
Tactile Stimulation

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Synonyms

Contact; Touch

Definition

Touch has been described as the most fundamental means of contact with the world, and the simplest and most straightforward of all sensory systems. Tactile stimulation is vital in several domains of the infant's and child's life, including social, cognitive, and physical development.

Description

Touch has been described as the most fundamental means of contact with the world [2], and the simplest and most straightforward of all sensory systems [7]. Touch is vital in several domains of the infant's and child's life, including social, cognitive, and physical development (e.g., (5)). In fact, touch is the first sense to develop in utero and by 14 weeks after gestation, the surface of the fetus is almost entirely sensitive to tactile stimulation. Touch continues to play a central role in adulthood when flirting, expressing power, soothing, playing, and maintaining proximity between child and caretaker [4]. By adulthood, the skin constitutes the largest organ of the body, covering 1.8 m² of the average person. As with humans, touch serves many functions in non-human primates as well. Different species groom to reconcile following aggressive encounters, to initiate sexual encounters, to reward cooperative acts of food-sharing, to maintain proximity with caretakers, and to soothe conspecifics in stress [3].

The Physiological Underpinnings of Touch

As mentioned, the skin is the largest organ of the human body and weighs between six and ten pounds [11]. The skin is a multilayered structure containing several receptors, each of which sends unique signals to the brain through neurons via the spinal cord. Information from the spinal cord enters the thalamus – the “relay station” of the brain – which then sends this input to a strip of the brain called the somatosensory cortex located on the parietal cortex. The more area on the somatosensory cortex that is dedicated to a given area of skin on the body, the more sensitive that area of skin is to tactile stimulation. Thus, areas of the body such as the fingers and lips – two of the most sensitive areas of the body to tactile stimulation – are well represented on the somatosensory cortex compared to less sensitive areas of the skin such as the back.

Learning About the World Via Touch

Throughout life, we actively explore the world with our hands to learn about objects in the world – a process known as haptic perception [10]. Haptic perception, in conjunction with vision, is particularly important for infants to learn about the world. Research indicates that by 3 months of age infants can distinguish objects by size and shape (e.g., a cube from a hollow square), by 6 months of age they can distinguish objects by hardness and texture, by 9 months of age they can distinguish objects by weight, and by 15 months of age they can distinguish between shapes that are similar in features but differ in spatial arrangement.

Effects of Touch on Biology

Touch plays an instrumental role in brain development and growth, especially in early life [5]. Without adequate tactile stimulation early in life, the brain does not grow to a normal size and the synapses between neurons do not develop properly. In addition, adequate tactile stimulation early in life can buffer the effects of tactile deprivation later in life. Thus, exposure to adequate amounts of touch early in life seems to form a foundation for later nervous system development.

The importance of touch does not wane later in life. Research indicates that when nonhuman animals are provided extra tactile stimulation later in life, their brains increase in size and the synapses between neurons increase. Moreover, tactile stimulation can help stimulate neuronal growth due to brain lesions and infarcts in the brain later in life. In addition to studying the effects of touch on the brain, researchers have investigated the effects of touch on premature infants' growth. In one study a group of premature infants received a 10-day protocol of massage therapy comprised of tactile/kinesthetic stimulation while a control group did not receive the massage therapy protocol [6]. Compared to the control group, the treatment group gained 47% more weight, was more active and alert, and spent six fewer days in the hospital.

Effects of Touch on Cognition, Emotion, and Social Interaction

Tactile stimulation has a significant impact on cognitive development [8]. A wide body of literature suggests that cognitive development is intimately tied to brain development in the childhood years and, as mentioned, touch plays a pivotal role in neuronal development in the early years of life. Parental aversions to touch as well as harsh touch have been implicated as factors in the development of language and learning disorders. In addition, research suggests that parents who use touch to stimulate the central nervous

system regularly and appropriately have children that are more likely to develop an accurate and sophisticated body image. These parents provide a variety of forms of tactile stimulation to a number of areas on the body.

Touch plays an integral role in the caregiver-child relationship from the beginning of life. In one U.S. sample, infants were touched for 33–61% of the time during brief interactions with their mothers. The frequency of contact is much higher in some cultures such as the !Kung and the Efe tribe of Zaire where mothers spend approximately 75% of the time in contact with their infants [8].

In infancy, caregivers' touch is thought to serve a variety of communicative functions while they are in contact with their infants [8]. Two of the most important are the communication of emotions, as well as the communication of security. A number of studies indicates that touch is capable of communicating and eliciting positive and negative emotions. One powerful demonstration of the power of touch to elicit positive emotions has been shown when researchers use the "still-face paradigm" to study infant emotionality. The still-face paradigm is comprised of a period of interaction when the caregiver assumes a still-face, thereby not responding to the infant's actions. During this period, infants typically react negatively because this is an unusual event in most infants' lives. Several studies indicate that if caregivers touch their infants during the still-face period, their infants' emotional displays are significantly less negative and more positive compared to infants who are not touched during the still-face period.

The quality of caregiver-infant touch is a central feature of the responsive and available caregiving environment that is necessary to foster an infant's sense of security. Several studies suggest that touch between the caregiver and infant is the "ultimate signal" of security of the infant. In one experimental study, researchers compared how infants were attached to their caregivers when they carried their infants ventrally in soft infant carriers versus those who were carried in harder infant seats [1]. The researchers found that infants carried in the soft infant carriers were significantly more likely to be securely attached to their caregivers than infants who were carried in the infant seats. This study and others strongly suggest that touch plays a key role in the communication of security to children.

Touch continues to play an integral role in social communication in adulthood [9]. For example, touch communicates power and emotions to others, as well as aids in persuading others to comply with our requests. In addition, touch increases verbal interaction among people, gains attention from others, and communicates our attraction toward others.

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