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Human Growth and Development

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1. Identify and briefly describe the significant physical and physiological changes that occur in infancy.

When identifying the physical and physiological changes that occur during infancy, there are important patterns of growth that should be highlighted. In the early stages of early infancy, the head is larger than the rest of the body. This is due to the pattern of growth called cephalocaudal. Cephalocaudal is described in the textbook as a pattern in which the earliest development occurs at the top of the head; with physical development, starting from top to bottom. Following the Cephalocaudal growth pattern; comes the sensory and motor development pattern. This pattern can be defined as a process in which the infant starts to become aware of muscles, and coordination, and starts to put them to use. As described in the textbook, for infants to obtain these motor skills they must see something in their environment that gives them the incentive to move. Most importantly, the use of motor skills is contingent upon the development and maturation of the nervous system. The first stage of motor development is the reflexes(rooting, sucking,moro, and grasping); which can be described as reactions to stimuli in the infant's environment; which develop the infant's involuntary survival instincts. Next is Gross motor skills; which develop in the second year of the infant's life; this involves the use of larger

muscle groups; which allows infants to become more mobile. Next, is sensory and perceptual development; which can best be described as sensory interactions coming into contact with ears, eyes, tongue, and skin, and interpreting those interactions.

Chapter 2 Q1. Explain the relationship between genes, chromosomes, and DNA.

The relationship between genes, chromosomes, and DNA begins in a single cell; this cell can contain up to 1 million base pairs of DNA, and the chromosome in this cell can contain up to 1,000 genes. In the nucleus of a single cell are the chromosomes; these are tight-knit structures that are composed of DNA material. DNA is a spiral-like structure that houses the genetic information needed to form our genes. We each get 46 chromosomes, but 23 of those replicate and become copies during mitosis (cell division). Each chromosome in a pair contains different forms of the same genes, meaning they carry different characteristics such as hair color or eye color. The environment of genes can have a direct impact on their activity and can influence gene expression. From genes you get genotypes and phenotypes, Genotypes make up a person's genetically inheritable history; while phenotypes make up a person's physical characteristics(blue eyes, height, brown hair). As a result of this, a person can have susceptibility genes and longevity genes. Susceptibility genes make a person more at risk for certain diseases like cancer and cardiovascular diseases. Longevity genes do the opposite of susceptibility genes; they make people less vulnerable to certain diseases which can increase the chances of living to old age.

Chapter 2 Q4. Name and explain at least three examples of abnormalities in genes chromosomes.

Chromosome abnormalities form when the paired sperm and ovum do not have a normal set of 23 chromosomes. One chromosome abnormality that can occur is Fragile X syndrome. Fragile X syndrome occurs when a mutation in a gene on the X chromosome happens. The mutation affects how the body produces a protein called FMRP; this mutation causes the body to produce less of the protein, causing Fragile X syndrome. This mutation is inherited and can continue to be passed down, consequently, a person who inherits the gene mutation still has a chance of not getting Fragile X syndrome. This is because women have a 50/50 percent chance of passing it down to their offspring, and Men only pass the gene down to their daughters. The abnormality can cause intellectual disabilities, learning disabilities, and short attention spans. Treatment includes special education, speech, and language therapy. Another sex-linked chromosome abnormality is Turner Syndrome; this happens when a girl is either partially or completely missing an X chromosome. This error occurs during the formation of the egg or sperm; as a result of the x chromosome being missing, certain genes become missing; which initially causes the syndrome. This can cause intellectual disabilities, sexual underdevelopment, and even infertility. Treatment for this abnormality includes hormone therapy during childhood and puberty. Gene-linked abnormalities can occur when in the presence of abnormal chromosomes and by defective genes. A known Gene-linked abnormality is Diabetes; diabetes occurs when the body doesn't produce enough insulin; which causes abnormal metabolism of sugar. Although most diabetes cases are sporadic in meaning: there is no

family history of the disease, it can still occur from a gene-linked abnormality. This abnormality can be managed with the help of insulin.

Chapter 3 Q17. Discuss the Pros and Cons of breast-feeding vs bottle-feeding

Breastfeeding is the process by which mothers nurse their children using the breast milk that is secreted in the breasts; this method of sustenance for infants comes with many pros and a few cons. Some pros of this method include: helping infants with weight gain, reducing the risk of SIDS, and stomach infections, and helping the immune system develop. Gathered in multiple research studies; a consensus was made that mothers breastfeeding their infants lessen the infant's chances of hospitalization. One benefit that directly impacts the Mother's health is that breastfeeding was found to reduce the risk of breast cancer and ovarian cancer. Regarding the cons of breastfeeding one major flaw is that mothers can pass various STIs and STDs to their infants during breastfeeding. In regards to bottle feeding, which is the action of using a milk alternative like a formula to provide nutrients to infants, there are a few pros and cons as well. Some pros associated with bottle feeding are that it provides a good alternative to breastfeeding if the Mother cannot breastfeed, the formula is always made available, can be used as a good alternative if Infants have a hard time digesting certain proteins in human milk, it also allows other family members to bond with infants as well, and most importantly if the Mother has a transmittable disease it prevents that disease from being passed down. Some cons include: the price of formula which can often be expensive, infants don't receive the

boosted immunity acquired in breast milk, and infants don't receive the same nutrients that are provided in breastfeeding.

Chapter 3 Q16.

Newborns tend to sleep more of the time than they would in the later stages of their development. It was found that on average an infant should receive at least 14 to 21 hours of sleep per day. Often newborns have trouble sleeping through the night and staying asleep until the following morning. An infant's sleeping schedule can often be very sporadic and become tiresome without a consistent bedtime schedule. To continue, it was found in recent studies that infants with a consistent bedtime schedule slept longer and woke up less frequently during the night. It's also important to limit the amount of screen time infants receive, as that can also have a negative impact on their sleep schedule and shorten the duration of sleep. Another important aspect of infants' sleep is REM (rapid eye movement; In fact, infants spend most of their sleep cycle in REM. REM sleep aids in self-stimulation and promotes the brain's development in infancy. In regards to infants sleeping, it's important to highlight the fact that infants should always be placed on their backs to sleep; which can reduce the risk of SIDS. SIDS is sudden infant death syndrome; this occurs when an infant stops breathing, usually during nighttime. It was found that having infants sleep on their backs rather than stomachs; decreases the risk of SIDS, this is because when you sleep on your back it increases airflow. In conclusion, the sleep schedule of infants is of utmost importance as sleep aids in the development of cognitive functions, memory, language, brain maturation, and alertness.

Chapter 3 Q32

Language is a mode of communication that can be broken down into two categories: verbal, spoken language, and written language in the form of symbols/words written on paper or typed on a computer. Many different languages all over the world are derived from people within these different communities. Although each language is unique; they all share a common ground: Infinite generativity. Infinite generativity can be described as the process of understanding and reiterating countless sentences and phrases using a set of words and rules as a basis. Language is used daily to talk, read, understand, and write; which allows information to be passed all over the world. Language starts in Infants in the form of crying which can be detected at birth; then in the form of cooing which is a gurgling sound, next is babbling which occurs in the newborn's first year of life, this is when they start to produce vowels, Then there is the stage of gesturing such as actions like pointing and waving. From birth to about 6 months babies can identify sounds of any language and detect when those sounds start to change. Moving on to the second half of infants' first year; they begin to produce continuous forms of speech. Around the latter half of the infant's first year is when they produce their first word. The infant's first spoken word is often something of familiarity such as dada (representing dad), or clock (common household item). After the infant’s first spoken word, the vocabulary starts to rapidly increase, and at the end of the infant's first year he/she can speak and identify at least 50 words, this rapid growth is known as a vocabulary spurt.

Chapter 4 Q45

Attachment is defined as a close emotional relationship between two people. In regards to the individual differences in attachment, Mary Ainsworth created an observational test called the Strange Situation, as a way of measuring infant attachment, through a series of introductions, separations, and reunions with caregivers. Mary's test produced four types of attachment: securely attached(caregiver is comfort and promotes exploration of the environment), Insecure & avoidant (shows insecurity by avoiding caregiver), Insecure resistant (cling to caregiver and cries in absence), and insecure disorganized attachment (appear dazed and confused). From this, it can be gathered that early attachment is detrimental to a child's behavior as the different types of attachments can influence actions later in life. Interestingly enough, one study conducted by Alan Sroufe found that infants' attachment insecurity was associated with less emotional regulation skills about 20-35 years later in life; which further raises the importance of early attachment. It should be noted that attachment security doesn't always produce positive outcomes, but it is directly linked to the way children experience social experiences later in life. In contrast, some researchers challenge the secure attachment importance in infants and believe that they are equipped with the skills to stay on a positive developmental course; regardless of their attachment. Researchers like Jerome Kagan have debated that genes and temperament have more influence on a child's social development than attachment styles. Another contrast of attachment theory is that it does not account for diversity agents in an infant's environment. Different values are expected in a given culture in comparison to another culture. An example discussed in Chapter four is that in Germany

infants are expected to be more independent while in Japan infants are more dependent on their caregivers.

Chapter 4 Q40

Emotions such as crying and smiling are the ways for infants to express how they feel during certain interactions, and promote the bonding between infant and caregiver. In regards to crying it was found that there are three types of cries: the basic cry(a rhythmic pattern of a cry followed by silence; researchers think the basic cry is associated with hunger), next the Anger cry (a variation of basic cry with more force on the vocal cords), and the Pain cry (a sudden loud cry, followed by the holding of breath). Nurturing responses to an infant crying have produced mixed results from researchers, with some saying that not nurturing crying infants right away can cause behavioral problems; while some researchers have said not nurturing an infant right away had no significant impact on behavioral development. In contrast, smiling has been described as a critical social skill and produces two categories of smiling. One category is a reflexive smile which doesn't occur from external stimuli and appears the first month after birth. Another category is a social smile that occurs in response to an external stimulus that occurs as early as 2 months of age. Researchers have found that smiling and laughter are linked to self-regulation. Once infants develop emotions like crying, laughter, smiling, and fear they can social reference or read the emotions or emotional cues of others. Social referencing allows infants to determine how to act in certain environments and impacts if infants want to explore the environment they are in.

Works Cited

Santrock, John W. *Essentials of Life-Span Development*. McGraw-Hill Education, 2022.