs to have a working proficiency in the rules of spoken language, especially semantics; they also must have the ability to talk about things that are not physically present or may not have ever been present; and they must be able to effectively consider the knowledge and thoughts of the person they are lying to. This is not easy to do (as we all know – sometimes it works, and sometimes it does not!)

Language Development Models

The models that seek to explain language development are not that different from the models used to explain most other aspects of human development. They all can be reduced to one of three sources for developmental input: Nature, Nurture, or a mix of the two. What makes theories of language development particularly interesting are the fact that spoken language development – unlike many other things – is universal across cultures and geographical locations, and the near impossibility of testing any one theory using truly experimental methods. Instead, these theories have been informed by careful observation and quasiexperimentation across language users.

Behavioral Theories

Behavioral Theories of language are firmly based in the "nurture" camp of developmental theories. The basic premise of this theory stems from B.F Skinner's theory of operant conditioning, which states that all behavior is learned and modified through the consequences of that behavior – either a reward or a punishment. According to behavioral theories, learning language is no different from any other learning in childhood.

Language is learned through a series of reinforcements or corrections by more competent speakers, typically parents and other adults. In this model, the child attempts an utterance which is then either confirmed by the adult to reinforce the speech behavior or corrected by the adult to modify it.

For example, imagine a child who is given a ball:

If the child says:	Then the adult will respond:	And the outcome will be:
Ball!	That's right! It's a ball!	The behavior is confirmed and will be repeated
Apple!	No, that is not an apple; it's a ball.	The behavior is weakened and is less likely to be repeated.



According to the behavioral model of language acquisition, this is how language development proceeds, with each language behavior being either strengthened or weakened through feedback from a competent speaker. There are certainly examples of language development where this happens, and there is evidence that parents and other caregivers routinely correct children's language production in this manner. However, this theory alone cannot explain the rich variety of language use in early childhood. One of the main criticisms of this theory is that it cannot explain two of the most intriguing elements of language development: how quickly it happens, and how children can say things they have never heard before. If language were behaviorally conditioned, it would take an entire lifetime for children to develop proficiency in spoken language since every component would have to be learned through trial-and-error with competent feedback. Instead, children become competent speakers of their native languages in an average of five years. During that time, they also say many things they have never heard before, including made-up words [like goed for went], incorrect pronunciations of real words, and completely novel sentences (and sometimes whole stories!) In short, behavioral theories explain one aspect of how competent speakers help the language development process along by giving real-time feedback, but they can't explain most of language production in early childhood.

Psycholinguistic Models of Language Development

On the opposite end of the nature-nurture spectrum is the psycholinguistic-syntactic model of language development. In this family of theories, the underlying assumption is that language development must be driven by some innate, biological force – possibly even a physical structure in the brain. This theory attempts to explain how language acquisition can be universal among all humans even if the languages we learn can vary so much. There are thousands of languages spoken on this planet, and we can learn any one of them!

When trying to explain human universals, most of the time a biological explanation is helpful because it works around cultural differences. Adding in the possibility of an innate structure in the brain designed specifically for language acquisition is also helpful; it provides an explanation for how quickly young children learn the sounds and rules of spoken language, which can be extremely complicated. One early version of the psycholinguistic theory of language development was proposed by Noam Chomsky. He theorized that infants were born with a specific area or module in the brain, called the Language Acquisition Device (LAD), that was there specifically to ensure the development of spoken language. The LAD was described as a universal, genetic attribute that allowed anyone to learn any language and helped explain many of the gaps in the behavioral model.

The LAD would be like a switchboard, with individual switches for phonemes, morphemes, and syntax. At birth, the infant's brain starts immediately listening for language input in the environment – people talking. What the infant hears helps the LAD decide which way to flip a switch. For phonemes, if certain sounds are never heard, those switches do not get turned on. With syntax, hearing sentences spoken helps the LAD

determine that it should be set to a subject-verb-object word order for English and not a subject-object-verb order, as in Korean.

Although this theory helps fill in many of the gaps in other models, it still falls short of being able to explain the range of situations in which language is developed. Plus, increasingly refined techniques for viewing the brain in action, such as functional MRI, have failed to show any evidence for the LAD as described by Chomsky. Instead, it seems that language development is another example of nature AND nurture, not versus.

Sociolinguistic Models

At the halfway point between nature and nurture lie the sociolinguistic models of language development. As you probably already have guessed, this family of theories recognizes that while the brain structure is important – after all, there are specific areas of the brain that process and create language – human interaction is also essential.

From the second chapter of this book, you should recall Vygotsky's theory and the emphasis he placed on the balance between children's internal cognitive development (what they are ready to do independently) and the challenge that can be provided by the environment (what children can do with help). Sociolinguistic models are like this. These models recognize that large parts of language acquisition are socially supported, particularly semantics and pragmatics. This makes sense; these are the two aspects of language that are most necessary for social interaction. Semantics, or word meanings, need to be socially shared for words to make sense. Imagine if we all used a different word for mayonnaise – ordering a sandwich would be an interesting surprise every time! Pragmatics is how we use language to create shared thoughts and emotions, and to get people to do what we want them to. For example, saying "I don't want mayonnaise on my sandwich" when a friend gets out the

Miracle Whip tells them what you really mean is "That's gross!").

Researchers into language development now routinely assume that language acquisition is a balance of nature and nurture. Yes, most children will learn spoken language just by being around people who are talking, which means there must be some strong, internal force that guides the brain to pay attention and develop this ability. However, stories of children who are not exposed to spoken language and are never able to learn it later in life give good evidence for the deep need for social interaction; hearing it at a distance is not enough – infants and babies need to be a part of the social interactions in which language is used. These findings give compelling evidence that language acquisition is both nature and nurture!

Language Development from Conception through Birth

The womb is not soundproof. The developing fetus hears muffled versions of the sounds of the outside world – none so clearly and regularly as the sounds of the mother's speech. As the fetal brain develops, it is stimulated by these sounds and becomes accustomed to hearing specific voices and sounds, which the newborn will actively respond to once out and about in the world.

During gestation, the areas of the brain which will later become adept at processing and producing language are just developing, using the ambient sounds of the environment as early input.

Recall from the chapter on Brain Development that some neural networks are "experience expectant." In that chapter, we discussed the visual system, and how infants are born with the basic framework but need input from the environment to complete the development of those neural pathways. It is possible that language is a similar system, where the neural foundation is laid during gestation with some ambient input, but the system is not fully functional until a significant amount of language experience takes place after birth.

Language Development from Birth to 15 months (Infants)

Infants' and toddlers' effortless development of spoken language has led to several theories seeking to explain how this acquisition occurs, and which environmental or innate features drive the development.

Skinner and the other Behaviorists were not entirely wrong when they claimed that children learn language from competent adults, and that it is through a system of feedback that children refine their language use. Although this theory cannot explain everything about language acquisition, it does help us to understand the importance of some of the earliest language that children are exposed to.

Conversational Patterns

If you have ever spent time with a pre-lingual baby, you have probably engaged in the critical practice of patterning conversation – and you probably did it without even realizing that you were engaging in a major developmental process. As babies begin to babble, they not only start to experiment with the phones of the languages they hear, but also with the intonations and speech patterns of the speakers around them. Mothers, fathers, and other caregivers are important first models not just for the sounds of speech, but also for the back and forth of conversation.

It is a common Western practice for adults to "talk" to babies long before the infant can respond in conventional speech, yet in these conversations the babies often do a lot of the talking! Caregivers, parents, and other adults frequently engage in the practice of modeling by responding to babies' speech as if it were in fact comprehensible language, and then taking turns to allow the baby to "talk" more. Imagine the quite common scenario of a parent making dinner while the infant rests in a bouncy chair on a nearby countertop or in a swing. The baby babbles away, watching the parent prepare dinner. As the baby pauses in speech, the parent takes the opportunity to "respond" to what the infant has been "saying." Perhaps the parent describes what he is doing or agrees with the baby– "You're right, we should have added more garlic!" The parent then pauses, giving the baby a chance to babble another "response" in the conversational chain, to which the parent again replies. This time the parent asks a question ("Do you think the puppy would like these scraps?") or disagrees with what the baby has said ("Oh, I don't know – that seems like a lot of cheese for one person…") and so on, in

direct response to the inflection, volume, or facial expressions of the baby as she "talks."

These episodes of modeling conversation are essential for helping infants figure out not only what the sounds of their language are, but also how language can be used between two people. In each exchange, the infant is exposed to a repetition of the phonemes of the language around her, helping her brain to narrow down the range of possible sounds that can be speech. This also helps the infant to more reliably mark the boundaries of words and phrases. Finally, this provides critical information about the patterns of discourse, including how users share conversational responsibilities (if you pause, then it is my turn to talk).

Although we tend to think of language as a cognitive process, it has a very real set of physical constraints. As newborns, babies' brains are already tuned in to the language around them, and they quickly begin to pick up sounds in their environment. It does not take long before infants are trying out those sounds, babbling away to themselves while their parents are trying to get them to go to sleep! Over hours of practice, infants become increasingly adept at forming sounds, at imitating speech patterns, and at attempting individual words. But as all of that is happening, there is a lot of physical growth that must also occur. At birth, an infant's tongue is disproportionately large for the mouth, and the musculature that is necessary for speech hasn't developed fully. But over the course of the first year of life, these physical barriers to speech are resolved and by the time they are a year old, most babies have one or two words they produce reliably along with a diverse collection of almost-words that are the baby's developing attempts at spoken language.

How does language develop in infancy? Crying is present at birth. It signals distress. Cooing begins at about

1 to 2 months. Babbling occurs in the middle of the first year. (Ma Ma, Da Da) Gestures begin at about 8 to 12 months. This is about the same for children who can hear and children who are deaf. From birth to 6 months, infants are "citizens of the word". They recognize most sound changes in any language. After 6 months, infants learn their own language and gradually lose the ability to recognize sound changes in other languages.

The first words occur between 10 to 15 months. The holophrase hypothesis states that there is a time when infants say one word that implies a whole sentence. (For example, "juice" means "I would like some juice in my sippy cup.") Infants understand about 50 words at 13 months (receptive language) but they are unable to say them until about 18 months (spoken vocabulary).

Children have a huge amount of growth in language from 18 months to 2 years. This is called the vocabulary spurt. They speak 50 words at 18 months and 200 words at two years. Toddlers use short and precise two-word utterances to communicate–telegraphic speech. Biology influences language development. Human language is about 100,000 years old and is strongly influenced by biology. The vocal apparatus has evolved over the years. The brain plays a large role in language development. Aphasia is brain damage that involves a loss of ability to use words. Broca's area is the brain's left frontal lobe that directs the muscle movements involved in speech production. Wernicke's area is in the brain's left hemisphere. It is involved in language comprehension.

Noam Chomsky believes that humans are biologically prewired to learn language. Children are born with a language acquisition device (LAD), a biological ability to learn language. Children all over the world reach language milestones at the same time.

However, there is a critical period for learning language. One of the most famous examples of this is the story of Genie, a girl who suffered severe emotional abuse and neglect. She was kept in a closet for many years and was never spoken to. At age 14 she was finally rescued and placed in a loving home with many people working together to help her. Even after years of professional interventions she was never able to progress past the stage of toddler speech. She had passed the critical period and was stunted in her growth. She was only able to learn to speak 50 words and was unable to combine them into full sentences.

Preschoolers experience rapid language learning. Critics argue that learning continues beyond preschool. The behavioral view states that language is a complex skill which is learned and reinforced. Biology cannot explain creativity or the orderliness of language; individual differences exist.

Environmental influences impact children's language development as well. Parents' talkativeness, vocabulary and level of language is linked to children's vocabulary growth. Parents often use child directed speech. This is spoken in a higher pitch than normal with simple words and sentences. It holds an infant's attention and maintains communication.

Other strategies used to encourage infant speech include recasting, rephrasing what a child says, expanding, adding more sophisticated vocabulary to what a child says, and labeling, assigning and identifying objects by name.

Parents can stimulate infants' language development by being an active conversational partner, talking as if an infant understands what you are saying, and using a comfortable language style.

Parents can stimulate toddlers' language development by being an active listener, using comfortable language while expanding language abilities, avoiding sexual stereotypes, and resisting making comparisons.

The interactionist view of language development states that biology and sociocultural experiences contribute to language development. Parents and teachers construct a language acquisition support system. Children acquire native language without explicit teaching. Children learn by modeling their parents' language.

Imitation

Imitation is a powerful way for children to learn. Newborns love to imitate facial expressions and vocalizations. Through reciprocal socialization, adults interact with infants and infants learn to respond back by imitating

what they have seen/heard. Infants engage in both immediate imitation and delayed imitation. When a parent sticks out their tongue and the infant responds by doing the same, this is an example of immediate imitation. When an infant covers a doll with a blanket a few hours after watching her parent do so, that is an example of delayed imitation. Children imitate the language that they hear. Being raised in a language-rich environment allows the infant to imitate the wide range of words they are exposed to.

Memory

The capacity to remember things an infant has been exposed to allows them to learn language, interact with familiar adults and understand how objects work. As infants get older, they can remember information for longer periods of time.

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Social and Emotional Development in Infancy

Infants are emotional beings. Although they can't use language to express their feelings and emotions, they are extremely sensitive to other people's emotional states. Understanding what an emotion is and how to respond to an infant's emotional state is crucial.

An emotion is a feeling or an affect. It can be positive or negative. It varies in intensity and is influenced by one's perceptions. Functionalists believe that emotions are relational and are linked with an individual's goals.

There are two broad types of emotions. Primary emotions are present in humans and animals. They appear within the first 6 months of life. They include surprise, anger, joy, sadness, and fear. Emotions promote caregiver-infant interactions.

Self-conscious emotions require cognition. Empathy, jealousy and embarrassment first appear at about 1 ½ years old. Pride, shame and guilt first appear at about 2 ½ years.

Crying is the first way an infant communicates. There are three types of crying: a basic cry, an anger cry, and a pain cry. An attentive caregiver can recognize why infants are crying and quickly respond to their needs. There is a controversy among experts about how to respond to a crying infant. Some believe a quick response is important in developing a strong caregiver-infant bond. This helps to develop trust and security. Others believe that a quick response increases and reinforces crying and spoils the child. Young infants cry to communicate their needs and quickly responding creates trust. Swaddling and massaging can also help to soothe a crying infant.

There are two types of smiling: a reflexive smile and a social smile. A reflexive smile happens during the first month after birth, usually during sleep. A social smile appears at about 2 to 3 months of age. A child responds to an external stimulus, often responding to faces.

Fear first appears at about 6 months of age. Stranger anxiety is a fear of strangers. It intensifies from 9 to 12 months. Separation protest is distress at being separated from a caregiver. It peaks at about 15 months in infancy.

Social referencing is reading emotional cues in others to help determine how to act in a particular situation. Infants "check" with a parent or caregiver before acting in a social situation.

It is important that over time an infant learns to self-soothe. Infants often use a **transitional object** (a teddy bear, a blanket) to make the transition from being dependent to independent. When an infant moves from relying on a caregiver to learning self-soothing strategies, they exhibit emotional regulation.

Temperament is one's behavioral style and characteristic emotional response. There are three basic temperaments: easy, difficult, and slow to warm up. An easy child has a positive mood and adapts easily. A difficult child is negative, cries often and adapts slowly. A slow-to-warm- up child has a low activity level, low adaptability and intensity of mood. Physiological characteristics are associated with different temperaments. It is important that parents consider children's temperaments when choosing caregivers. Goodness of fit is a match between a child's temperament and environmental demands. It is important to pay attention to and show respect for individuality. When considering a child's temperament, it is important to structure the child's environment, carefully choose caregivers, and avoid labeling.

To be emotionally secure, an infant must learn to trust. Erikson believed that trust vs. mistrust is the most important stage in development (birth to one year). Infants experience the world as either secure and comfortable or insecure and uncomfortable. If a child learns to trust their caregiver in their first year of life, they will be more comfortable throughout their childhood. Erikson believed that the first year is the key year for attachment, and Freud agreed. However, Erikson believed that attachment was formed with the person an infant trusted the most (Erikson, 1956). Freud believed that infants become attached to the person giving

oral satisfaction. Some developmentalists believe secure attachment in the first year provides an important foundation for psychological development. Others believe too much emphasis is placed on attachment in infancy (Santrock, 2013).

The transition to parenthood can be an emotional time for parents as well. New parents must adapt to having the responsibility of a new life as well as new demands on time, finances and changing roles. While both parents can be excited about the new baby, it still can have an impact on a marriage. The family functions as a system. Marital relations, parenting and infant behavior all impact each other. If a newborn is extremely difficult, that can put a strain on the marriage. If parents have different beliefs about parenting, that can cause stress as well. It is important that parents work together to be on the same page about parenting strategies. If parents are feeling stress, the infant is going to feel that stress as well. Mothers and fathers also typically interact differently with a child even when they are both competent caregivers. Mothers focus more on caring for the children and meeting their basic needs, while fathers are more likely to center on play activities.

Infants develop socially through interactions with the people in their environment. Reciprocal socialization is the term used to describe activities in which children interact with an adult and an adult interacts with a child. This includes eye-to-eye contact and a great deal of language. When a parent speaks to a child and a child coos back, that is an example of reciprocal socialization. Parents can also support their infants through scaffolding. Scaffolding is the support that a parent gives a child until they can do something independently. For example, when children are learning to walk, they first grip their parent's hands tightly. Then they hold on to one finger of each hand. Next, they may take a tentative first step and fall into their parents' arms. Finally, parents may take a few steps back encouraging children to walk independently. Scaffolding provides the child with the correct support needed to learn a new skill in a supportive environment.



Often parents need to go back to work while their child is still an infant. There are five types of parental leave: maternity leave, parental leave, child-rearing leave and family leave, but rarely does a parent receive leave with pay throughout infancy. Choosing a safe, educational environment that is a good fit for a child's temperament can seem to be a daunting task. High quality childcare is characterized by small group sizes, low adult-child ratios, teachers with specialized training, and caregiver sensitivity to children. Higher quality care and fewer hours in care lead to positive outcomes. To raise an infant who is emotionally secure, it is important to keep in mind the effect of quality parenting on a child's development. Parents must make good parenting decisions, spend a great deal of time interacting with their children (reciprocal socialization), teach their children to self-soothe, monitor their children's development, and take time to find the best childcare.

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CHAPTER SEVEN: TODDLERS (15 MONTHS TO 3 YEARS)

After completing Chapter Seven students will be able to:

- Discuss physical development and growth in toddlerhood
- Describe the importance of play
- Summarize Piaget's theory of toddler development
- Describe how toddlers learn and remember
- Discuss specific safety concerns for toddlers
- Describe the nature of language and how it develops in toddlerhood
- Discuss emotional and personality development in toddlerhood
- Explain how social contexts influence the toddler's social and emotional development



A child's first birthday is a big celebration! Beyond the cake, this moment should also be savored as the calm before the storm. Once a child turns one, if they are not walking already, the child will soon be walking and then running! This is the year of independence as a child develops autonomy-a sense of self. Autonomy in early childhood means letting children know that they have control over themselves and the choices that they make. With the new independence that walking brings, there is also a tumultuous ambivalence that can be challenging for those in a child's life. Temper tantrums emerge because of this ambivalence. Although exhausting for parents and caregivers, the life of a toddler also brings excitement and joy as they watch their rapid development and growth over the next couple of years. Welcome to toddlerhood!

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Physical Development for Toddlers



By age one, an infant heading into toddlerhood is typically triple their birth weight and on average, between 28 and 32 inches. By age two, the weight has quadrupled. This makes the average two-year-old between 20 and 40 pounds. Boys reach about 50 percent and girls 53 percent of their adult height by age two (Santrock, 2013).

Genetic factors play a major role in determining a child's growth pattern, especially for height and to a lesser extent for weight. Generally, tall parents have children who are tall and short parents have children who are short.

The conditions in which children are raised also influence growth patterns. Children who do not receive adequate nutrition during their early years do not achieve optimal height. They are also at risk for developmental delays and other health concerns due to the lack of adequate nutrients needed to sustain physical growth and brain development.

Physically, a toddler at 18 months (about 1 and a half years) is walking and even running. They are able to pull toys while walking. Toddlers can help undress themselves, drink from a cup, and start to eat with a spoon. They are climbing stairs with assistance.

Bowel and Bladder Control

During the first year of life, infants do not have control over the muscles involved in elimination. They also lack awareness of the physical signs that signal the need for elimination. It is not until the middle of the second year when children may begin to make the connection between the feelings of impending elimination and their outcome. At the end of the second year or the beginning of the third year the potential for toilet training emerges. Control over bowel movements is usually accomplished earlier than bladder control.

When to begin toilet training is a serious concern for many parents. It is important to remember that there is a wide range of individual differences when children will be trained and when they are physically and emotionally ready for this milestone in development. Most children learn to control their bladders and bowels when they are ready, just as they learned to sit and walk. Starting to train a child before he or she is ready can potentially lengthen the process and lead to emotional distress for both the child and parents/caregivers. Only four percent of children are potty trained by age two. One of the key signs of developmental readiness is if a child stays dry for at least two hours. They also need to have the ability to walk independently and remove clothing necessary to use the potty. Approximately 60 percent of children are trained by age three. Only approximately 2 percent are not trained by age four. Girls are generally able to meet this developmental milestone earlier than boys (Berk, 2017).

Safety Concerns

It is very important to make sure that toddlers, just like infants, are supervised at all times. Toddlers are at risk for many types of accidents including falling down stairs, drowning, and getting hit by cars if they wander off. Parents need to make sure that their homes are toddler-proofed. Electrical outlets need to be covered. Hazardous materials such as chemicals and household cleaners need to be stored out of reach and ideally locked up out of harm's way. Medication needs to be made inaccessible as well as access to any firearms that a family may own. Toddlers are fast. They also have Houdini-like skills when it comes to escape and getting into things that they shouldn't have access to. As a toddler learns to walk, they will also begin the art of climbing. If the child is still sleeping in a crib, mattresses should be at their lowest setting and monitored closely because the toddler will soon learn to climb out of cribs and playpens. Caution near water is another area of concern. Toddlers can drown in as little as an inch of water. Children under age five have the highest risk of drowning, with death rates of nearly 3 per 100,000 in 2010 according to the Centers for Disease Control (CDC). Swimming pools are the most common place where children under five drown each year. Car seat safety is also of critical importance.

Car Seat Safety

Car seat safety is of utmost importance. Many toddlers spend a considerable amount of time in a motor vehicle. According to the Centers for Disease Control (CDC, 2018), white children are more likely to be buckled up than black or Hispanic children. From 2001 to 2010, approximately 1 in 5 child passenger deaths in the United States involved drunk driving. Sixty-five percent of the time it was the child's own driver that had been drinking (CDC, 2018). Restraint use among young children often depends upon the driver's seat belt use. Almost 40% of children riding with unbelted drivers were themselves unrestrained. Child restraint systems are often used incorrectly. An estimated 46% of car and booster seats (59% of car seats and 20% of booster seats) are misused in a way that could reduce their effectiveness (CDC, 2018). Children should remain in rear-facing car seats until age 2 or when they reach the upper weight or height limit of that seat (CDC, 2018). All children 2 years old, or those younger than 2 years old who have outgrown the rear-facing weight or height limit for their car seat, should use a forward-facing car seat with a harness for as long as possible, up to the highest weight or height allowed by the manufacturer of their child safety seat (CDC, 2018). Car seat installation should be completed by a trained professional. Many local police and fire stations offer this service free of charge to help ensure that car seats are installed properly. Proper car seat installation significantly helps protect a child in the event of a motor vehicle accident.

Immunizations

Today, most children in the United States lead much healthier lives and parents live with much less anxiety and worry over infections during childhood. Immunizations are one of the success stories of modern medicine. Parents often wonder if vaccinations are worth putting their young child through the distress of receiving vaccinations or the potential side effects. The answer from the vast majority of medical experts is a resounding "yes." The Centers for Disease Control and Prevention (CDC) and the American Academy of Pediatrics (AAP) recommend that healthy children get vaccinated against 14 diseases by age 2 (with boosters later for some),

along with an annual inoculation against the flu. The government supports vaccines so strongly that any uninsured child can walk into a clinic and get his or her shots for free.

Despite doctors' reassurances and mounting evidence that underscores the safety and value of vaccination, many educated, dedicated parents are still wary of vaccines or strongly opposed to them. Although the national immunization rate has remained stable over the past decade (76 percent of children ages 19 to 35 months were up to date on all of their shots in 2008), that's still short of the government's goal of 80 percent. In some parts of the United States, a rising number of parents are delaying shots for their children or skipping certain ones altogether, citing religious or philosophical exemptions from state laws that require children to be vaccinated in order to attend school. As a result, there have been recent outbreaks of serious diseases that vaccines had virtually wiped out in the U.S., including measles, mumps, pertussis (whooping cough), and haemophilus influenzae type b (Hib), which was once the most common cause of bacterial meningitis in children under 5 (CDC, 2023).

What scares parents most about inoculations is that there are some who believe that their child's autism was caused by immunizations. Some believe that the increased number of vaccines are to blame for the rise in children with autism spectrum disorders (ASD). The idea first made headlines in 1998, when Andrew Wakefield, M.D., a British gastroenterologist, published a study of 12 children in The Lancet that linked the measles, mumps, and rubella (MMR) combination vaccine with intestinal problems that he believed led to autism. The following year, the American Academy of Pediatrics issued a warning about thimerosal, the mercury-containing preservative that was found in most vaccines. Though it didn't mention autism specifically, it suggested that the use of vaccines with thimerosal could theoretically push an infant's total exposure of mercury, a neurotoxin, above safe limits, and it recommended that the preservative be removed from shots. The vaccine-autism hypothesis was solidly in the mainstream by the time actress Jenny McCarthy went public with her belief that vaccines caused her son's autism, describing in heartbreaking detail how "the soul left his eyes" on a 2007 segment of the The Oprah Show.

Caregivers can rest assured, however, since at least seven large studies in major medical journals have now found no association between the MMR vaccine and ASD and The Lancet officially retracted Dr. Wakefield's original paper. In March, the U.S. Court of Federal Claims, Office of Special Masters, a group of judges appointed to handle cases of families who believe immunizations were responsible for their child's autism, ruled that thimerosal in vaccines does not increase the risk of the disorder. Several demographic analyses have also found that autism rates continued to rise even after thimerosal was removed from all vaccines except some flu shots (AAP, 2018).

Any association of ASD characteristics emergence with the timing of vaccines is almost certainly coincidental. Children get their first dose of the MMR vaccine at 12 to 15 months, the age at which autism symptoms typically become noticeable. Some autism activists now believe that we shouldn't even be performing more studies about a possible vaccine connection because they take attention and money away from important research that is investigating other potential causes of the disorder which has reached alarming numbers in the past decade.

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Cognitive Development for Toddlers

Did you know that 80% of a child's brain develops by the age of three years old? It is during these early years of development that a child's brain begins to develop memory, language, thinking, and reasoning skills. They learn by imitating the behavior of others, especially adults and older children. It can also be a challenging time as children begin to show defiant behavior and set out to explore the world around them.

During the toddler years, a child's ability to play pretend emerges. At 18 months, it is a simple ability, such as feeding a doll. By the end of this period (3 years), a child's ability to pretend play has become much more elaborate. As stated in chapter two, Erikson's psychosocial theory has eight stages. Erikson claims that human motivation is social. During the first year of life, infants experience trust vs. mistrust. Erikson stated that this was the most important stage in development. If infants learn to trust their caregivers, they will feel confident to explore their world independently. During the second stage, autonomy vs. shame and doubt, ages 1 to 3, toddlers and young preschoolers want to be independent. You often hear them saying, "Me do it." They get frustrated and may feel shame and doubt when they are unsuccessful. It is important to provide them with opportunities to accomplish tasks independently–for example, providing small pitchers so they can pour their own milk and clothing that they can put on independently.

According to Piaget, toddlers remain in the sensorimotor stage of development through approximately 24 months or two years of age. From 12 to 18 months, toddlers become creative problem solvers. For the first time, they are able to apply entirely new strategies to solve problems rather than simply using combinations of previously used schemes. Their creativity during this stage stems from their use of **tertiary circular reactions**, in which toddlers make subtle modifications in their behavior so as to explore the effects of those modifications. The ability to utilize tertiary circular reactions provides toddlers with the means to learn from their actions (Piaget, 1955).

The final stage of the sensorimotor period involves the emergence of symbolic representation and the use of mental symbols to represent objects. Toddlers develop the ability to imagine the acts of a sequence of events to discover the outcome. This is the emergence of their problem-solving abilities, which will continue to develop throughout childhood.

Joint attention between caregiver and child is critical during the toddler phase of development. It facilitates cognitive development through a sharing of focus, allowing the toddler to learn how to interpret and understand interactions with others. Caregivers who are sensitive and responsive to a child's needs and focus with the child on a shared task assist the child in their cognitive development.

First Sentences: Language Development in Toddlerhood

Between 12 and 18 months, toddlers add about three words per month to their vocabularies. After 18 to 24 months, a vocabulary explosion often takes place, which adds a multitude of words at a rapid rate of acquisition. At about 18 months, many children begin to produce sequences of words. They are usually separated by long pauses. By the end of the second year, these sequences give way to true sentences. Toddlers shift from using holophrases (single-word utterances that convey as much meaning as a whole sentence) to actual sentences with multiple words strung together. This shift is one of the tremendous accomplishments of the toddler years.

Social and Emotional Development for Toddlers

At 18 months, a toddler has met many developmental milestones. In the social/emotional domain, they like to hand things to others and will often point to show others something of interest to them. A child at 18 months may be afraid of strangers, shows affection to familiar people, and explores alone but still prefers a parent or caregiver close by. They may cling to caregivers in new situations.

Temper tantrums are a normal part of toddler development. Saying and shaking one's head "no" is common during the toddler stage. At 18 months, a child has several single words that they can say. Their vocabulary will expand rapidly over the next several years.

Biting

Biting is a very common behavior among toddlers. It brings a source of stress to parents and caregivers alike in trying to determine what is causing the biting behavior. Children bite in order to cope with a challenge or fulfill a need. For example, a child may be biting to express a strong feeling (like frustration), to communicate a need for personal space (maybe another child is standing too close), or to satisfy a need for oral stimulation. Trying to understand the underlying cause of the biting will help develop an effective response (zerotothree.org).

There are many reasons why toddlers might bite. The following list includes some of the most common reasons, with the most common being a lack of language skills necessary for expressing important needs or strong feelings like anger, frustration, or joy. Biting is a substitute for the messages toddlers can't yet express in words, such as "I am so mad at you," "You are standing too close to me," "I am really excited," or "I want to play with you."

Biting could also be the result of :

- Being overwhelmed by the sounds, light, or activity level in this setting
- Experimentation to see what will happen
- The need for more active playtime
- Being over-tired
- Teething
- Having a need for oral stimulation

Helping to understand the reasons a child is biting will help caregivers develop a plan to address the underlying needs the child has that are not being met (Crain, 2011).

Hitting/Scratching and Temper Tantrums

Most toddlers get aggressive sometimes. Tantrums and aggressive behaviors such as hitting, kicking, scratching, and biting are all behaviors that are exhibited by children at some point during this phase of development.

An aggressive young child, at least up to the age of three, is not being 'bad' or disobedient. The child is trying

to communicate and hasn't yet developed the language skills or emotional habits to express themselves more effectively. Another possibility is that the child does not feel that they are being heard, and violence is the only way to get their caregiver's attention.

Toddler aggression usually happens when a little one is not getting what they want, whether that want is reasonable (food, attention, a cuddle), or not (candy, someone else's toy, something dangerous). Context matters. Quite predictably, toddlers are more likely to be aggressive when they're tired, worried, not feeling well, hungry, or otherwise stressed. The caregiver can help remedy a difficult situation by looking at it from the toddler's point of view. Hitting, scratching, and temper tantrums are the reactions that often express the powerlessness of being a toddler

(https://www.psychologytoday.com/us/blog/going-beyond-intelligence/201701/toddler-tantrums-hitting-kicking-scratching-and-biting)

Toddler Property Laws Author Unknown

The following list of "Toddler Property Laws" sums up the joy and challenges of toddler development. There are several versions, and the original author is unknown.

1. If I like it, it's mine.
2. If it's in my hand, it's mine.
3. If I can take it from you, it's mine.
4. If I had it a little while ago, it's mine.
5. If it's mine, it must never appear to be yours in any way.
6. If I'm doing or building something, all the pieces are mine.
7. If it looks like it's mine, it's mine.
8. If I saw it first, it's mine.
9. If I can see it, it's mine.
10. If I think it's mine, it's mine.
11. If I want it, it's mine.
12. If I "need it, it's mine (yes, I know the difference between "want" and "need"!).
13. If I say it's mine, it's mine.
14. If you don't stop me from playing with it, it's mine.
15. If you tell me I can play with it, it's mine.
16. If it will upset me too much when you take it away from me, it's mine.
17. If I (think I) can play with it better than you can, it's mine.
18. If I play with it long enough, it's mine.
19. If you are playing with something and you put it down, it's mine.

20. If it's broken, it's yours (no, wait, all the pieces are mine).

2-3 Year Milestones

Are the terrible twos a universal experience?

Contrary to the experience of many Western parents, the "terrible twos" is not a universal phenomenon. In fact, it is much less dramatic and even completely absent in some cultures. The Aka in central Africa, for example, have a culture in which infants are doted on and held by both mother and father and then transition easily to playing alone or with siblings, peers, and others in their villages. Behaviors such as playing with machetes and spears are not only tolerated but often encouraged.

Similarly, research into Guatemalan mothering practices found that if there was a situation where an older sibling or older peer had a desired toy that the toddler wanted, the Guatemalan mother insisted that the toy be given over to the toddler. Although this may be seen as overly indulgent by standards in the United States, the terrible twos are not an experienced phenomenon in this culture. The Guatemalan mothers' approach seems to be more reflective of cultural values of collectivism and interdependence. It is interesting to think about whether the experience of tantrums in two-year-olds in American culture reflects a cultural emphasis on individual rights and freedoms, autonomy, and independence (Jackson, 2011)

URL: https://pathways.org/growth-development/toddler/milestones/

CHAPTER EIGHT: EARLY CHILDHOOD DEVELOPMENT

After completing Chapter Eight students will be able to:

- Discuss physical growth and change in early childhood
- Describe changes in motor development in early childhood
- Characterize the health of young children
- Discuss the cognitive changes that occur in early childhood
- Describe language development in early childhood
- Discuss emotional and personality development in young children
- Explain how families can influence young children's development
- Describe the role of peers, play and television in young children's development

Physical Development in Early Childhood

Growth in Height and Weight

Children continue to grow greatly during early childhood. The average child grows 2 ½ inches and gains between 5 and 7 pounds a year. Each year as they grow older, their increases in height and weight decrease. Growth patterns are affected by genetics, growth hormones and environmental factors. Some reasons for unusually small children are genetic problems, prenatal problems, physical problems in early childhood and emotional problems. Deprivation dwarfism is a condition in which children who are deprived of attention do not grow at a normal rate. This deprivation affects the release of hormones by the pituitary gland.

Girls are slightly smaller and lighter than boys during the preschool years, and most children have lost their "top heavy" look. Boys gain muscle and girls gain fatty tissue during this time. Children are fascinated by their bodies. They are constantly asking questions about their bodies and are beginning to understand the physical differences between boys and girls. Two developmentally appropriate books to share with children are "The Body Good" by Claire Raynor and "Blood and Guts" by Linda Allison.

Brain Development

The brain and the head experience the fastest growth in the body. It is 75% of adult size by age 3 and 90% of adult size by age 5. It is interesting to note that at age five a child's body is only 1/3 of adult size. The top parts of the head, the eyes and the brain grow faster than the jaw. Nerve endings continue to grow into adolescence. Myelination refers to the process by which nerve cells are insulated. Myenilation makes information process more quickly. It occurs in the areas of the brain related to hand/eye coordination at 4 years old and in the areas related to attention in middle childhood. It is interesting to think about the pressure we put on children to spend large amounts of time sitting and focusing in preschool when their brains need more active learning to develop.

There are also structural changes in the brain. The brain undergoes dramatic anatomical changes between ages 3 and 15. Some areas almost double in size, and the purge of unneeded cells follows up to the age of 4. Frontal lobe growth occurs between 3 and 6 years of age, and temporal and parietal lobes from age 6 through puberty (Berk, 2017; Hyson, 2014).

Signs of Vision Problems

It is important for children to have regular vision screening before age 3. Treatment before age 6 can prevent vision loss. It can sometimes be difficult to discern if a child is having vision problems. Some signs to look for are tilting of the head, squinting, irritability when asked to complete tasks that require long distance vision, rubbing the eyes, shutting and covering one eye, excessive blinking, and headaches. Two eye conditions that many children suffer are functional amblyopia and strabismus. Functional amblyopia, also called lazy eye, is an eye defect that occurs when one eye is not used as much as the other eye to avoid the discomfort of double vision. It is caused by imbalanced eye muscles. Strabismus is misalignment of the eyes (CDC, 2022).

Gross Motor Skills



Preschoolers have the highest activity level of any age in the life span. They need daily exercise, and good programs with creativity and free movement. Exercise increases physical and visual awareness. Children's gross motor skills develop when they use the large muscles of their body. At age 3, children enjoy simple movements such as hopping, jumping, running back and forth, throwing a ball underhand, catching a large ball and catching a bounced ball. At age 4, children become more adventurous and love to climb. They can kick a ball towards a target, bounce a ball under control, hop on one foot four times and come down stairs with one foot on each step. At age 5, children run hard, enjoy races, kick a rolling ball, skip using alternating feet, roller skate, jump rope, ride a two-wheeled bike with training wheels and are adventurous and try hair-raising stunts in climbing. Some gross motor ideas to incorporate into a preschool classroom are:

- Beam Walking
- Daily Fitness Activities
- Creative Movement With Music
- Moving To A Steady Beat
- Including Language Activities (over, under, around)
- Including Perceptual Activities (copying teacher's movements)

Remember that children are **not able to sit still!** (Hyson, 2014)



Fine Motor Skills

Fine motor skills are subtler movement skills in children's hands and fingers. At age 3, children are still clumsy at picking things up with their thumb and forefinger. They have difficulty placing pieces in a puzzle but are adept at building block towers. At age 4, their coordination has improved and is more precise. They are much better at puzzles. At age 5, the hand, arm, and body all move together well. Children want to build a more detailed block structure. Hand strengthening activities are important during this time. Finger painting, squeezing stress balls,

tearing paper, manipulating windup toys and spray bottles can all strengthen children's hands, which will lead to increased fine motor skills for when children are learning to write (Gestwicki, 2017; Shaffer, 2000).

Young Children's Artistic Drawings

Art provides a hands-on approach to problem solving skills; it reinforces ideas of scale, space, motion and distance. Child art reflects inventive problem solving. Developmental changes depend on talent, motivation, familial support and cultural values. It flourishes in sociocultural contexts where tools are available and art activity is valued.

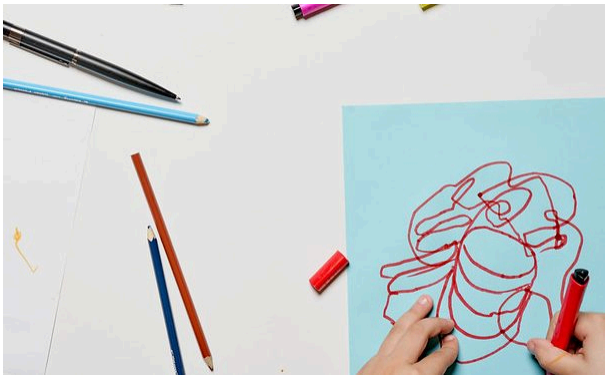
Rhoda Kellogg is a preschool teacher who has observed and guided young children's artistic efforts for many years. She has collected over 2,000 samples of drawings produced by preschool children. She documented that children's art is ordered, structured and meaningful. She outlines five stages of artistic development:



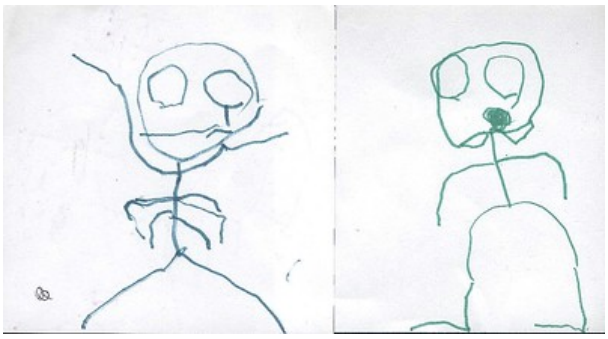
Basic Scribbles: a child's first attempts at drawing



Placement: age 2-3, drawings are patterns placed on the page



Shape Stage: age 3, drawings consist of diagrams in different shapes



Design Stage: age 3-4, two basic shapes mix into more complex designs



Pictoral Stage: age 4-5, drawings of objects adults can recognize

(Berk, 2017; Santrock, 2013; Jensen & Arnett, 2019).

Handedness

People argue about whether handedness is determined at birth. Some believe it is genetically inherited. Others believe it develops in early childhood. Right-handedness is dominant in all cultures. Hand preference may occur in the womb. Many preschoolers use both hands before preference develops later.

Approximately 95% of right-handed individuals process speech primarily in the left hemisphere. Left-handed individuals show more variation in processing and are more likely to have reading problems.

Left-handers are more common among mathematicians, musicians, architects and artists (Berk, 2017; Santrock, 2013; Jensen & Arnett, 2019).

Sleep and Sleep Problems

By preschool, most young children sleep through the night. Many use transitional objects: stuffed animals, blankets, etc. to help them sleep independently. Sometimes sleep can be interrupted by nightmares, night terrors and somnambulism. Nightmares are frightening dreams that usually wake the sleeper. Night terrors are characterized by sudden arousal and are extremely intense. Somnambulism is sleep walking (Berk, 2017; Santrock, 2013; Jensen & Arnett, 2019).

Nutrition

Proper nutrition is extremely important in early childhood. Energy/calorie needs increase with age. Diets should be well balanced. Young children should avoid excessive fast food, fat and sugar. This can be difficult as children grow older and are exposed to different types of food. Children's diets worsen with age. Parents should be persistent in exposing children to the right foods. They should avoid giving children sweets at snack times and set limits on certain foods. Childhood obesity is on the rise. The average American child consumes almost 2 pounds of sugar a week! Be aware of hidden sugar in juices, cereals, granola bars, ketchup and crackers. Lifelong eating habits are determined in early childhood.

Sweets, snacks and fussy eaters: Many eating problems carry over from toddler years. It is important to allow a child to eat in any order/combination, let the meal end when the child has had enough, keep mealtimes enjoyable, and not use food as a reward or punishment.

Obesity in children: The percentage of obese children is increasing. It is important to encourage children to make independent and better choices. Childhood obesity affects health problems. Obesity is linked to poor self-esteem. Caregivers should center life around activities, not meals, and keep children active.

Malnutrition is linked to many aspects of development: iron deficiency anemia, cognitive deficits, aggressive and hyperactive behavior. Underfed children tend to receive less supervision, stimulation and education.

How children eat at different ages

- 3 year olds
    - o Appetite good, prefer small servings
    - o Eat almost everything except cooked vegetables.
    - o Feed themselves independently
    - o Dawdle over food
    - o Can pour milk and juice

- o Begin to drink a lot of milk

- 4 year olds
  - o Appetite changes from good to fair
  - o May refuse to eat certain foods
  - o Use all eating utensils
  - o Talking dominates eating
  - o Like to help in the preparation of a meal

- 5 year olds
  - o Usually eat well, but not at every meal
  - o Like familiar foods
  - o Are influenced by the dislikes of other family members
  - o Like to make their own breakfast

Accident Prevention

Accidents are the leading cause of death in children ages 1 through 4. Most accidents occur in the bathtub or in the car. Many injuries can be prevented. Caregivers should always use car seats and lock up guns. They should childproof home and playground and make sure playground equipment is well constructed (CDC, 2022).

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Cognitive Development in Early Childhood

Learning Objectives

- What cognitive changes occur in early childhood?
- How do young children develop language?
- What are some important features of early childhood education?

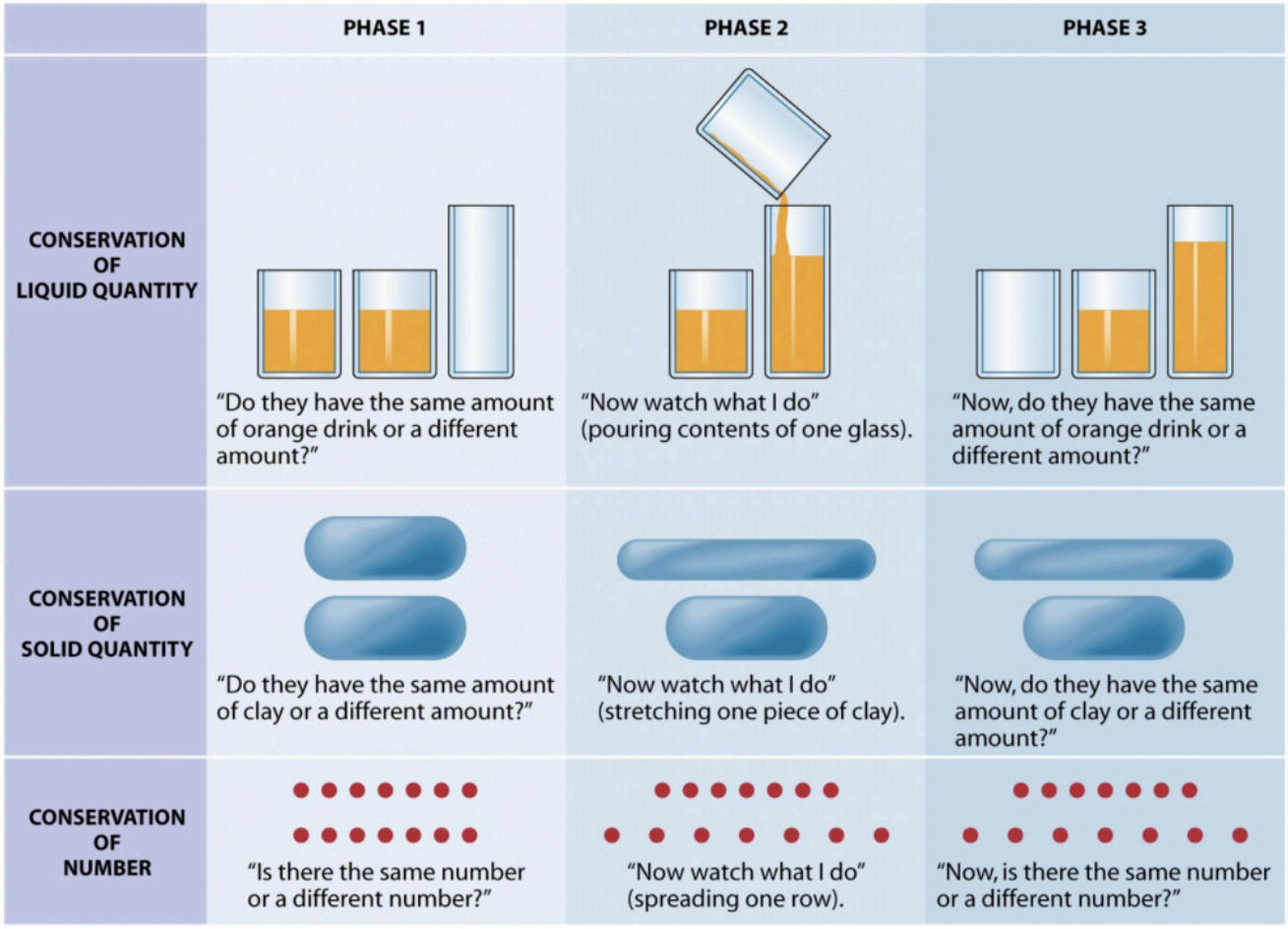
Piaget's Preoperational Stage: Operations are an internalized set of actions. During the preoperational stage, stable concepts are formed. Mental reasoning and magical beliefs emerge. Egocentrism strengthens, then weakens. Thought is still flawed and not well organized.

The symbolic function substage is the first substage of preoperational thought. It occurs between the ages of 2 to 4. The child gains an ability to mentally represent an object not present. Drawings are imaginative.

There are two limitations on preoperational thought. **Egocentrism** is a child's inability to distinguish between one's own perspective and someone else's. **Animism** is the belief that inanimate objects have lifelike qualities and are capable of action.

The intuitive thought substage occurs between 4 and 7 years of age. Children begin to use primitive reasoning and seek answers to all sorts of questions. **Centration** and **conservation** occur during this stage. Centration is the focusing of attention on one characteristic to the exclusion of all others. Conservation realizes that altering an object's substance does not change it quantitatively (Berk, 2017; Santrock, 2013; Jensen & Arnett, 2019).

Conservation Concepts



Vygotsky's Theory of Development

Vygotsky believed that children actively construct their knowledge and understanding. Their ways of thinking develop primarily through social interaction. He believed that all members of a classroom could be both teachers and learners. He theorized that each child has a zone of proximal development at each stage in their learning. The Zone of Proximal Development has two limits: the lower limit is what a child can achieve independently, and the upper limit is what can be achieved with the guidance and assistance of adults or more skilled children. Vygotsky introduced the notion of scaffolding in instruction, which is changing the level of support over the course of a teaching session to fit the child's current performance level. Guided participation is used to stretch and support children's understanding of skills.

Language and thought: Children use language to plan, guide, and monitor their behavior. Private speech (self-talk) is an early transition to being more socially communicative. It is used more when tasks are difficult (Berk, 2017; Santrock, 2013; Jensen & Arnett, 2019).

Teaching Strategies Vygotsky Would Agree With

Use a child's zone of proximal development
Use more skilled peers as teachers
Monitor and encourage private speech
Effectively assess the child's zone of proximal development
Place instruction in a meaningful context
Transform the classroom to encourage group learning (Berk, 2017; Santrock, 2013; Jensen & Arnett, 2019).

Vygotsky vs. Piaget

Vygotsky is a social constructivist; Piaget is a cognitive constructivist.

In Vygotsky's theory, no general stages of development are proposed. In Piaget's theory, there is a strong emphasis on stages of development: sensorimotor, preoperational, concrete operation and formal operational.

Vygotsky believed that language shapes thought; Piaget believed that language has a small role. Thought directs language.

Vygotsky believed that education plays a central role in helping children learn about culture. Piaget believed that education just refined the child's skills that had already emerged.

Vygotsky believed that a teacher is a facilitator and guide and that it was important to provide many opportunities for children to learn with a teacher and more skilled peers. Piaget also viewed the teacher as the facilitator and guide, someone to provide support for children to explore their world and discover knowledge (Berk, 2017; Santrock, 2013; Jensen & Arnett, 2019).

Literacy in Early Childhood Education

Literacy is the understanding of language. Literacy encompasses reading, writing, listening and speaking. Children develop literacy when they have the opportunity to speak, when they have active language partners, and when they are read to.

Nourishing the Young Child's Cognitive Development

Caregivers should provide opportunities for young children to develop symbolic thought by encouraging exploration

Being an active language partner
Being sensitive to the child's level of cognitive functioning: what they can do with and without your help.
Evaluating the quality of the child's early childhood programs.

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Social and Emotional Development in Preschool

Learning Objectives

- What characterizes young children's socioemotional development?
- What roles do families play in young children's development?
- How are peer relations, play and television involved in young children's development?

Emotional Development

Emotions are strong feelings deriving from one's circumstances, mood, or relationships with others. Self-conscious (evaluative) emotions first appear at about 2½ years. Pride is felt when a successful outcome results in joy. Guilt results from judging efforts as failure. Emotional development is heavily influenced by parents' responses.

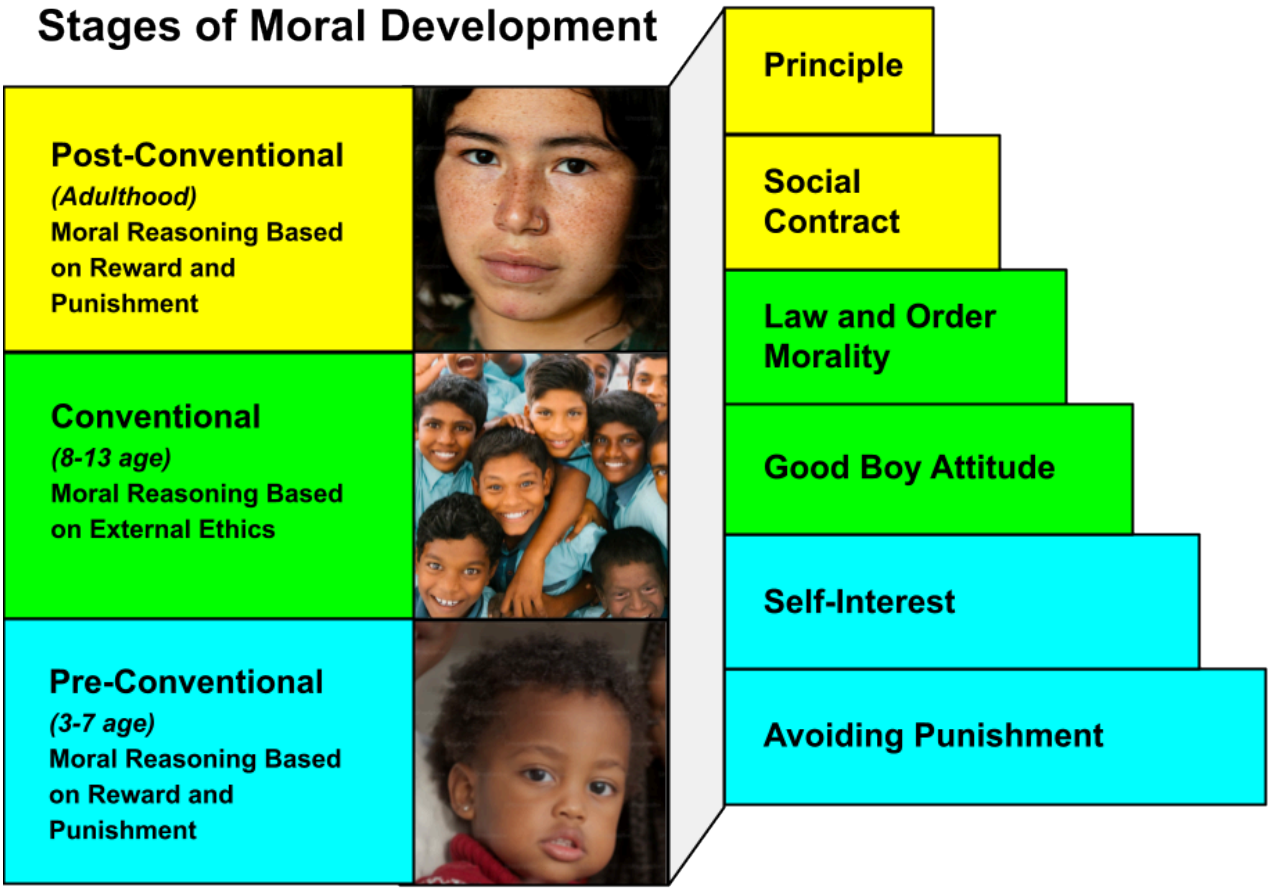
Young Children's Understanding of Emotions: From ages 4 to 5 children show increased ability to reflect on emotions. Self-regulation of emotions continues. Parents play an important role in its development through emotional coaching by nurturing and using praise. Emotional dismissal is when a parent ignores and denies. Emotions also play a big role in peer relations. Moody, negative children experience greater peer rejection. Emotionally positive children are popular. Children controlling emotional responses are more likely to show social competence (Gordon & Browne, 2017; Hyson, 2014).

Moral Development

Moral Development refers to rules and regulations about what people should do in interactions with other people. Piaget extensively researched children. He wrote about two distinct stages of how children think about morality.

Here is a chart outlining Piaget's Theory of Moral Development, heteronomous morality and autonomous morality.

Imminent justice is the belief that if a rule is broken, punishment will be meted out immediately. This is characteristic of heteronomous morality. Autonomous morality realizes that punishment is not inevitable.



Gender

Gender is the social and psychological dimension of being male or female. A gender role is a set of expectations of how females or males should think, act, and feel. Gender typing is a process for acquiring thoughts, feelings and behaviors considered appropriate for one's gender in their culture. There are many things that impact children's beliefs about gender.

Peer Influence

Gender plays an important role in interaction with peers. Children prefer same-sex groups by age 3, and this preference increases through age 12. Gender also impacts social situations. Boys in preschool engage in rough and tumble play and are very competitive. Girls engage in collaborative discourse. More time in same-sex groups is linked to more gender-stereotyped behavior (Berk, 2017).

Teacher Influence

Teachers also have a strong influence on beliefs about gender. Boys' academic problems tend to be ignored more frequently. They experience more learning problems, receive more criticism, and are more likely to be stereotyped as having a behavior problem. Teachers often spend more time disciplining boys and more time giving girls academic tasks to complete.

School and Media Influences

On television, females are often portrayed as less competent. Most prime-time characters are male and traditional roles are reinforced. Most advertising continues to reflect traditional roles.

Gender Schema organizes the world in terms of female and male. Children gradually develop schemas of what is gender-appropriate and gender-inappropriate in their culture.

Socialization is also influenced by parenting styles, sibling relationships and the context of the family structure.

There are four different parenting styles:

- Authoritative: clear expectations, firm consequences
- Authoritarian: harsh, strict punishment, child does not have a voice
- Neglectful: uninvolved, disinterested
- Indulgent: no limits, caregiver gives child everything they ask for (Jensen & Arnett, 2019).

Child Abuse

Punishment sometimes leads to abuse. Types of maltreatment, which include physical maltreatment, child neglect, and sexual and emotional abuse, are all causes for concern. Here are some warning signs to be aware of: questionable patterns of injuries, age-inappropriate sexual knowledge, poor hygiene, food hoarding, and stealing and behavioral extremes.

Developmental consequences of abuse: Poor emotional regulation, attachment and peer relation problems, school difficulties, psychological problems and a later risk of violence and substance abuse. As a teacher, you are a mandated reporter and legally you must report any suspicion of abuse.

Sibling relationships and birth order: Sibling relationships can be both pleasant and aggressive. Siblings treat children differently than parents do. Extensive sibling conflict can be linked to poor outcomes. Birth order can affect sibling relationships.

Importance of Play

Play is a pleasurable activity engaged in for its own sake. It can increase health, release tensions and help children control conflicts. Play also helps with cognitive development. Therapists often use play therapy to help children work through problems.

Social Development in Preschool: Friendship

In infancy and toddlerhood, social interactions with peers are often limited to proximity and to parents' choice. However, upon entering preschool, children suddenly have the chance to play with new peers, in new settings. Unlike early playdates, which are closely monitored and in which parents may choose to intervene to redirect play and to initiate cooperative play, in preschool, children are more likely to be encouraged to play with one another without a great deal of adult guidance, for the purpose of creating social skills.

In a new setting, with new peers, there is often a pattern to the development of social interactions.

Preschool children will not always follow these exact phases, but they are most common and early childhood educators can use this pattern to help set up their classroom for new students, to help move them through the stages.

Nonsocial Play: It may seem counterintuitive, but the first type of play that many preschool students engage in is "nonsocial", which just means that children play at the same time and perhaps even in the same area, but their play is self-centered. Even in a group of 4-5 children, you may see each child playing with an individual toy, talking to themselves and not one another, and following an internal plan for the play that is not shared with or dependent on what any of the other children are doing.

Parallel Play: As preschoolers become more accustomed to the group setting of the classroom, their play begins to be more social as well. Parallel play describes activities that children participate in while physically near each other and often using the same toys, but the intention is still mostly internal, and the social aspect occurs only in an effort to share (or not share) space and objects. For example, two children may be playing in a block center with the same set of blocks, but each is building a separate structure that is not a shared project. This sort of play is an important first step in helping children understand how to share resources (toys and space) and to become aware of other children in their environment. This period of parallel play can be challenging for children who have limited experience with same-age peers because they may not be used to having to negotiate sharing toys with other children who also don't know how to navigate this new social world!

Associative Play: As preschool children get better at parallel play, they will gradually start to incorporate one another into games and activities. This might start out as joining their two block towers or sharing crayons during an art project. The intention of the play may not yet be shared since each child likely has his or her own ideas about what the purpose of the game is; however, they are working together more overtly and are probably speaking to one another to figure out next steps (Gordon & Brown, 2017. This language is likely to be directive "Give me that." as opposed to negotiating phrases such as "should we use that block?")

Cooperative Play: Finally, as preschool children settle into the rhythm of group play and social interactions, they become more comfortable and able to talk to peers. They develop more cognitive awareness of their own intentions, and play becomes cooperative. At this stage, children are playing together intentionally, sharing objects and purpose for games and activities. They may be making up games with shared rules or planning projects together. Now the block building is a joint effort to make the tallest tower, with language being used to negotiate how that will be done. Games have rules, although those may be questioned and changed repeatedly as play goes on!

Television, Prosocial Behavior and Aggression: Watching too much television can cause aggression. Children who watch less television are more likely to engage in prosocial behavior, develop higher level cognitive skills and experience greater achievement (Gordon & Brown, 2017; Shaffer, 2000).

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CHAPTER NINE: SCHOOL AGE (5 YEARS TO 8 YEARS)

After completing Chapter Nine students will be able to:

- Discuss physical growth and change between ages five and eight
- Describe the cognitive changes that occur between ages five and eight

Physical Development in School Age

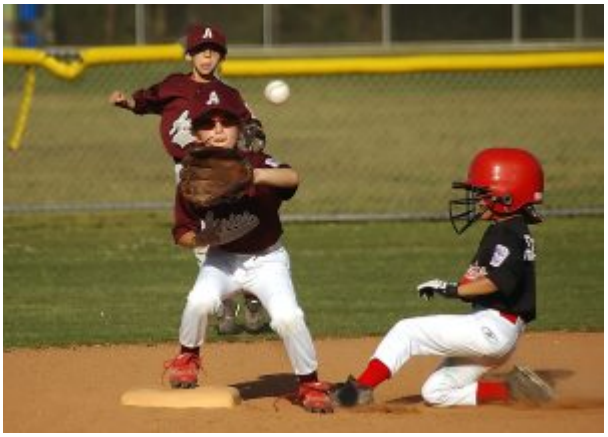
Overall Physical Growth

Rates of growth generally slow during the early school years. Typically, a child will gain 5-7 pounds a year and grow about 2-3 inches per year (Kuczmarski, 2000). They also tend to slim down and gain muscle strength and lung capacity making it possible to engage in strenuous physical activity for long periods of time. Boys typically outperform girls during this period in gross motor tasks such as learning to ride a bicycle. Girls typically outperform boys during this period in fine motor tasks such as stringing beads or cutting one's fingernails.

Brain Growth

During these early school years, children gain greater control over the movements of their bodies. Between ages 6 and 8, significant improvements in fine motor skills and eye-hand coordination are noted. They are able to master many gross and fine motor skills that eluded the younger child. There is a brain growth spurt between the ages of 6 and 8. Another factor related to brain growth is that between the ages of 6 and 12, the nerve cells in the areas of the brain associated with motor planning become almost completely myelinated. Children are better able to plan and coordinate activities using both the right and left hemispheres of the brain and are beginning to be able to control emotional outbursts. The ability to pay attention also improves as a function of continued maturation of the prefrontal cortex (Berk, 2017; Santrock, 2013).

Sports



Children between the ages of 5 and 8 are often exposed to organized sports for the first time. It is also common for parents to give their children the opportunity to engage in other organized physical activities such as martial arts, horseback riding, gymnastics, or dance. The most popular organized sport for youth in America is soccer. Over three million children play soccer in the United States (United States Youth Soccer, 2018). Soccer is an activity that promises to help children build social skills, improve athleticism, and learn a sense of competition. Too much focus on competition and athletic skill is a concern, with many children desiring to quit. The focus for soccer and other youth sports and activities should be on building a love for the game or activity and allowing children to foster their natural talents.

Some of the researched benefits of children's participation in sports include better academic performance, improved physical and emotional development, and higher levels of satisfaction with family and overall quality of life.

Sabo & Veliz (2008) found in their study on children's sports in the United States that gender, disability, ethnicity, poverty, and location all play a role in limiting opportunities for sports participation. Children living in suburban neighborhoods were more likely to participate in sports than those living in urban areas. Caucasian boys and girls participated in sports at higher rates than minority children.

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Cognitive Development in School Age

Cognitive Growth

Once children reach the age of 5-8 (school-age), they are more able to place themselves in other people's shoes maturely. Along with that, their imaginations and perceptive way of thinking also develop immensely during these years. A child's genuine enthusiasm to learn unfolds while they also strive to gain self-confidence. Children during this age are also developing the cognitive skills that allow them to learn to read, an important developmental milestone that occurs in most children by age eight. This varies greatly among children. With so many milestones, it is important to remember that many things need to be in place developmentally before a child can read. In Finland, which has in recent years been hailed as the country with one of the best educational systems in the world, children do not begin school until age seven. Despite this, Finnish students score higher in reading comprehension than students from the United States at age 15. This child centered approach with no formal academic instruction during the early years of childhood is an important consideration for schools across the globe (Sahlberg, 2021). Earlier is not necessarily better. Children in the early school aged years still need lots of opportunities to play and create with open-ended materials.

Secondly, children at this age disclose genuine enthusiasm to learn new things while striving to gain self-confidence. They are open to embracing the necessary skills to understand the world and others around them.

When they enter their 8th year, children can articulate their feelings properly. Also, they can solve various problems verbally and with a range of ideas.

7-8 Year Olds

When the children cross over the 7-8-year-old threshold, their attention span grows greater. They also willingly take responsibility for doing chores. The understanding of fractions and space concepts heightens during this time. Children understand the concept of money by the age of eight. They can also tell time by reading a clock. Remembering the names of days and months becomes easier for them (Santrock, 2017).

The Emergence of Concrete Operational Thought

During Piaget's preoperational stage, children are learning to think symbolically about the world. Cognitive skills continue to expand throughout childhood as thought processes become more logical and organized when dealing with concrete information. As they transition from the preoperational stage into the concrete operational stage, children understand concepts such as past, present, and future. This gives them the ability to plan and work toward goals. Additionally, they can process more complex ideas such as addition, subtraction, and cause-and-effect relationships (Berk, 2017).

Children between the ages of 7 and 11 are in what Piaget calls the concrete operational stage of cognitive development. This stage involves mastering the use of logic in concrete ways. The child in this stage of development can understand principles of cause and effect, size, and distance (Piaget, 1955).

Inductive Reasoning

Inductive reasoning applies a "bottom to top" approach to logic. It allows the person to detect regularities, rules, or generalizations and, conversely, to detect irregularities. It is one way in which we structure our world, Deductive reasoning applies a "top to bottom" approach. With deductive reasoning, if a statement's premises are true, the conclusion must be true. But with the inductive form, even if the premises are true, that doesn't mean the conclusion must be true. Inductive reasoning increases during this stage of development and continues to grow into adulthood (Berninger & Richards, 2002). It is significant because it reflects a child's increasing understanding of the world around them.

Language & Literacy Development

By the time children enter the formal schooling years beginning in kindergarten, they have mastered many of the basic building blocks of language. They have a large vocabulary, understand how to communicate many of their needs to others, adjust their speech for their listeners, and use many grammatical rules in their speech. Their language skills will continue to become more refined during the upcoming years, but the changes are subtler than they were during the preschool years. Compared to the preschool-aged child, the school-aged child can communicate more effectively over a broader range of contexts. A significant accomplishment also occurs during these years... children learn to read!

Intelligence

Traditional View of Intelligence

The first tests of intelligence were developed by Alfred Binet and Theodore Simon at the beginning of the twentieth century. The reason these tests were designed was to differentiate between those children who would benefit from standard schooling versus those who might need special types of instruction. Intelligence Quotient (IQ) was originally used to express the relationship between the number of items passed and the child's age. More recently, a child is compared to children of the same age. This method assumes that IQ is equally distributed across the population, with most people falling in average ranges, and fewer people falling in the upper and lower ends of the scale. Children who score 100, for example, have an IQ equal to or greater than that of 50 percent of children of the same age (Santrock, 2013).

For many children, especially those with strong verbal abilities, IQ tests have been able to predict school achievement and success. They have also helped identify children who may need extra support in school. They have limited value in predicting life success. They have been questioned and even banned for use in school placement in many states. There are many reasons why IQ tests have been questioned, but one of the primary ones has been due to their inherent cultural bias. They test material that is more important or familiar to people from one culture than people from another. This has caused a disproportionate number of children from racial minorities to be placed in special education. Today it is widely recognized that the assumptions underlying IQ tests are flawed and that it is best to conduct a more holistic assessment of the child and their functioning. (Santrock, 2013).

Gardner's Theory of Multiple Intelligences

Multiple Intelligence (MI) Theory is widely recognized as a more holistic approach to viewing an individual's abilities and strengths. It was the result of a synthesis of research on human cognition and a response to the psychologist Piaget who viewed intellect as a single entity (Armstrong, 2018).

Intelligence Defined

The term intelligence, as defined by Gardner, is "a biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture" (Gardner,1999, p.33).

Here is an overview of the eight intelligences Gardner (1993) has researched and whose existence he has documented:

Linguistic (Word Smart): The ability to think in words, and use language effectively, either in writing or orally. The ability to reflect on the use of language in daily life (Gardner, 2006).

Logical-Mathematical (Math Smart): The capacity to use numbers effectively and reason well. Sensitivity to cause and effect functions, patterns, calculation, hypothesis, inference, generalization, problem solving, and categorization (Gardner, 1993).

Spatial (Art Smart): The ability to see the visual world accurately. To think in pictures, three-dimensions, and involves sensitivity to form, space, color, line, and shape. The ability to effectively orient oneself in space and manipulate objects in meaningful ways (Gardner, 2006).

Bodily-Kinesthetic (Body Smart): Involves specific physical skills such as coordination, balance, dexterity, strength, flexibility and speed. The ability to use one's body in expressing ideas and feelings and the ability to use one's hands to transform or produce things (Gardner, 1993).

Musical (Music Smart): The capacity to recognize, create and reproduce music by using an instrument or voice. Involves sensitivity to rhythm, tone, pitch, timbre, melody, and emotions of a musical piece (Gardner, 2006).

Interpersonal (People Smart): Intelligence that is about thinking and understanding another person. The ability to distinguish the moods, motivations, and intentions of others by being sensitive to facial expressions, voice, gestures, and cues. It involves working and interacting effectively with others in a variety of circumstances (Gardner, 2006).

Intrapersonal (Self-Smart): The ability to understand oneself. The awareness of one's strengths, and weaknesses, and the ability to plan in such a way that personal goals can be achieved. The capacity to reflect and monitor one's thoughts, feelings, emotions, and self-esteem effectively (Gardner, 2006).

Naturalist (Nature Smart): The capacity for understanding the natural world, including plants and animals, sensitivity to other natural phenomena such as cloud formation and mountains. The naturalist can discriminate between nonliving forms. They can also interact positively with living creatures and decipher patterns in life cycles and ecological relationships (Gardner, 2006).

MI Theory is now taught in educational institutions around the globe as a framework for best teaching practices. Teachers incorporate the approach into their lessons for students of all ages and in all curriculum areas. Entire schools have adopted an MI approach in how they approach curriculum and assessment (Armstrong, 2009; Buckley, 2019). It has been demonstrated that the use of multiple intelligences enhances instruction for children with and without documented disabilities as well as for English Language Learners (Armstrong, 2018; Buckley, 2019).

When Development Looks Atypical

In order to best be able to identify a child who may have a developmental difference, it is important to have a strong understanding of what typical development looks like. This is what this entire book intends to give the reader!

The early years of school are often when developmental red flags may emerge.

If you are an educator, parent, or practitioner, what should you do? There are three important steps to consider.

The first step is to ask questions about a child's development and health history.

Does the child have a history of any health problems? Even common ear infections, if frequent, can delay speech development.

Has the child been hospitalized? Has a vision and hearing screening been conducted?

The second step is to document what you are seeing. The importance of documentation cannot be understated. Record observations, the reports of others and information regarding developmental milestones that have been met or are emerging.

The final step is to communicate. If you are a parent concerned with your child's development, share your concerns with others, including your child's pediatrician and educators. If you are an educator or caregiver, share your concerns with the child's parents or guardians. Ongoing communication is critical.

If concerns seem warranted, have the child referred for a full developmental evaluation. Many developmental challenges are best addressed with early intervention.

Early supports for a young child who needs them provides the opportunity for the best long-term outcomes for a child.

CONCLUSION

We hope that you have found this textbook helpful in your understanding of young children and their development. We have not gone into detail on a child's development once a child reaches beyond what becomes known as middle- childhood or school-aged, nor have we gone into detail on atypical development. Our hope is that this textbook serves as solid foundation in better understanding what early childhood development encompasses and that the student of early childhood education desires to continually learn more! More and more research continues to support the fact that the early years of a child's life are the most critical years in a child's life. Working with young children for decades and now guiding the next generation of early childhood educators continues to bring both of great joy. Thank you for your commitment to young children and their families. The work you are doing will make a difference for generations to come.

Glossary

accommodation

adjusting schemes to fit new information

Adolescence

12 - 18 years

Ages and Stages

a term used to describe the periods of childhood development

assimilation

incorporating new information into existing schemes

autonomy

independence; self-regulation

Behaviorist Theory

primarily concerned with behaviors that are observable and measurable; emphasizes changes in behavior that result from stimulus-response associations made by the learner

Case studies

refer to investigations in which a single child or small group of children are studied. Case studies are far more in-depth and detailed than longitudinal studies, include the related contextual conditions in which development is observed, and draw upon data from multiple sources.

Causation

describes a relationship among two or more variables in which one occurs as the direct result of another. One thing causes another.

cephalocaudal pattern of growth

growth from the head down

chronosystem

the dimension of time; the transitions and shifts in one's lifespan

classical conditioning

involves learning a new behavior via the process of association; classical conditioning involves associating an unassociated signal (such as a particular sound) with a naturally occurring response or involuntary behavior (such as salivation or blinking)

cognition

thinking; process of acquiring knowledge

Concrete Operational Stage

the stage in which children are capable of operational thought and begin to be capable of thinking logically

conservation

refers to the concept that even if surface attributes of an object changes (such as shape), its mass, volume, and number stay the same. If you flatten a ball of playdough into a pancake, the amount of playdough has not changed—only the shape.

constructivist theory

a learning theory based on the belief that people construct their own knowledge or understandings as the result of experiences and reflection

Continuous development

refers to the idea that development occurs as the result of a continual maturation process

Correlation

describes the relationship among two or more variables that appear to be related to one another, but one does not cause the other

Cross-Sectional Studies

refer to studies in which comparisons are made in the abilities and behaviors of two or more groups of children, each group being of a different age

despair

loss of hope

Developmental Psychology

the study of how and why humans change throughout the lifespan

Developmentally Appropriate Practice (DAP)

refers to a framework designed to promote young children's optimal learning and development. To make decisions that reflect best practices, educators take into consideration what they know about:
child development and learning
each child as an individual
each child's social and cultural context

Discontinuous development

refers to the idea that development occurs in distinct stages, each stage being fundamentally different from the preceding or following stages

domains of development

a term referring to the primary areas of development in which change occurs:
Physical/Biological
Cognitive
Social
Emotional

doulas

professionals who support a woman before, during and after labor

Early Childhood

3 - 5 years

Ecological Theory

states that human development is influenced by the different types of environmental systems

egocentrism

refers to the state in which children are not able to take the perspective of others

exosystem

indirect influences

fine motor skills

small muscle activities

fixed mindset

a mindset in which people believe their basic qualities, like their intelligence or talent, are simply fixed traits

Formal Operational Stage

stage in which adolescents and adults are able to reason logically and systematically, and develop more complex concepts through the addition of knowledge

generativity

a sense of productivity and accomplishment

genetic epistemology

the study of the origins and development of knowledge

gestation

the process or period of developing inside the womb from conception to birth

gross motor skills

large muscle activities

growth mindset

a mindset in which people believe that their most basic abilities can be developed through dedication and hard work

holophrase hypothesis

one word implies a whole sentence

Humanistic Theory

a theory of development which examines the “whole person” and uniqueness of individuals

identity

those characteristics which define each individual

identity crisis

a period of confusion in which a person’s identity is insecure

industry

hard word; application of skill

Infancy

birth - 16 months

inferiority

the sense that something is not as good as something else

initiative

the power to act with intention and self-regulation toward a desired outcome.

integrity

the state of being whole and complete

intimacy

close familiarity or friendship

involution

when the uterus returns to pre-pregnancy size

isolation

the state of being separate and alone, without relation to others

Longitudinal Studies

refer to studies in which a large group of children is studied over time in order to look at specific changes that occur

macrosystem

the culture of an individual

mesosytem

the relationships between the microsystems in one's life

microsystem

the setting in which we have direct social interactions with people and social agents

Middle Childhood

5 - 12 years

mindset

self-perception or self-theory

nature vs. nurture

refers to the debate within developmental psychology concerned with examining whether certain characteristics and aspects of behavior are primarily the result of biological programming (nature) or whether they are learned and the product of experience (nurture)

Negative reinforcers

the removal of an unfavorable outcome used to increase behavior (ex. a child doing something in order to stop being nagged or yelled at)

neurons

brain cells

object permanence

the concept that objects continue to exist when they are out of sight

operant conditioning

also involves learning a new behavior via the process of association, but in this case involves voluntary behavior which is either encouraged via the use of positive reinforcers, or discouraged via the use of negative reinforcers or punishers.

operation

refers to the logical manipulation of information

oxytocics

synthetic hormones used to stimulate contractions and speed up labor

positive reinforcer

a favorable outcome used to encourage (increase) a specific behavior (ex. a child doing something to get praise or a sticker)

Prenatal Period

conception – birth

Preoperational Stage

the stage in which children become capable of representational thought (ex. drawing, pretending, language) but cannot yet understand adult logic or mentally manipulate information

proximodistal pattern of development

growth starts at the center of the body and moves to the extremities

psychosocial theory

describes growth and change throughout life, focusing on social interaction and conflicts that arise during different stages of development

punisher

an unfavorable consequence used to discourage (decrease) a specific behavior

resilience

the ability to effectively cope with and overcome adversity

response

the reaction that occurs as a result of a specific stimulus

risk

exposure to an adverse situation, which may be unwelcome, unpleasant, or even detrimental

role-confusion

mixed ideas and feelings about the specific ways in which one will fit into society

scaffolding

structuring learning encounters in order to support and foster a child's emerging capabilities

Sensorimotor Stage

the stage in which a child is concerned with gaining motor control and learning about physical objects; all interactions are either sensory (ex. seeing, hearing) or motor (ex. grasping, pulling)

Social Cognitive Theory

a learning theory based on the idea that people learn by observing and interacting with others

Sociocultural Theory

a learning theory which examines the relationship between the social world and cognitive development, specifically focused on the significance of culture and the role of language

somnambulism

sleep walking

stagnation

a sense of dissatisfaction due to a perceived of lack of productivity; a sense of being still rather than moving forward

stimulus

an event which brings about a specific reaction or result

Sudden Infant Death Syndrome

when an infant stops breathing and dies without apparent cause

tabula rasa

refers to the view that children are born with no biological predispositions; it then becomes the responsibility of parents, educators and society to write upon the minds of children by providing them with experiences.

telegraphic speech

two word toddler speech

temperament

behavioral style and characteristic emotional response

teratogen

anything that causes a birth defect

Toddlerhood

16 months - 3 years

transitional object

an object like a teddy bear that helps a child to be independent, especially at bedtime

trust

as defined by Erikson, is an essential belief in the reliability of others, as well as a fundamental sense of one's own trustworthiness

umbilical cord

connects the baby to the placenta

Zone of Proximal Development

referring to the difference between a child's existing abilities and what he or she can learn under the guidance of an adult or a more capable peer

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For more information about the ROTEL Project, please visit our project website.

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