The First Two Years: Biosocial Development

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Note: Worth Publishers provides online Instructor and Student Tool Kits, DVD Student Tool Kits, and Instructor and Student video resources in PsychPortal for use with the text. See Part I: General Resources for general information about these materials and the text Lecture Guides for a complete list by text chapter.

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Suggested Activities

Introducing The First Two Years: Biosocial Development

"On Your Own" Activity: Developmental Fact or Myth?

Before students read about biosocial development during the first two years, have them respond to the true-false statements in Handout 1.

The correct answers follow. Class discussion can focus on the origins of any developmental misconceptions that are demonstrated in the students' incorrect answers.

1.	T	6.	T
2.	T	7.	T
3.	F	8.	T
4.	F	9.	T
5.	F	10.	T

Teaching Tip: Using Presentation Software Effectively

PowerPoint and other presentation software programs have become almost as common as chalk in the classroom. Advocates maintain that the visual dynamism afforded by presentation software captures and focuses student attention. In addition, they maintain, the variety of available formats—including video, extreme close-up images, sound, and three-dimensional representations—can elevate students' understanding more than less technologically rich lectures.

Critics of presentation software contend that succinct, bullet-pointed information stifles critical thought. They are fond of pointing out that one NASA official blamed presentation software for some aspects of a mission failure, claiming that engineers were more likely to fail to grasp the seriousness of data that were presented via PowerPoint slides. Students, too, often complain of being overloaded with onscreen information. In my early days of using PowerPoint, students frequently asked me to slow down my lectures as they scrambled to copy the content of slides verbatim. Although many instructors have solved this problem by providing students with the slides before class or on a Web site, students have another gripe. They complain that so much time is spent viewing slides in a darkened classroom that discussion is stifled, along with their alertness!

Cathy Sargent Mester offers several useful tips for preparing presentation software slides and effectively showing them in class.

Slide Preparation

- Avoid presenting too much information in a single slide. Too many instructors use slides as speaker notes, or as excerpts from the text. The best slides are "highlights" that clarify and emphasize rather than provide complete explanations. To this end, the "6 × 6" rule should be followed whenever possible. Derived from visual perception research, this rule states that six words or numbers across the field and six down is the maximum that viewers can process in a single look.
- Choose uncomplicated images that are large enough for every student in the class to see. Images should have high contrast and clear labels that are readable from the back of the classroom. The simplicity rule also applies to slide backgrounds, fonts, and the many sounds that presentation software companies have made available.
- Keep the room lights on. Before using a slide deck in class, preview it in the classroom while experimenting with different light settings. Choose a setting that affords the greatest visibility of the slides without triggering dark adaptation in your students' eyes. Lecturing in the dark puts a barrier between you and your students. It also makes it hard for students to take notes as a way of actively engaging in the learning process.

Presenting Slides in Class

- Synchronize slide information with your narration. Slides can be manually advanced as you lecture or triggered automatically on a timer. In addition, information on each slide can either be gradually revealed or shown all at once. Pedagogically, the most effective combination is to manually advance the slides and gradually reveal the content of each slide so that at any moment you are showing only the specific information you want to address. By using a wireless mouse, you can stand anywhere in class, spending as much or as little time on each slide as you need.
- Speak to the class, not the screen. Inexperienced and underprepared lecturers often make the mistake of looking at the slides instead of at the class, sometimes even reading the information. Doing so raises doubt in students' minds about your familiarity with the material and cuts off eye contact with the class. Whenever the human connection is lost, students' attention will wander.
- Be prepared for snafus. Like all forms of teaching technology, computers and projectors malfunction. Be prepared by arriving early to the class. Doing so will help ensure that your presentation is indeed on the flash drive and that there is time to call a technician to get the projector to communicate with your laptop and to deal with the host of other problems that can arise. Ideally, you will also have a contingency plan, either by having backup visual aids such as handouts or by switching to another classroom activity.

Mester, C.S. (2006, September). Technology is not a toy! *Association for Psychological Science Observer.* Retrieved July 11, 2007 from www.psychologicalscience.org/observer.

AV: The Journey Through the Life Span, Program 2: Early Infancy

Program 2 (12:10) examines biosocial development during the first weeks of life. Four-week-old Lily and 7-week-old Julia demonstrate the reflexes we are all born with and the developmental trajectory of those reflexes. The regulation of sleeping and other physiological states is also discussed, along with the underlying neurological development that enables this regulation. A highlight of this segment is a discussion of cultural differences in sleep patterns led by Charles Super and Sara Harkness of the University of Connecticut. The final segment of the program is a delightful exploration of the first exogenous smiles during infancy, the first true social smiles that occur at about 2 months of age, and the pain and hunger cries that infants use to convey their needs.

The unnarrated observation module for Program 2 is divided into two segments. In the first (3:15), the Moro, rooting, sucking, and Babinski reflexes are vividly demonstrated in a 4-week-old infant. The second segment (5:35) depicts a 7-week-old infant in various states of arousal.

AV: Transitions Throughout the Life Span, Program 5: Grow, Baby, Grow

Program 5 begins with observations on the overall growth and health of infants, including their size and shape during the first two years. Next is a discussion of brain growth and development, noting the importance of experience in these processes. At birth, the brain contains over 100 billion nerve cells, or neurons, but the networks of dendrites that interconnect them are rudimentary. Over the course of the first few years, extensive growth occurs in these neural pathways, enabling the emergence of new capabilities in each domain of development.

The program then turns to a discussion of motor abilities, including infant reflexes, walking, and gross and fine motor skills, and the ages at which the average infant acquires them. The final segment discusses the importance of nutrition during the first two years and the consequences of severe malnutrition and undernutrition. During the program, pediatricians Beverly Hendrickson, Alberto Gedissman, and W. Donald Shields, along with developmental psychologist Claire B. Kopp, provide expert commentary.

AV: The Journey Through the Life Span, Program 3: Infants and Toddlers

Program 3 introduces the developing person during infancy and toddlerhood as embarking on a journey of sensorimotor and social change that will affect every domain of his or her development. The first segment of the program, physical development (7:00), begins by pointing out the changes in size, weight, and shape that occur during infancy. Charles Nelson of the University of Minnesota outlines the stages of brain growth, focusing on the myelination of the central nervous system. A highlight of the segment is the depiction of the universal developmental pattern by which infants around the world develop postural control, the ability to sit up, crawl, stand, and take the first tentative steps.

The second segment of the program describes cognitive development (18:30) and so might be held for your discussion of cognitive development during the first two years. It begins by describing infants' emerging perceptual abilities. The development of reaching and grasping is depicted, as is the ability to differentiate mother's voice from other people's. Charles Nelson discusses infant face perception and recognition of emotional expressions in other people and the developing awareness of the affordances that objects provide. Karen Adolph of New York University explains how infants perceive surfaces and how they learn more and more about affordances as they refine their locomotion skills. At each developmental milestone (cruising, crawling, sitting, etc.), babies must essentially relearn to perceive the world around them. The segment then describes the development of perceptual constancy and how researchers use the habituation procedure to test infants' abilities. The final portion of the segment centers on Jean Piaget's stage of sensorimotor development. The development of object permanence, memory, and imitation are discussed, and the six substages of the sensorimotor period are delineated and described in detail. In the closing minutes of the segment, Steven Pinker of MIT describes the language explosion that occurs during the first three months of life, focusing on Noam Chomsky's notion of universal grammar. In their need to communicate, infants first make sounds that develop into cries and then babbling, which forms the building blocks of speech. These lead to the first words and holophrases and then, telegraphic speech. More than any other skill, the emergence of language signals the end of infancy and the beginning of childhood.

The final segment of the program, social development (10:20), begins by exploring synchrony between infants and caregivers throughout the world. Separation anxiety and stranger anxiety are described and the biological advantages conveyed by the infant–caregiver bond are discussed. The strange situation test is depicted and the nature of secure attachment and avoidant attachment is explored. In a fascinating segment, Gilda Morelli of Boston College describes her research studies of attachment among the Efe people of the Congo region in Africa. The program concludes with an exploration of toddlers' emerging self-awareness and temperament. The temperamental types of "easy," "difficult," and "slow-to-warm-up" are differentiated and depicted.

The observation module for this unit is divided into three segments. In the first segment (0:50), 5-month-old Skye and 6-month-old Boris illustrate the development of coordinated arm and leg movements. In the second segment (5:00), 1-year-old Rylen and Maya and 11-month-old Lilith demonstrate a variety of locomotor and manual skills. In the third segment (4:20), 18-month-old Emma demonstrates her remarkable skills of speech and coordinated hand–eye movements. Because her arms are short, she can reach only to the top of her head, which provides a good illustration of infant body proportions.

Teaching Tip: How Biology and Culture Shape Parenting

A good way to begin discussion of this material is to pose the following problem to your students:

> It's 3 A.M. and little Davy is wailing in the nursery. Shaking her husband, Mom says: "Get up. It's your turn to feed our son. Don't you hear him crying?" Dad rolls over and says: "Davy has to learn to sleep through the night sooner or later. Let him cry." Who's right? Mom or Dad?

According to the sociocultural perspective on development, there are as many different views on how to raise children as there are parents, relatives, and pediatricians eager to offer opinions. If your class is like most, your students' reactions to this example will reveal that even the most basic questions can be quite polarizing. Some will argue that if you let a baby cry, the child will become an emotional cripple. Others will argue with equal passion that the opposite will occur and the child will eventually adjust by becoming a self-possessed, independent adult. If you want to push this exercise a bit further, here are some other good questions to pose: If a child sleeps in his or her parents' bed, will he or she become overly dependent or more affectionate and secure? Does breast-feeding on demand lead to an overweight, demanding child or a lean and healthy, loving one?

These examples also are a good way to introduce the scientific study of ethnic and cultural variations in parenting. Consider the Gusii, an agricultural people of southwestern Kenya, who would never allow an infant to remain alone and crying. Gusii infants are carried around by their mother or a nurse all day long, and they are never left alone to play by themselves. In addition, they are breast-fed whenever they cry, even if it means that the mother must leave her work in the fields. Yet, these mothers rarely talk to their babies, believing that doing so fosters a child who is self-absorbed and too individualistic for the communalistic society in which they live. Contrast this lack of concern for early linguistic stimulation with the views of parents who miss no opportunity to provide cognitive stimulation to their offspring, beginning almost from the moment of conception.

But parenting is shaped by natural as well as cultural evolution. This means that child-rearing practices that may seem beneficial from a societal standpoint are sometimes not optimal to the well-being of the infant. Regarding the issues of nursing on demand and sleeping with parents, all primates evolved to be held, fed, and slept with until they were ready to fend for themselves. Thus, it may make sense to allow children to sleep with parents and to be breast-fed on demand until they wean themselves.

Epigenetic inheritance can account for the transmission of parental behaviors (and other phenotypic responses) from one generation to the next. Although psychologists have long maintained that behavior can influence evolution, until fairly recently, plausible mechanisms have not been identified. One example of epigenetic inheritance is relatively common; in this case, typical responses made by a parent to environmental threats or challenges are displayed by offspring, even when the offspring have not themselves encountered the same threats or challenges. Likening the phenomenon to "phenotypic inertia," Lawrence Harper of the University of California, Los Angeles, suggests that gene expression is altered in subsequent generations, resulting in a type of "intergenerational continuity" of response.

Harper, L. V. (2005). Epigenetic inheritance and the intergenerational transfer of experience. *Psychological Bulletin, 131*(3), 340–360.

Body Changes

Body Size

Teaching Tip: The Evolutionary Perspective on Infant Growth

To stimulate thinking about the evolutionary perspective on human development, you might remind your students that any specific pattern—such as a growth spurt—must have evolved because it added some benefits to the life of the species. Then ask them to speculate as to what these benefits might be.

All placental mammals, including humans, share some fundamental physical skeletal and neurological adaptations. Among these are those related to rapid and flexible locomotion, brain capacity suited for high levels of learning by offspring, and intense attachment to parents.

In contrast to these universals of mammalian development, humans differ from most other mammalian species in our postnatal growth patterns. For example, whereas mice reach their maximum rate of growth after birth (during the infancy stage), humans achieve their maximum rate of growth in length and weight during prenatal development, with growth rates slowing during infancy. This difference is probably due to the fact that humans typically have only one fetus per pregnancy, while competition among multiple fetuses in mice and other mammals in which litters are the norm limits prenatal growth rates. Another difference is that the human placenta is much more efficient in providing nutrition than that of other mammals. Cows, for example, grow much more rapidly after birth than before because lactation provides much better nutrition than that received via the placenta.

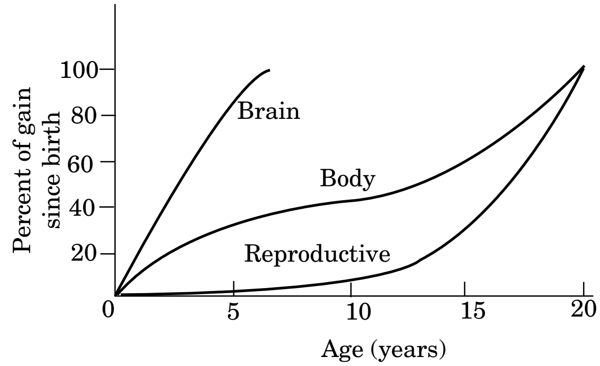
Another major difference is that among most nonhuman mammals, puberty begins when growth rates are decelerating but still near the maximal rate of infancy. In contrast, human puberty takes place when the rate of growth in weight and height are at their lowest points since birth. A fourth difference is that while human adolescence is marked by a cascade of endocrine changes that trigger the pubertal growth spurt, growth rates in other mammals continue to decline following puberty. A final difference is that while humans generally delay the adult reproductive stage for some years after puberty, other mammals generally begin to reproduce soon after they are fertile.

Thus, while most mammals develop "seamlessly" from infancy to adulthood, humans show patterns of growth that are much more stagelike and include a long interval between weaning and puberty that is almost completely absent among other nonprimate mammals. One hypothesis to explain the juvenile stage is that this period enabled an extended time for brain growth and the social learning necessary to ensure reproductive success (*learning hypothesis*). To survive, social animals such as primates must learn how to live within the group's social hierarchy. They must also develop the skills necessary for locating food, hunting, competing for mates, and caring for offspring. An extended period for learning also permits a species to adapt to unpredictable changes in climate, food availability, and so forth.

Another hypothesis for the existence of a juvenile stage is that individuals with delayed reproductive maturity may have survived to adulthood more often (and achieved greater reproductive success) than individuals who matured at a younger age. Support for this *dominance hypothesis* comes from evidence that among wolves, lions, and other social carnivores, high-ranking individuals in the dominance hierarchy seem to be able to inhibit the reproductive maturation of younger, low-ranking individuals. This may occur as a result of stress-related hormonal changes triggered by social intimidation, or as a result of inadequate nutrition because of competition for food.

As a final quiz for your students, ask them to speculate as to why humans and most primates delay body growth and sexual maturity, but do not delay brain growth. As noted in the text, the human brain reaches 75 percent of its adult weight by age 2, while body growth obviously continues until age 18 and beyond.

According to the evolutionary perspective, this pattern of growth gives primates their incomparable ability to learn (note that for most children, formal schooling is delayed until approximately the age of brain maturity). It may also be the case that rapid brain growth and delayed body growth and sexual maturation also contribute to the overall reproductive success of the species. Older, "prereproductive juve-



niles" can help their parents care for new infants (and develop their own caregiving skills at the same time).

Mascie-Taylor, C. G., & Bogin, B. (2005). *Human variability and plasticity.* Cambridge: Cambridge University Press.

*AV: Developmental Phases Before and After Birth (*30 min., Films for the Humanities and Sciences)

This film describes milestones of physiological and psychological development during the fetal period and the first year of life. A major theme is that these milestones are identical for children throughout the world. It also examines the impact of the mother–child relationship on child development.

*AV: The First 365 Days in the Life of a Child (*13 programs, 28 min. each, Films for the Humanities and Sciences)

This 13-part series describes normal development of an average healthy child during the first year of life. The series focuses on the research of a group of pediatricians at the University of Munich who systematically observed and filmed five babies for a year. From these observations, the researchers developed a system of developmental tests that measures a baby's most important developmental functions monthly. The first program shows the reactions of the newborn 10 days after birth. Programs 2–13 show the baby at 1 month, 2 months, and so on until the first birthday.

AV: A Baby's World (3 volumes, 60 min. each, Insight Media)

This three-part series provides a detailed depiction of the remarkable process by which helpless infants develop biologically, cognitively, and socially into walking, thinking, and talking human beings.

AV: In the Beginning: The Process of Infant Development (15 min., Davidson Films)
Nurturing (17 min., Davidson Films)

These two movies can be shown together. Both feature Dr. Bettye Caldwell describing infant development. *In the Beginning* shows stages of development in several children, illustrating normal variation in growth rates. *Nurturing* examines the role of the caregiver as an active contributor to optimal growth. Caldwell offers several suggestions for fostering curiosity, exploration, and stimulation.

Classroom Activity: Evolutionary Theory and Head-Sparing

Head-sparing is the process by which the nutrition stored as body fat is used to protect a baby's brain during times of inadequate nutrition. Even if the body stops growing as a result of dietary deficiency, the brain's development is protected, or "spared." This fascinating developmental phenomenon is an excellent starting point for a class discussion of whether evolutionary pressures and definitions of "fitness" have shifted over the millennia. Get the ball rolling by pointing out that head-sparing was viewed as an adaptive response to the immediate environmental challenge of a less-than-optimal pregnancy. Students will readily understand that, from the standpoint of species survival, during such times the brain's needs must take precedence over those of the body.

However, the long-term developmental consequences of head-sparing are potentially quite negative, including increased risk of obesity, impaired cognitive development, and a greater risk of metabolic diseases later in life. More recently, some developmental psychologists have suggested that the adaptive process of head-sparing evolved (and was appropriate) in the challenging environments of prehistory, when a steady supply of food was difficult to come by. Today, however, head-sparing is mismatched with the modern environment of the developed world. Ask the class whether this argument makes sense, and if so, whether new approaches to intervention and prevention might be appropriate.

Gluckman, P. D., & Hanson, M. A. (2006). The consequences of being born small: An adaptive perspective. *Hormone Research, 6*5(3), 5–14.

"On Your Own" Activity: Growth Rates During the First Two Years—On an Adult Scale

Using their own weights and heights, students can answer the questions in Handout 2 to see how dramatically the developing person grows in the first two years of life. The first statement is, "If you were gaining weight at the rate of an infant, your weight would be tripled one year from today. Calculate how much you would weigh."

Students should note the extremely rapid rate of growth of infants during the first year, and the comparatively slower rate of growth in the second year.

AV: The Growing Infant (30 min., Insight Media)
*The First Year of Life (*28 min., Films for the Humanities and Sciences)

These two films examine physical growth during infancy, including cephalocaudal and proximodistal principles, the relationship between cognitive and physical growth, and the development of vision, hearing, and perceptual abilities. *The Growing Infant* follows one child through several stages of development. *The First Year of Life* explores how newborns see, hear, and make use of skills developed even before birth to interact with their surroundings. The infant's emerging individuality is also discussed.

Sleep

Classroom Activity: The First Two Years of Sleep

Students are fascinated by sleep. Those who are parents, or who anticipate having children, will benefit from knowing developmental norms for sleep behavior during the first two years of life.

Like adults, infants cycle between rapid eye movement (REM) sleep and non-rapid eye movement (NREM) sleep. Unlike the 90-minute sleep cycle of adults, the complete sleep cycle in infants lasts about 50 to 60 minutes. As any parent knows, newborns sleep on and off, all through the day and night, averaging 15 or 16 hours out of every 24. By age 4 months, most babies sleep a 6- to 8-hour chunk at night, and by age 6 months, about 10 to 12 hours. The following table illustrates the developmental progression of nighttime and daytime sleep over the first two years of development.

Age	**Nighttime Sleep (hours)**	**Daytime Sleep (hours)**	**Total Sleep (hours)**
1 month	8.5 (many naps)	7.5 (many naps)	16
3 months	6–10	5–9	15
6 months	10–12	3–4.5	14.5
9 months	11	3 (2 naps)	14
12 months	11	2.5 (2 naps)	13.5
18 months	11	2.5 (1-2 naps)	13.5
2 years	11	2 (1 nap)	13

Source: University of Michigan Health System. (n.d.). *Sleep problems.* Retrieved July 10, 2007 from www.med.umich.edu/1libr/yourchild/sleep.htm.

Classroom Activity: Problem-Based Learning: Sleeping Patterns

The Introduction's Classroom Activity: Introducing Problem-Based Learning describes this relatively new pedagogical tool. Following is a sample problem that you might want to give to your students as part of your coverage of biosocial development during the first two years:

> Marysol and Belize disagree about whether their infant daughter should be allowed to sleep with them in their bed. Belize strongly feels the baby should be allowed to sleep with them because his family has done this for generations. Marysol disagrees, expressing concerns based on some information she heard on the evening news.
>
> Before you leave class today, your group must address the following questions: First, from what you have learned about co-sleeping, how prevalent is this practice and how do cultural customs affect sleeping patterns? Second, after your group agrees on an answer to the first question, determine some resulting learning issues that need to be researched to answer the question, "Where Should Babies Sleep?"
>
> Based on your group's decisions, you should devise a plan for researching the various issues. Two weeks from today's class, your group will present a recommendation for Marysol and Belize based on the issues you think are relevant.

Brain Development

*AV: Birth of a Brain (*33 min., CRM/McGraw-Hill)

This film shows the development of the brain from the fetal period through infancy. Two features make it particularly interesting. First, it uses moving pictures to show the development of neurons, dendrites, and axons in the brain as maturation occurs. The striking images of this process help students visualize the crucial prenatal and postnatal periods of development.

Second, it uses only one infant, from birth to about 8 months, to illustrate brain development. Beginning with her Lamaze birth—a useful review of Prenatal Development and Birth—we watch as the infant becomes more capable of coordinated motor movements and early language, and of interaction with her parents and her older sister (who is, predictably, jealous).

The interaction of biological and psychological factors is apparent throughout the film. For example, the narrator stresses the importance of avoiding toxins (both postnatally, in the form of "chemical pacifiers," as well as prenatally) and providing proper nutrition and stimulation to allow the brain to develop normally. This film includes material that can easily serve as a springboard for many of the topics in this unit as well as cognitive and psychosocial development during this period.

AV: The Development of the Human Brain (40 min., Films for the Humanities and Sciences)

This film traces the course of brain development from conception to age 8. After describing brain functions that are already present at birth, it identifies the range of motor and cognitive skills that appear as the brain matures.

AV: The Brain (50 min., BBC Films)

Using vivid graphics, animation, and three-dimensional models, this spectacular video takes students on a complete tour of the brain.

AV: Pediatric Brain Development: The Importance of a Head Start (13 min., Films for the Humanities and Sciences)

(See description in Prenatal Development and Birth.)

AV: Pediatric Neuroscience: Rage of Innocents (47 min., Films for the Humanities and Sciences)

Taking a strong sociocultural and evolutionary perspective, this film explores the impact of attentive and neglectful caregiving on the emotional and neurological development of the child. Researchers discuss studies demonstrating a biochemical link between early caregiving and the development of brain regions that regulate emotions and the individual's response to stress. It also explores parental nurturing from the perspective of evolutionary biology.

"On Your Own" Activity: BYOB: Bring Your Own Brain

To familiarize students with the overall structure of the brain—especially the cerebral cortex and other areas that develop most rapidly during the first two years—have them follow the guidelines in Handout 3 and actually prepare an edible, neuroanatomically accurate model of the brain. The model can be an appetizer, dessert, or other food item depicting the cerebral cortex, brain stem, limbic system, nerve cell, or any other part of the central nervous system.

In addition to being a fun-filled—and perhaps delicious—activity, the diversity of projects that is sure to result will expand on the text coverage of the developing brain.

Sensation and Movement

AV: The Discovery Year (52 min., Films for the Humanities and Sciences)

The late Christopher Reeve hosts this exploration of the first year of life—the discovery year—as babies learn to use their senses, crawl, explore, and finally walk. The program also examines how personality develops at this young age by focusing on how three sets of parents respond to the individual personalities of their infant daughters.

AV: Discovering the Outside World (23 min., Films for the Humanities and Sciences)

This program focuses on the extraordinary development of the individual that occurs during the first nine months. Sleep–waking cycles are described, sensory development is outlined, and the infant's expanding repertoire of communication skills is delineated.

AV: The Newborn: Development and Discovery (29 min., Magna Systems, Inc.)

This film discusses the developmental needs of the neonate, focusing on tests that determine the state of sensory, motor, cognitive, and social development. Other issues explored include bonding, breast- versus bottle-feeding, and the care of high-risk infants.

The Five Senses

AV: Seeing Infants with New Eyes (30 min., Child Development Media)

This documentary profiles infant specialist Magda Gerber and her philosophy of raising self-confident, intrinsically motivated infants.

AV: Helping Babies Learn (19 min., Child Development Media)

This brief video presents a discussion of how caregivers can create stimulating environments for infants and toddlers. It also includes developmentally appropriate learning exercises.

Observational Activity: Time Sampling of Newborn Behavior

All babies come into the world with a number of internal biological "clocks" that regulate cycles of sleeping, waking, and eating. Although all infants show the same states of sleeping and waking, the exact patterns exhibited by infants vary greatly.

Sleep is the dominant state for neonates, with newborns averaging 16 hours of sleep during each 24-hour period. Infant sleep differs from adult sleep, however, in that newborns sleep only in short stretches of 2 to 3 hours, much to the chagrin of haggard first-time parents who are used to sleeping in 7- to 8-hour stretches. Beginning at about 3 months of age, however, babies begin to sleep through the night. By 6 months of age, fully half of an infant's daily quota of sleep occurs during the night.

Newborn sleep alternates between *active sleep* and *quiet sleep*. These two stages probably represent rudimentary forms of adult REM (rapid eye movement) sleep—which is linked to dreaming—and non-REM (NREM) sleep, respectively. NREM sleep may be especially important in restoring the body's physiological resources after the day's activities. In adults, REM and NREM sleep alternate on a 90-minute cycle; in newborns, the two stages alternate in a 1-hour cycle. In the neonate, active sleep accounts for up to 80 percent of total sleep. By 6 months of age, the sleep cycle lengthens to more closely approximate the adult pattern, and active sleep is reduced to about 30 percent of total sleep. Handout 4 provides suggestions for having students observe newborns in a hospital setting. Handout 5 describes the procedure for students and provides a data sheet and follow-up questionnaire for them to complete.

Although hospital nurseries are extraordinarily busy places, most will permit a small number of students to observe the newborns (through the observation window) for half an hour or so. However, be sure to first obtain permission from the hospital administration and coordinate the scheduling of student visits with the nursing staff so that the visits will not be disruptive to the nursery.

After introducing the activity in class, distribute copies of Handout 4, which lists the five infant states identified by the questionnaire authors. Next, explain the *time sampling* method of observing behavior in order to prepare students for the observational activity. The following information should be helpful.

In the time sampling method, an observer records the frequency, or presence/absence, of an overt behavior (one that can be seen clearly and counted) during short time intervals of uniform length. As a method of observation, time sampling has several advantages: (1) it takes less time and effort than other methods, such as narrative recording; (2) it is more objective than some methods; and (3) it provides useful information on intervals and frequencies of behavior in a quantitative format that lends itself to statistical analysis. The disadvantages of time sampling are as follows: (1) it is limited to overt behaviors, (2) it takes behavior out of context and does not keep units of behavior in their original form, and (3) it does not describe the behavior, its causes, or results.

Now distribute copies of Handout 5, which includes a description of the procedure, a data sheet, and a follow-up questionnaire. After students have had a chance to review the procedure, answer any questions they might have. Have students work in teams of two, with both students in a team scoring the same infant independently. After the observation has been completed, instruct students to complete the questions on the follow-up questionnaire and hand it in, along with their data sheet.

Classroom Activity: Incorporating a Comparative Perspective Into Developmental Psychology

Psychology is usually defined as the scientific study of behavior and mental processes, yet many courses limit their focus to human behavior and cognition. When animal research findings are discussed, they are often descriptions of older research, presented in historical context (e.g., Harlow's attachment studies; early studies of learning by Pavlov and Skinner).

Suzanne Baker of James Madison University suggests that incorporating information on the behavior of nonhuman species into your class can give students a more comprehensive picture of the richness and diversity of behavior and mental processes throughout the animal kingdom. All species, including humans, face problems in their physical and social environments. These include problems related to obtaining food, shelter, safety and other resources; surviving as a member of a social group; and adapting to changing circumstances.

In this unit, you might focus on comparative differences in sensory and perceptual processes. Characteristics and limitations of the human infant's sensory capabilities are highlighted when they are compared with those of other species. A good way to start is by noting that sensory and perceptual capabilities have evolved as adaptations to the social and physical environment of the species. Animal species provide fascinating examples of specialized sensory systems. For example, bats use high-frequency sonar, outside the range of human hearing, to orient and to capture their prey in total darkness. Rats, which have poor visual acuity, communicate using ultrasound and are sensitive to light in the ultraviolet (UV) region of the spectrum. Elephants' use of infrasonic vocalizations allows them to communicate over vast distances. Almost every species of bird can see UV light, and color signals in these wavelengths often play an important role in how they select mates. Some species of fish can also see UV wavelengths.

Many teachers are reluctant to give up time to fit information on the behavior of nonhumans into an already overcrowded course curriculum. However, even the briefest diversion into the world of animal behavior can broaden students' understanding of the diversity of behavior, and deepen their appreciation of the applicability of some of developmental psychology's big principles and ideas. Additional ideas for incorporating a comparative perspective into your course can be found in other units of these resources.

Baker, S. C. *Expanding our students' horizons: Incorporating a comparative perspective into psychology courses.* Retrieved on November 8, 2010, from teachpsych.org/resources/e-books/eit2005/eit05-01.pdf.

Classroom Activity: The Development of Visual Perception

Infants come into the world with remarkably acute sensory and perceptual systems, all of which continue to develop after birth. You can expand the text discussion of the development of infant visual perception by explaining the physiological changes that cause the improvements.

Studies using Robert Fantz's preference method show that although vision is not well developed at birth, acuity improves rapidly. (In these studies the infant is shown two images; a consistent preference for one image over another indicates an ability to discriminate between the two.) The newborn's limited distance vision is due primarily to the inability of the *cornea* and *lens* of the eye to focus images on the infant's retina. At birth, the *retina* is not fully developed; although the *rods* and *cones* in the outer, peripheral region are relatively adultlike, the cones in the central region (*fovea*), which later will permit the sharpest vision, are immature. At higher levels in the visual system, including the *lateral geniculate nucleus* and the pathways to the *visual cortex*, we find a similar degree of immaturity in the neonate. Here, too, however, development is rapid; these neural pathways are nearly mature only two months after birth.

Visual focusing in the adult is largely due to the ability of the *ciliary muscles* of the eyes to contract and thereby change the shape of the lens in order to *accommodate* nearby or distant objects in the visual field. In general, the eye muscles are not well developed at birth, which limits the infant's ability to accommodate, or focus. Because these muscles also control eye movements, a baby's eyes occasionally move in different directions. Eye coordination also improves markedly during the first months after birth.

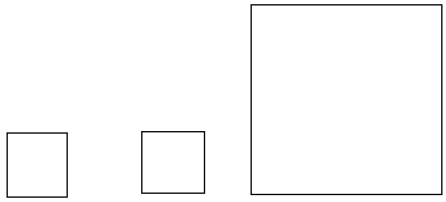
Neonates have limited color vision. One-month-old infants, for example, have difficulty distinguishing red or green stimuli from a yellow background. By the time infants reach the ripe old age of 3 months, however, they seem to possess the *trichromatic* (three-color) vision characteristic of adult color vision.

Babies seem capable of responding to visually perceived movement soon after birth. In one remarkable study, researchers presented moving cartoon faces to babies who were only 9 *minutes* old. All the babies consistently moved their heads to follow the moving cartoon figures.

Adult vision is also characterized by *perceptual constancy*, or the tendency to perceive objects as remaining the same even when their actual appearance (as represented on the retinas of the eyes) changes. Visually, adults perceive constancy of size, shape, brightness, and color. To determine whether size constancy is present in infants, researchers have relied on a technique known as the *conditioning method*. In this method, the experimenter rewards the baby for making a simple motor response, such as turning his or her head in response to an interesting visual image, perhaps by "popping up" in front of the infant in a simple game of peekaboo.

Using this conditioning method, Gordon Bower conditioned infants to turn their heads only when a particular white cube was displayed (see original cube, figure on next page). If the infants responded when the cube was not displayed, no reward was delivered.

In a later test, Bower presented the original white cube and several other test cubes, as illustrated in the figure, measuring the number of head-turning responses that each triggered in the infant subjects. Bower reasoned that the number of responses to each cube was an indication of how similar it seemed to the



Stimulus:	Original Cube	Test Cube 1	Test Cube 2
Size:	30 cm	30 cm (same)	90 cm (larger)
Distance:	1 m	3 m	3 m

original cube. A significant number of responses to test cube 1—a cube the same size as the original cube but presented at a different distance—would indicate the presence of size constancy, or an awareness that objects remain constant in size even though their distances (and the retinal images they project) are changed. Conversely, a significant number of responses to test cube 2—a larger cube presented at a greater distance so that it projected a retinal image *the same size as the original cube*—would indicate the absence of size constancy.

Infants as young as 6 weeks of age made a total of 98 head-turns to the original stimulus, 58 head-turns to test cube 1, and only 22 head-turns to test cube 2. Bower concluded that infants do possess some size constancy.

More recent studies have failed to consistently demonstrate size constancy in such young infants. Because depth perception—which is not fully developed until about 4 months of age—may be necessary for size constancy, some researchers prefer a more conservative approach, saying that constancy is present by 6 months of age and that data from younger infants are inconclusive.

Matlin, M.W. (2005). *Cognition* (6th ed.). Hoboken, NJ: Wiley.

"On Your Own" Activity: Infants' Shape Preferences

To familiarize students with the classic preference method of assessing perceptual abilities, have them complete Handout 6, which examines infants' preferences for shape. Students are asked to construct six test stimuli consisting of cartoon faces, bull's-eyes, and blank circles. They then are asked to present the test stimuli one at a time to a 2- to 6-month-old infant while measuring the number of seconds the infant looks at each stimulus before turning away.

Students should find that infants initially prefer simple visual patterns consisting of highly contrasting elements. Researchers have also discovered that infants prefer curvilinear patterns to straight-line patterns; they prefer concentric patterns (as in the bull's-eye) to nonconcentric patterns; and they prefer shapes with multiple orientations to those with all the elements oriented in the same direction.

AV: Simple Beginnings? (24 min., Films for the Humanities and Sciences)

This short film explores child development from birth to age 5. An especially interesting feature is the description of three experiments, which test early abilities of infants to recognize faces and motion as well as their short-term memories.

Classroom Activity: Facial Expression Processing: Neurobehavioral Maturation or Cognitive Scaffolding?

From infancy through adulthood, the ability to distinguish among and interpret facial expressions plays an important part in the development and maintenance of human relationships. It is therefore not surprising that adult women, whose interactions tend to be more intimate than those of men, are more accurate at identifying nonverbal cues than are men. Although the adult female advantage in processing nonverbal cues is well documented, the process by which it develops is poorly understood.

A meta-analysis by Erin McClure of Emory University was designed to explore this issue, focusing on facial expression processing (FEP). First, here's some basic information about FEP and theories regarding its development. FEP is operationally defined in terms of performance on a variety of tasks involving facial expression discrimination, recognition, and identification. Most studies of FEP in the first months of life use visual preference or habituation techniques to evaluate discrimination among facial expressions. In preference tasks, emotional expressions are presented either in pairs or successively to an observing infant. Examiners measure the duration of the infant's gaze at differing expressions; gaze times are then compared between expressions. If infants show a preference for one expression by gazing at it longer over several trials, it is assumed that they can discriminate among the different expressions presented.

FEP habituation tasks involve repeatedly presenting a facial expression to infants until they meet a predetermined criterion, often defined as decreasing by 50 percent the time spent looking at the face before looking away. Following a short delay, a new expression is presented, and infants' duration of gaze is once again measured. If infants look longer at the novel face than they did at the last presentation of the habituated face, they are thought to perceive a difference between the two. Conversely, if they gaze at the novel expression for the same length of time as they did at the habituated expression, they are not thought to perceive any difference.

According to the *neurobehavioral maturation* model, FEP development depends on maturation of brain areas that are specialized for recognition of complex patterns such as faces. Studies have implicated a variety of brain areas, but especially several areas in the temporal cortex and the amygdala. For instance, using micro-electrodes to record single neuron activity, numerous investigators have found cells in the temporal cortex that respond more strongly to faces than to other visual stimuli. Some research indicates that these regions may develop more rapidly in females than in males. In normally developing macaques, for instance, females appear to become capable of forming visual discrimination habits—a skill thought to be mediated by the temporal cortex—earlier than do males.

From the perspective of the neurobehavioral model, sex differences in the development of FEP correspond to sex differences in the maturation of brain areas mediating this skill, particularly the amygdala and the temporal cortex. Findings from several studies suggest that areas in the temporal cortex linked to FEP mature less rapidly in male than in female primates, apparently as a consequence of hormonal surges. When human males and females reach the age of 3 to 4 years, however, their temporal cortexes appear to have reached similar developmental stages. Indeed, both girls and boys in this age range generally perform well above chance levels on tasks requiring them to identify the most common expressions as well as their meaning.

In contrast, the *social constructivist theory* of FEP development maintains that social interactions are critical to the development of nonverbal skills. Adults provide cognitive scaffolding, initially identifying facial expressions or exaggerating their own expressions for the observing child. Over repeated interactions, adults systematically reduce their involvement, leaving more and more of the task to the child. Eventually, the child becomes capable of completing the task alone. From this perspective, gender differences in FEP stem primarily from different patterns of early, scaffolded experience for boys and girls. Over time, individual differences in scaffolding history may lead to differences in boys' and girls' development of emotional understanding and FEP. Girls, who generally are exposed to a more expressive environment than are boys from infancy onward, are likely to develop FEP skills more rapidly than are boys. Later, through the greater emphasis that adults place on emotion with girls, they further encourage girls to develop their skills and guide them more carefully in doing so. This suggests a pattern in which sex differences should emerge gradually during the first year and increase through development, until they reach adult levels.

McClure's meta-analysis of 104 studies of gender differences in FEP set out to test two hypotheses: first, whether, in line with the neurobehavioral model, biological maturation could be the primary force influencing the development of gender differences. If this is the case, gender differences favoring girls should be evident in the youngest infants studied; these effects should decline gradually until children are 3 to 4 years of age. After this point, effect sizes should either remain low and constant throughout development or show an increase in adolescence, when hormonal levels rise again. Second, as suggested by the social constructivist model, gender differences in FEP should be experience-dependent and heterogeneous across age groups. In contrast to the pattern predicted from the neurobehavioral model, however, the gender differences should be nonexistent or minimal in the early months of life. They should then increase gradually over time, with girls showing an ever-increasing advantage until adult levels are reached, when they should level off and remain relatively constant.

As predicted by both the neurobehavioral and social constructivist hypotheses, both infant and child/adolescent samples of effect sizes were significantly heterogeneous. Moreover, gender differences in FEP were greatest in infancy; they then declined to lower, but still significant, levels by the preschool years. Throughout childhood and adolescence, gender differences appeared to remain relatively stable. This pattern is consistent with predictions derived from the neurobehavioral model and suggests that gender differences in FEP are linked to differences in early neurological maturation.

McClure, E. (2000). A meta-analytic review of sex differences in facial expression processing and their development in infants, children, and adolescents. *Psychological Bulletin, 126*(3), 424–453.

Motor Skills

AV: A Child Grows: The First Year (25 min., Insight Media)

This program outlines the development of motor and cognitive abilities during the first year of life. Special attention is paid to the development of eye–hand coordination and the process by which infants learn to distinguish self from non-self.

AV: Infancy: Landmarks of Development (22 min., Magna Systems, Inc.)

This film traces the major landmarks in the development of gross and fine motor skills during the first year. It also discusses influences on the timing of motor development, including nutrition, health care, opportunities for practice, and cultural patterns.

Classroom Activity: Normal Development of Motor Skills

To reinforce the idea that there is a range for the normal development of motor skills, before students read the relevant material ask them to estimate the average age at which a baby sits up without support, stands steadily without holding on, and walks a few steps without falling. The answers will show a wide range, especially if your students come from various ethnic groups. Thus, you might get:

sit up	4–8 months
stand	7–14 months
walk	9–16 months

If your students come from fewer ethnic groups, you may well get a narrower range and unusually early or late estimates. This is so simply because the sample may be less representative of the population as a whole. Thus, a class of African American students is likely to say:

sit up	4–5 months
stand	7–8 months
walk	8–11 months

After your students have made their estimates, put the norms from the Denver Developmental Screening Test on the board:

sit up	5.5 months
stand	11.5 months
walk	12.1 months

This exercise is useful for emphasizing not only the wide range of normal behavior but also the fact that norms always depend on the particular population surveyed.

This may also be a good time to point out that children who develop motor skills rapidly are not necessarily those who develop other skills quickly: The 6-year-old who can already read and write well may have been the first infant on the block to walk, or the last. Severe retardation in the development of motor skills (as in the case of an infant who is not sitting up at 9 months), however, may signal a serious problem, which helps explain why the Denver study is used by psychologists as well as physicians. Mental retardation, neurological impairment, severe malnutrition, and poor parent–infant interaction all correlate with very slow motor development.

Classroom Activity: Nature and Nurture in Motor-Skill Development

To help students understand the interaction of nature and nurture in the development of motor skills, ask any students who have at least two children to tell the class about the similarities and differences in the early motor-skill development of their children. Or you might ask a colleague to speak to the class on this subject. Among the factors that might affect the rate of development are the following:

(a) Overweight children master skills more slowly; the fact that they have more body weight than their relatively immature legs can support makes it harder for them to crawl, creep, and so forth.

(b) Infants who were born prematurely are seemingly slower than those who were full-term. However, if they are compared with children *conceived* at the same time rather than with children *born* at the same time, they are found to be developing very close to schedule.

(c) Overprotection tends to slow development; attention and encouragement tend to accelerate it. Since firstborns are often more protected than their siblings, parents frequently report that their first child was slower to develop than their later-born children.

"On Your Own" Activity: Basic Motor Skills: Learning Like an Infant

To allow students to "feel" the progressively finer motor coordination achieved by the infant, have them complete Handout 7, which asks students to re-master their motor skills as they work through the stages of development in a limited way. For instance, to master the skill of picking up objects, students are first directed to pick up a piece of paper or some other small object with the entire hand, that is, with all their fingers curled around it. Next, they are directed to hold the paper between the middle fingers and the palm of their hand.

Completion of this exercise may provide a good basis for discussing how knowledge about the acquisition of such skills can be applied in other areas, such as rehabilitation following a paralyzing stroke.

AV: See How They Move (28 min., Child Development Media)

Infants from 3 months to 2 years demonstrate the major landmarks of gross motor skill development: turning, crawling, sitting, and walking.

Observational Activity: Gross Motor Skill Development in the Infant

As noted in the text, developmentalists make a distinction between *gross motor skills*, which demand large body movements, and *fine motor skills*, which require small movements. Jumping, hopping, and clapping, for example, are gross motor skills; pouring a liquid into a glass without spilling it and turning a radio knob are fine motor skills.

In the first two years of life, the most obvious gross motor skills are those that transform the helpless newborn who cannot roll over without assistance into an active toddler who crawls, stands, walks, and finally runs. The *nonlocomotor*, or *stability*, *skills* pertain to the development of control of the head, neck, and trunk, and the eventual abilities to sit and stand. The *manipulative skills* include reaching for, grasping, and releasing objects. Finally, the *locomotor skills* include creeping, crawling, and walking.

Because motor development is such an obvious aspect of growth, it is often taken for granted. Although the development of gross motor skills occurs in a predictable cephalocaudal (head to tail) and proximodistal (near to far) sequence, and at a predictable rate closely related to maturation of the nervous system, the age at which these skills are acquired can vary considerably from infant to infant and still be considered normal. And although the rate of development of motor skills is limited by the maturity of the infant's neuromuscular system, environmental factors have a significant impact on skill attainment. A stimulating environment will encourage the child to practice movements and, therefore, promote motor development.

This observational activity is designed to increase students' understanding of how motor development is measured in young children. Have students arrange to observe a 1- or 2-year-old and his or her primary caregiver in a natural play setting for a period of approximately 30 minutes. Ideally, students will ask a relative or friend and his or her child to participate. The play setting could be in the child's home, at a local playground, in the campus child development center, or at any other mutually agreeable location. If the student does not know someone with a young child, he or she can complete this observational activity by visiting a playground or day-care center (after obtaining permission from the day-care center, of course).

During the observation period, students are to assess the child's gross motor skill development using an 11-skill checklist developed by Janice Beaty and based on the Denver norms for infant motor development (see Handout 8). The skills range in degree of difficulty from those certain to be mastered by a 1-year-old, such as standing without assistance, to skills that even some 4- and 5-year-olds will have difficulty with, such as clapping out musical rhythms and walking down steps alternating left and right feet.

If you wish, allow students to test a child anywhere between the ages of 1 and 6. This should make it easier to find children to study and allow a cross-sectional comparison of gross motor skill development over a greater span of years. If you choose this approach, the observational activity could be used again in conjunction with the discussion of biosocial development during early childhood. When students have completed the activity, collect the skill checklist data from the follow-up questionnaires (Handout 9), tabulate the percentage of children who demonstrated mastery of each skill by age in years, and put these results on the board. This information could form the basis for a general discussion of biosocial development during childhood.

Beaty, J. J. (1990). *Observing development of the young child* (3rd ed.), pp. 161–187. Copyright © 1994. Adapted by permission of Prentice Hall, Upper Saddle River, New Jersey.

Critical Thinking Activity: The Effects of Biosocial Experiences on Cognitive and Psychosocial Development

Each unit of these resources contains a critical thinking exercise designed specifically to test students' critical thinking about a topic covered in the text. Handout 10 contains a brief scenario followed by a series of questions.

Answers to this unit's critical thinking exercise are as follows:

1. In addition to biological maturation, brain development in the early years depends on normal sensory and perceptual experiences. This is most clearly demonstrated by experiments with kittens that were temporarily blindfolded for the first several weeks of life. These kittens never developed normal visual pathways. Consequently, their binocular vision and depth perception were permanently impaired.

   The fine-tuning of the visual systems of human babies is a much more gradual process than for kittens, lasting up to six years. This means that abnormal visual experiences during these years may have an irreversible effect on Samantha's neural pathways.
2. If Samantha's vision is abnormal, it is possible that the rate at which she acquires gross motor skills—such as crawling, creeping, and walking—may lag behind that of other children. This is so because her less-than-optimal depth perception may distort the perceptual feedback her brain receives as she moves about the environment.

   Samantha's fine motor skills may also suffer. For example, as a result of her faulty vision she may find it difficult to learn to coordinate the movement and trajectory of her arm and hand muscles as she reaches for toys and small objects. Her ability to "track" moving objects may also be slow to develop.
3. During the first months and years of life, there are major spurts of growth and refinement in the neural connections of the visual system and cortex. Over the course of time, neural pathways that are exercised are strengthened, while those that are not used die. These developmental processes improve the efficiency of neural communication in the brain.

   Although at birth, vision is the least developed of the senses, improvement in the perception of distance, motion, and color is rapid over the early months of life. Although scientists' understanding of the role of early experiences in cognitive development is far from complete, it is possible that abnormal visual experiences—which impair neural development in the cortex and distort learning experiences—may affect cognitive and social development. Samantha may, for example, be slower to learn about color, form, size, and other visual concepts since her vision is distorted. To the extent that her cognitive and motor skills lag behind those of other children, she may be more likely to withdraw socially from other children. If her visual, cognitive, and motor skill development does not improve, the impact on development in the social domain would probably become more severe as Samantha gets older and social play becomes more important.

Surviving in Good Health

AV: Keeping Babies Healthy and Safe (33 min., Child Development Media)

The first part of this video focuses on how caregivers keep their babies physically healthy, focusing on resistance to illness. The second part discusses the importance of parental monitoring and other ways to keep infants and toddlers safe in the home and elsewhere.

Internet Activity: Childhood Infections

Every child gets some sort of infection sooner or later. And when their children get sick, parents need answers. What are the symptoms? How can I help my child feel better? When should I call the doctor? To help students learn more about childhood infections and the Internet resources available to parents, have students search the Web to find information about the five childhood infections listed in Handout 11.

AV: Bottle Babies (26 min., University of Michigan Media)

This film exposes some of the adverse effects of marketing baby formulas in developing countries, including infant disease and malnutrition that may result from the substitution of powdered milk formulas for breast-feedings.

AV: Nutrition (15 min., Magna Systems)

This film presents a concise overview of the importance of good nutrition in each stage of childhood. The food pyramid and nutrient composition of common foods are explained.

Classroom Activity: Nutrition for Children

Nutritionists have become increasingly concerned that parents are applying their own diets to their infants, which may be hampering the infants' development. A set of dietary guidelines for children under 2 years of age published by the American Academy of Pediatrics includes the following recommendations for parents.

(a) Use your child's appetite as a feeding guide.
(b) Do not overly restrict the amount of fat and cholesterol in your infant's diet. Unless they are seriously obese, babies should be given whole or at least low-fat—not nonfat—milk until 2 years of age.
(c) High-fiber diets (often recommended for some adults) are not healthy for babies and children.
(d) A moderate amount of sodium is necessary in a child's diet to maintain the appropriate balance of minerals and water and to help the muscles and nervous system function.
(e) For children 2 and older, the amount of dietary fat should be reduced to no more than 30 percent of daily calories.

Early nutrition lays the foundation for the developing infant's future health. From a dietary standpoint, two potential problems are *obesity* and *dental disease*. Obesity is also related to increased risk of cancer, atherosclerosis (coronary artery disease), and diabetes.

Experts warn parents that infant obesity is less likely to occur when the parents encourage eating habits that will help the individual avoid obesity throughout life. This means introducing a *variety of nutritious foods*, not forcing the baby to finish the bottle or jar of food, minimizing concentrated sweets and "empty-calorie" foods, and developing a regular program of vigorous physical activity. New foods should be introduced one at a time and gradually, so that food allergies can be isolated. To prevent babies from developing a preference for sweets over vegetables, parents should introduce vegetables first and fruits later. Parents also should never use food as a reward, or teach their babies to seek food for emotional comfort, or associate punishment with food deprivation. Because babies apparently have no natural sense of "calorie counting" and because they stop eating when they feel full, they should be offered water, rather than juice or milk, when they cry from thirst.

Proper eating habits such as those just mentioned also promote healthy development of teeth. In addition, parents should avoid giving babies bottles as pacifiers. Prolonged sucking on a bottle promotes the growth of bacteria that cause tooth decay; it also pushes the jawline out of shape so that buckteeth (overbite of protruding upper and receding lower teeth) are more likely to develop.

Sizer, F., & Whitney, E. N. (2008). *Nutrition: Concepts and controversies* (11th ed.). New York: Cengage Learning.

HANDOUT 1

Developmental Fact or Myth?

T F 1. During the first year of life, most infants triple their body weight.

T F 2. By age 2, infants are already half their adult height.

T F 3. At birth, the nervous system contains only a fraction of the neurons the developing person will need.

T F 4. At birth, infants' vision is better developed than their hearing.

T F 5. At birth, newborns cannot focus well on objects at any distance.

T F 6. All healthy infants develop the same motor skills in the same sequence.

T F 7. Age norms for the development of motor skills, such as sitting up and walking, vary from group to group.

T F 8. The risks from diseases are far greater than the risks from immunizations.

T F 9. Approximately a third of the world's children are short for their age because of malnutrition.

T F 10. Chronic malnutrition during infancy may lead to permanent damage to the developing brain.

HANDOUT 2

Growth Rates During the First Two Years—On an Adult Scale

The text notes that growth in early infancy is astoundingly rapid. You can begin to appreciate just how rapid this growth is by projecting the growth patterns of the infant onto an adult, such as yourself.

1. If you were gaining weight at the rate of an infant, your weight would be tripled one year from today. Calculate how much you would weigh.

2. If you, like an infant, grew an inch a month, the change would not be as dramatic—because you are already much taller than an infant. Thus, every inch is a smaller percentage increase for you. Nevertheless, assume that you were growing at the rate of an infant during the first year, adding an inch a month. What would your height be a year from today?

3. How would you describe the growth rate of the infant?

4. The same kinds of calculations can help you make a less dramatic comparison between growth rates during the first and second years of life. During the first year, weight is tripled; thus, an infant born at a little more than 7 pounds will weigh about 22 pounds at 1 year. If growth were to continue at this rate, how much would the child weigh at 2 years?

   In fact, the average infant at 2 years weighs only 30 pounds. If a 30-inch 1-year-old continued to gain an inch a month, he or she would grow 12 inches during the second year. How tall would he or she be?

   In fact, even the fastest growing child grows only 6 inches, to reach 36 inches at age 2.

5. Compare the rates of growth during the first and second years.

HANDOUT 3

BYOB: Bring Your Own Brain

Imagine that you are a local caterer who is struggling to keep a fledgling business afloat. You've just heard that the International Association of Brain Surgeons (IABS) is holding its annual convention this year in your hometown, and you have been selected to prepare an edible, neuroanatomically accurate centerpiece for the keynote speaker's table. Your centerpiece may be an appetizer, dessert, or other food item depicting the cerebral cortex, brain stem, limbic system, nerve cell, or any other part of the central nervous system. It may represent any angle or cross section of the brain, and you will be asked to give a brief oral summary of its features and significance to the developing child's motor, emotional, and/or cognitive abilities. Grading will be based on the integration of creativity, flavor, and anatomical accuracy.

Source: Raap, D. (2002, January). *Course projects for targeted audiences.* Paper presented at the meeting of the National Institute on the Teaching of Psychology (NITOP), St. Petersburg, FL.

HANDOUT 4

Observational Activity: Time Sampling of Newborn Behavior: Infant States

Infant's State

1. Active Sleep

Eyes:	Closed, with jerky, rapid eye movements apparent beneath the eyelids
Breathing:	Shallow and irregular
Movements:	Muscles are deeply relaxed
Response to stimuli:	Sounds or changes in lighting may elicit facial reactions in the sleeping infant

2. Quiet Sleep

Eyes:	Closed, with slow, rolling movements apparent beneath the eyelids
Breathing:	Deep and regular
Movements:	Occasional generalized startle responses
Response to stimuli:	Little or no response to mild sounds and lights

3. Drowsiness

Eyes:	Open or closed
Breathing:	Irregular
Movements:	Moderately active
Response to stimuli:	Facial expressions; startle responses to stimuli

4. Awake-Quiet

Eyes:	Open
Breathing:	Inconsistent pattern in this state
Movements:	Quiet; some movement of head and limbs while examining environment
Response to stimuli:	Novel stimuli may trigger and maintain this state

5. Awake-Fussing

Eyes:	Open
Breathing:	Inconsistent pattern in this state
Movements:	Much activity characteristic of highly aroused state
Response to stimuli:	Crying, kicking, thrashing about may increase in response to feelings of physical discomfort (cold, pain, hunger, being placed in crib, etc.)

HANDOUT 5

Observational Activity: Time Sampling of Newborn Behavior: Observation Procedure

1. Each student and his or her partner will independently observe the behavior of the same infant for forty 30-second intervals.
2. Review the descriptions of infant states and make sure you are familiar with the behavioral characteristics of each state.
3. Pick an infant to observe who is *not in quiet sleep* at the start of the observation period. Doing otherwise may give you little or no variation in infant behavior during the observation period.
4. Begin timing the 30-second intervals. For each interval make a check mark on your data sheet in the column under the infant state that most accurately describes the infant's behavior (eyes, breathing, movements) during the preceding 30 seconds.
5. Following the observation period, complete the follow-up questionnaire and return your answers, along with your data sheet, to your instructor.

HANDOUT 5 *(continued)*

Time Sampling of Newborn Behavior: Data Sheet

For each 30-second interval, make a check mark in the column beneath the state that most accurately describes the newborn's behavior during the preceding 30-second period.

Infant State

30-Second Interval	Active Sleep	Quiet Sleep	Drowsiness	Awake-Quiet	Awake-Fussing
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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25					
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30					
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37					
38					
39					
40					

HANDOUT 5 *(continued)*

Time Sampling of Newborn Behavior: Follow-Up Questionnaire

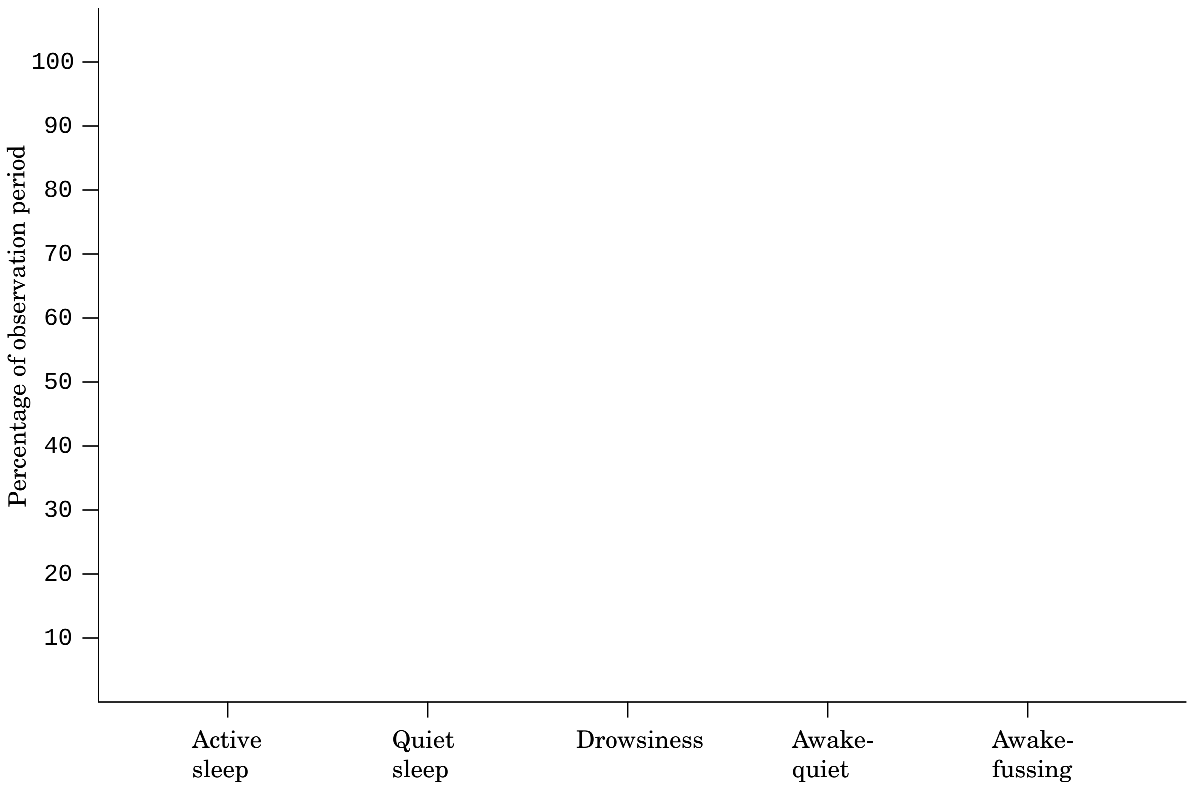
1. Describe the context of your observational activity (setting, time of day, whether the nursery was busy) and the newborn you chose to observe.

2. Did you find it difficult to decide which of the five infant states your subject was displaying at any given moment? Which states were most difficult to identify?

3. Approximately what percentage of the time did you and your partner agree on the infant's state? Were there any patterns to the occasions when you and your partner disagreed?

HANDOUT 5 *(continued)*

4. Determine the percentage of the 20-minute observation period that your subject was in each of the five infant states and draw a bar graph of these percentages in the space that follows.



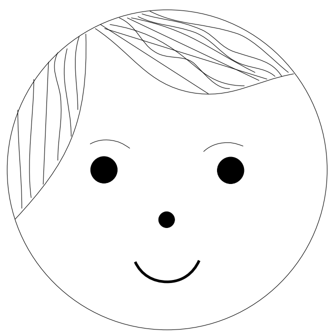
HANDOUT 6

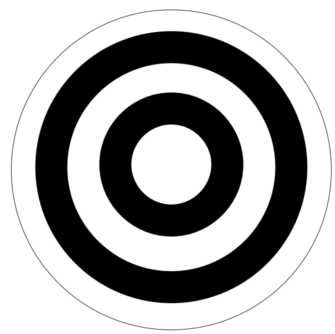
Infants' Shape Preferences

The preference method of assessing perceptual ability is based on the idea that if infants consistently prefer to look at one image over another, they must be able to perceptually discriminate the two images.

For this demonstration you will need to make six test stimuli. Draw three circles 6 inches in diameter on a white piece of paper. Using the examples below, draw a cartoon face on one circle and a bull's-eye on another. Leave the third circle white. Cut the circles out. Cut two more circles out of brightly colored paper, ideally yellow and red, respectively. Cut the sixth circle from newsprint. Present the test stimuli one at a time to a 2- to 6-month-old infant while measuring the number of seconds the infant looks at each stimulus before turning away. Each stimulus should be presented at least twice, with gaze time computed as the average of the two tests.

Source: Matlin, M. W., & Foley, H. J. (1997). *Sensation and perception* (4th ed.). Boston: Allyn & Bacon.





1. How old was the infant you tested?

2. Describe any difficulties you encountered in conducting your test.

HANDOUT 6 *(continued)*

3. Complete the following table by entering the average number of seconds your subject gazed at each test stimulus.

Test Stimulus	Trial 1	Trial 2	Average
Cartoon Face			
Bull's-Eye			
White Circle			
Yellow Circle			
Red Circle			
Newsprint Circle			

HANDOUT 7

Basic Motor Skills: Learning Like an Infant

One way to understand the way infants master basic motor skills is by trying to re-master these skills as an adult.

You can learn to "feel" the progressively finer coordination achieved by the infant if you work through the stages of development in a limited way. A good place to start is with mastery of the motor skills involved in picking up objects.

1. Pick up a piece of paper or some other small object with your entire hand; that is, with all of your fingers curled around it.
2. Now hold the paper between your middle fingers and the palm of your hand.
3. Pick up the paper by pressing your index finger against the side of your palm.
4. Finally, use the thumb and index finger to pick up the paper. When is this grasp achieved?
5. Which of these ways of grasping a small object felt most comfortable or natural to you?

HANDOUT 8

Observational Activity: Gross Motor Skill Development in the Infant: Skill Checklist

1. *Stands Alone Without Difficulty*

   By the twelfth month of life, approximately 50 percent of all babies can stand easily without assistance; by the fourteenth month, fully 90 percent of all babies have mastered this skill.

2. *Walks Well*

   Walking separates toddler from infant and normally occurs around the end of the first year of life. One-year-olds move cautiously, walk with a wide, "waddling" stride, and often need assistance. Two-year-olds still must concentrate somewhat on their balance but typically will not need assistance, and unlike 1-year-olds, will not lose their balance as easily when forced to stop suddenly.

3. *Walks Backward*

   Walking backward requires neuromuscular coordination, balance, and perceptual skills far in excess of those required in walking forward. At 14 months, only about 50 percent of toddlers are able to walk backward with confidence; by 21 months, nearly 90 percent can do so.

4. *Walks Up (or Down) Steps Alternating Feet*

   Approximately half of all babies are, with help, able to walk up steps by 17 months of age. By 22 months, nearly 90 percent can do so. At this age, however, they will place both feet on a step before advancing upward, rather than alternating left foot, right foot, left foot, etc., as they proceed. Older 2-year-olds may be able to alternate feet going upstairs, but doing so when going down the steps will not be mastered until much later.

5. *Kicks Ball Accurately*

   The 1-year-old toddler may approach and strike a ball with his or her foot, but not until children are nearly 2 are they able to consistently muster the balance, coordination, and eye–foot control necessary for effective and accurate kicking.

6. *Is Able to Run and Control Speed and Direction*

   Although 1-year-olds often walk very rapidly in a rudimentary form of running, their feet never leave the ground. True running usually does not occur until sometime between the second and third birthday.

7. *Can Jump Over Small Obstacle and Land on Both Feet*

   Unlike hopping and leaping, which involve taking off and landing on one foot, jumping involves landing on both feet and usually is not apparent in children under 2 years of age.

8. *Hops Steadily on One Foot*

   Because hopping involves taking off and landing on the same foot, children must have a fairly well-developed sense of balance in order to demonstrate this skill. Very few children are able to hop well before the third birthday.

HANDOUT 8 *(continued)*

9. *Climbs Well*

   Climbing requires coordinated use of the upper and lower body and is considered an advanced form of *creeping*. Children begin climbing as soon as they are able to pull themselves up onto an object worthy of being climbed. By 2 years, this skill is well developed.

10. *Moves Rhythmically to Music*

    An infant's earliest movements are reflexive, involuntary responses to specific stimuli. The first voluntary movements of young children typically are elicited by sounds. These movements gradually mature into skills that include rhythmic movement to music. Following the cephalocaudal pattern of development, young children will be able to move their arms and hands and later their legs and feet to a slow rhythm tapped out on a box or drum. As rhythmic skills improve, children will learn to follow irregular beats and beats that vary in sound intensity.

11. *Claps in Rhythm*

    As discussed in the previous item, the head-to-toe sequence of development also applies to the rhythmic use of the arms and hands. Two-year-olds typically love to clap, but usually are unable to control their clapping to follow even the simplest rhythmic pattern without great difficulty.

Source: Beaty, J. J. (1990). *Observing development of the young child* (3rd ed.), pp. 161–187. Copyright © 1994. Adapted by permission of Prentice Hall, Upper Saddle River, New Jersey.

HANDOUT 9

Gross Motor Skill Development in Infants: Follow-Up Questionnaire

Before your scheduled observation period, read through the gross motor skill checklist and the questions on this handout so you will know what to look for. Observe your subject for approximately half an hour of unstructured play. After the observation period, complete the questions on the handout and return it to your instructor.

1. Describe the participant (age, sex, motor skills, etc.) and setting that you chose for this observation.

2. Describe any difficulties you encountered in completing this observational activity.

3. Complete the following skill checklist for your subject.

	Demonstrated		
Skill	Yes	No	Comments
1. Stands alone			
2. Walks well			
3. Walks backward			
4. Alternates feet			
Walking up stairs			
Walking down stairs			
5. Kicks ball accurately			
6. Runs, controlling speed and direction			
7. Jumps over obstacle			
8. Hops on one foot			
9. Climbs well			
10. Moves rhythmically			
11. Claps rhythmically			

HANDOUT 9 *(continued)*

4. Assuming the normal variation in age norms for the attainment of the various motor skills you assessed, would you say that your subject was "on time," "early," or "late" in the development of gross motor skills? Give several specific examples of behaviors you observed to justify your assessment of the child's skill level.

5. Using the checklist, pick the gross motor skill at which the child was the *least accomplished*. Which skill is this, and what reasons can you suggest for the child's relatively weaker ability? Suggest at least three activities you could design for the child to promote mastery of the skill.

Source: Beaty, J. J. (1990). *Observing development of the young child* (3rd ed.), pp. 161–187.

HANDOUT 10

Critical Thinking Activity: The Effects of Biosocial Experiences on Cognitive and Psychosocial Development

Now that you have read and reviewed the material on biosocial development during the first two years, take your learning a step further by testing your critical thinking skills on this creative problem-solving exercise.

This exercise takes a creative look at how early experiences in one domain of development might also affect development in other domains. In an extensive study (Vernon-Feagens & Manlove, 1996), the researchers found that children with chronic middle ear fluid were more likely to play alone and less likely to talk with their peers than control children. Animal studies also provide evidence that early sensory experiences can have a dramatic, and sometimes irreversible, effect on developing neural connections in the brain.

In this exercise, you are asked to imagine that you are advising parents who are considering whether to have their toddler Samantha's vision disorder corrected. Samantha's disorder, which can be completely corrected only through surgery, involves an uneven curvature of the lens of each eyeball. Unless the problem is corrected, Samantha's vision will forever be slightly out of focus in both eyes, even if she wears corrective eyeglasses or contact lenses.

Samantha's parents, who are understandably concerned about the dangers of performing any operation on so young a child, have several questions. To stretch your creative imagination, see if you can answer their questions.

Vernon-Feagens, L., & Manlove, E. E. (1996). Otitis media and and the social behavior of day-care-attending children. *Child Development, 67,* 1528–1539.

The Parents' Questions

1. Is there any evidence that our child's vision problem should be corrected sooner rather than later in life? Why not wait until Samantha is older to correct the problem?
2. If we choose not to have the surgery performed now, will Samantha's physical development lag behind that of other children?
3. What about Samantha's cognitive and social development? Could her visual problem affect these areas of her life?

HANDOUT 11

Internet Activity: Childhood Infections

Every child gets some sort of infection sooner or later. And when their children get sick, parents need answers. What are the symptoms? How can I help my child feel better? When should I call the doctor? To learn more about childhood infections and the Internet resources available to help parents, search the Web to find information about the following five childhood infections. (Hint: A good starting point is www.kidshealth.org.)

Acute Otitis Media

1. What are the symptoms and causes of this condition? How does it differ from external otitis? Why are children more susceptible to this condition than are adults? What are some of the potential complications?

2. Why are breast-fed children less susceptible to otitis media than formula-fed children? State at least two reasons.

3. When should a doctor be called? What is the standard treatment for this condition? What can be done if the condition persists?

Conjunctivitis

4. What are the symptoms and causes of this condition? Why are children more susceptible to this condition than are adults? What are some of the potential complications?

HANDOUT 11 *(continued)*

5. What steps can be taken to help prevent conjunctivitis?

6. When should a doctor be called? What is the standard treatment for this condition? What can be done if the condition persists?

Reye's Syndrome

7. What is Reye's syndrome? When was it first discovered? How is it diagnosed?

8. How common is Reye's syndrome? What are some of the risk factors that are linked to this condition?

9. How serious is this syndrome? What can be done to prevent it from occurring? What is the standard treatment for this condition?

Chlamydia Trachomatis

10. What are chlamydia? What are the symptoms of chlamydia trachomatis?

HANDOUT 11 *(continued)*

11. How do children acquire this condition? What are some of its potential dangers?

12. How is the condition prevented? How is it treated?

Candidiasis

13. What are the signs and symptoms of this condition? What causes it? How common is it during infancy?

14. Is this condition contagious? How can it be prevented? How is it treated?

15. How dangerous is candidiasis to a child's overall health and well-being?