THE EXPRESSION OF EMOTIONS
• Let us now consider a specific example of how science interacts with art and the humanities.

• THE EXPRESSION OF EMOTION BY MEANS OF THE HUMAN BODY (ESPECIALLY THE FACE).

• This topic is an excellent example of the dialogue between science, art, and the humanities.
A painter who conducted research on the human face was Charles LeBrun (1619-1690).

This is a portrait of LeBrun by another painter, Nicolas de Largilliere.
LeBrun aimed to help the painter draw faces that would clearly express different emotions. He developed a system for this purpose.
Emotions according to LeBrun (clockwise): simple love, fear, anger.
Which emotion do you think this is?
SADNESS
What about this one?
SURPRISE
And this one?
ADMIRATION MIXED WITH ASTONISHMENT
Which parts of the face are most important in displaying emotions?
• Which parts of the face are most important in displaying emotions?

• For LeBrun, it is the eyes and (especially) the eyebrows.
• An important feature is whether the eyebrow slopes upward or is arched in the middle.
Mouvement singulier... Qui n'appartient qu'à l'espèce de l'homme...
• LeBrun’s painting of Louis XIV.
When the **angle of the axis of the eyebrows** rises up towards the forehead, this suggests a movement up towards the soul.
• LeBrun’s *The Penitent Magdalen*
LeBrun, *The Persian Queens*
• If the angle descends down towards the nose/mouth, the expression has a more animal quality.
• Here are desire, scorn, fear and terror.
• LeBrun used these techniques in his paintings, which stressed emotional expression.
• Example: The Sacrifice of Polyxena (detail),
• LeBrun also studied the similarities between human faces and animal faces.
• LeBrun was strongly influenced by a study of emotions written by the philosopher and scientist Rene Descartes.

• When teaching students how to paint, LeBrun used a classification of the emotions developed by Descartes.
• Other artists and scientists aimed to understand the relation between the inner world of the mind and the outer expressions of the body.

• Johann Kaspar Lavater (1741-1801) produced sketches of the facial expressions of the insane.
• The insane were confined in large institutions (asylums).

• Lavater often drew sketches of those inmates.
• 19\textsuperscript{th} century research on emotional expression benefited from two technological advances.

1. Photography
2. Electricity
1. photography

Why is it difficult to study (e)motions?

Charles Darwin wrote:

“The study of Expression is difficult, owing to the movements being often extremely slight, and of a fleeting nature. A difference may be clearly perceived, and yet it may be impossible... to state in what the difference consists.”

19th century researchers like Darwin used photography to aid the observation of emotional expression.
2. Electricity

- Emotional expression depends on the action of muscles.
- Researchers used electric shocks to produce muscle motions.
- This approach helped them to identify the combinations of muscle motions that express different emotions.
Guillaume-Benjamin Duchenne (1862) *The Mechanism of Human Facial Expression*
• Duchenne’s research involved first stimulating one single muscle.

• He then “combined these isolated muscle contractions in all the variations possible, by making the different muscles contract, two by two and three by three”
Duchenne believed that his work had both scientific and artistic value.
• Performance artist Stelarc allowed people to control his body motions remotely, via the internet, by electric means.
Michele Barker and Anna Munster
Duchenne’s smile (2009)
Scientist Charles Darwin admired Duchenne’s work:

“No one has more carefully studied the contraction of each separate muscle, and the consequent furrows produced on the skin. He has also, and this is a very important service, shown which muscles are least under the separate control of the will.”

Darwin,

*The expression of the emotions in man and animals*
• Darwin’s methodology for the study of emotion in the 1860s:
  
  – He showed people photographs of facial expressions to test whether or not those people could recognize the emotions in those photographs.
  – These are photographs of sadness used by Darwin in his research.
Darwin concluded that emotions are universal, i.e., they occur in all human cultures.

“...the young and the old of widely different races, both with man and animals, express the same state of mind by the same movements.”

Darwin published his results in the book *The Expression of the Emotions in Man and Animals* (1872).
Here is a short review of Darwin’s work on emotions, which summarizes his ideas and gives examples:

http://people.wku.edu/charles.smith/wallace/S220.htm

Darwin’s entire book is available online:

http://www.gutenberg.org/files/1227/1227-h/1227-h.htm
• Darwin’s work has influenced recent work about emotional expression.
• Psychologist Paul Ekman showed people in different cultures photographs of certain facial expressions.
• People were asked to label those expressions.

![Basic Emotions](image)
fear

1. eyebrows raised and pulled together
2. raised upper eyelids
3. tensed lower eyelids
4. lips slightly stretched horizontally back to ears

happiness

A real smile always includes:

1. crow's feet wrinkles
2. pushed up cheeks
3. movement from muscle that orbits the eye
- Most people, even those from different cultures, chose the same labels for the same expressions.

- Conclusion: Certain expressions represent the same emotions in all cultures.
Certain aspects of human culture, such as the expression of basic emotions, are rooted in our shared, universal human nature.
• Many scholars in the humanities emphasize cultural factors.
• They stress that every culture is different.
• The research, however, suggests that culture depends and builds on certain basic, universal (or very widespread) ways of expressing emotion.
• Articles by Ekman about the expression of emotion:

http://www.radford.edu/~jaspelme/_private/gradsoc_articles/facial%20expressions/Ekman%201993%20Am%20psych.pdf

Let us think of expression from an evolutionary point of view.

- This point of view asks questions about the advantages that certain traits (characteristics) confer on those who have them.

- What function(s) could the expression of emotion possibly serve?
• Perhaps facial expression at first was an adaptation.

• For instance, expressions of fear include a widening of our eyes.
  – They expand the visual field and the speed of eye movement, helping the organism to locate and track possible threats.
• Expressions of disgust often include a wrinkled nose, which potentially reduces the intake of smelly, and potentially harmful air or particles.
• According to Darwin, we often express fear by opening our mouths.
  – The reason is that breathing through our mouths is less noisy than breathing through our nose, and so can help us to escape without being noticed.
• Even when these behaviors no longer serve the purposes for which they evolved, they can then serve other functions.
• They can serve a **communicative function**: as **signals** for other members of the group (for ex., to warn them of threats).
• People sometimes exaggerate these gestures to communicate more clearly.
• Baring one’s teeth served animals the purpose of preparing to attack.
• Humans no longer fight with their teeth but might still do it to signal (communicate) that they are serious about fighting.
• Perhaps emotional expressions now serve communicative or signaling functions, even though they were formerly selected for other purposes.
Some expressive body motions send clear signals if they come in contrasting pairs.

- A dog’s attack posture is exactly the opposite (“antithesis”) of its welcoming posture.
• Expressing emotion can provide evidence to others of our sincerity or trustworthiness.

• This is especially true of expressions that cannot be easily controlled and so give more reliable evidence of the emotions of the person.
• Human beings have approximately 40 facial muscles.
• Many of those muscles cannot be easily controlled consciously.
• For this reason, they are often taken as reliable signals of (for ex) sadness.

http://www.jannilla.se/2012/10/emotions-and-facial-expressions-sadness/
• Many expressions serve a communicative function because they are difficult to control.

• Try to imitate the motion of the eyebrows in this image.
• Most people cannot produce it on purpose.
• But we all produce it spontaneously (not on purpose) when feeling distress, sadness, etc.
• Notice the eyebrows.
Another example of an emotional expression not easily controlled is **blushing**.
• In everyday life, it is **very beneficial** for you to **appear sincere** or trustworthy.
  – For instance, if you want someone else to enter into a business partnership with you, marry you, lend you money, etc.
  – Emotional expressions that we cannot control make this clear to other people.
  – Other people think that we must be sincere in our expression of emotion.

• Emotional expression thus performs an important adaptive function in everyday life.
• Economist Robert Frank has written a major study of emotional expression.

• It shows that emotional expression confers a strategic, adaptive advantage.

• The book is influenced by Darwin’s theory of natural selection and by mathematical game theory.

• It is an excellent example of the connection between the humanities and science.
• The topic of emotional expression shows that a dialogue between natural science and the humanities can produce new insights.
• More importantly, there is no absolute break between nature and culture.
• The study of nature (e.g., biology) can help us to understand culture.
Affective computing or Emotion Analytics is now a growing trend in the integration of design, computing, and business.
• The aim is the measurement of emotion.
Researchers aim to detect the emotion of a person based on her/his facial expression.
• The expression of emotion is not only a biological feature of human beings.
• It has social (political, economic, cultural) aspects.

• New deep learning algorithms will attempt to interpret the emotions expressed by human faces.
• The conclusions can be used, for instance, for commercial purposes.
**Cheese**, Christian Moller (video installation, 2003)

“...six actresses to hold a smile for as long as they could, up to one and half hours. Each ongoing smile is scrutinized by an emotion recognition system, and whenever the display of happiness fell below a certain threshold, an alarm alerted them to show more sincerity"
This work also shows the social pressures that certain people are under to display certain emotions.

If it is true that women are more subjected to these pressures than men, then there is a strong gender-bias here. This artwork raises questions about the social aspects of the expression of emotion.
CONCLUSION

• It is a mistake to believe that the sciences are all alike, that the humanities are all alike, and that they are always different from one another.

• The arts are also connected to science and the humanities, as shown by the example of the emotions.

• Perhaps the time has come to challenge the belief that there must be a gap between the three kinds of disciplines.