

Making Neuroscience Fun



A Brain Awareness Program for All Ages  
It's SPECTacular!

## Science Behind the Story What is Your Face Doing? (🌈 An Emotional Story) (Pre-Kindergarten – 4-5 yrs)

This story talks about emotions and how you can share your emotions with others.

- 🌈 You “feel” different things depending on what is going on inside and outside of your body. These “feelings” are emotions.

Feelings are mental experiences of body states (Damasio, 2013). They signify physiological need (for example, hunger), tissue injury (for example, pain), optimal function (for example, well-being), threats to the organism (for example, fear or anger) or specific social interactions (for example, compassion, gratitude or love) (Damasio, 2013).

- 🌈 All animals have some emotions – and people are animals. Animals share these emotions with their faces.

There are 8 basic emotions that can be organized into 4 pairs of opposites; joy/sadness, fear/anger, affection/disgust, expectation/surprise (Plutchik, 1994).

Higher and lower intensities of each of these emotions are also observed (Plutchik, 1994).

Most of these emotions are present at as early as 8-9 months of age (ref). (Joy/sadness = 3mos, anger/surprise = 4-6 mos, fear = 8 mos.)

Most of the emotions are represented by distinct facial expressions (Keltner & Ekman, 2000). Note, this does not mean that these are emotions are felt the same or universally by everyone.

The manifestation of these facial expressions is cross-cultural, universality hypothesis (Ekman, 2009; Arellano, 2008). Meaning that they are recognizable across many different cultures and socioeconomic backgrounds.

While research on facial expressions of emotion has focused on the study of six basic categories—happiness, surprise, anger, sadness, fear, and disgust - many more facial expressions of emotion exist and are used regularly by humans.

Compound emotions are those that can be constructed by combining basic component categories to create new ones (Du, 2014). For instance, happily surprised and angrily surprised are two distinct compound emotion categories. They defined 21 distinct emotion categories.

- 🌈 The reason our faces show how we are feeling is so others know how we are feeling. Sometimes that is important for the survival of animals.

Charles Darwin hypothesized that the ability to express, recognize and understand the 6 Universal emotions is an innate ability and gave the person a better chance of survival (Eckman, 2009).

Facial expression of emotion may be used as an accessory to communication (verbal or sign) (Ruch, 1995). Facial expressions are a way of sharing your emotions.

It has been suggested that a major role of facial expression is paralinguistic – and that the face is an accessory to verbal communication.

In fact, when using sign language (where you do not have the auditory cues that relate emotional context) facial expressions are often exaggerated.

🌈 Our brain lets us “show” how we feel by automatically making our faces change the way it looks.

Neural control of facial expression appears to be different than neural control of voluntary facial movements (ref).

Voluntary activation of our facial muscles goes through the corticospinal system (Rinn, 1984). Here the primary motor cortex is in “command” of the brainstem cranial nerve nuclei – facial and trigeminal nerves.

Patients with unilateral lesions of the motor cortex are unable to move one side of their face; however, when they are expressing emotions they can move both sides of their face (Borod, 1992).

Facial movements induced by emotion are presumed to involve subcortical systems (Morecraft, 2004). Here the brainstem cranial nerves have some autonomy.

Patients with subcortical lesions, such as Parkinson’s disease, can voluntarily move their face, but do not express facial emotions (flat affect) (Weddell, 1994).

### **National Education Standards:**

#### **Next Generation Science Standards**

- Crosscutting Concepts:
  - **Cause & Effect:** Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.
    - Events have causes that generate observable patterns.
  - **Structure & Function:** The way an object is shaped or structured determines many of its properties and functions.
    - The shape and stability of structures of natural and designed objects are related to their function(s).
  - **Patterns:** Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
    - Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

#### **ASCA National Standards for Students (American School Counselors Association):**

- **Standard A:** Students will acquire the knowledge, attitudes and interpersonal skills to help them understand and respect self and others.
  - PS:A1 Acquire Self-knowledge
    - PS:A1.5 Identify and express feelings

#### **National Health Education Standards (Shape America) & CDC (Centers for Disease Control and Prevention)**

- Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.
  - 1.2.2: Recognize that there are multiple dimensions of health
- Standard 4: Students will demonstrate the ability to use interpersonal communication skills to enhance health and avoid or reduce health risks.
  - 4.2.1: Demonstrate healthy ways to express needs, wants, and feelings.

### **References:**

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