




MasterCLIL: a sensorial approach

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First: let's
answer some
basic questions
about our
senses

1st sketch: did my primary school teacher lie to me?

(with a couple of girls in white lab coat – names are just examples)

... here we have Chiara, that is helping us in our discussion. So, Chiara, what do you know about human senses?

- Well, of course we know that there are five senses, touch, taste, sound, smell, and sight...

- really? do you have only five senses? Please close your eyes and touch your right ear.

(she does it)

And now, keep your eyes closed and follow what I'm doing

(teacher lets her gently turn and swing, she follows freely the movements).

- All right, and so?

- So, the fact that you're able to recognize the shape and the position of you body is a sense called proprioception, and the fact that you can recognise and hold a vertical position is due to vestibular sensation or balance.

And maybe we have even more different senses that we still are not able to recognize.

- But I've always been told that we have only five senses: did everybody lie to me?

- Who knows...

1st sketch: did my primary school teacher lie to me?

... let's take another example: Giulia, how many are the fundamental tastes?

- Of course they're four: sweet, sour, salty and bitter!

- I hope that your teacher is not one of these colleagues in front of us... that's what ancient Greeks, as for instance Aristotle, believed, but don't you know about umami?

- what's ... u-ma-mi? A kind of sushi?

- it's the pleasant taste of tomatoes, or of the proteins of meat, for instance. It's a Japanese word that biologists have been using since many decades, and possibly there are some other tastes about which we are still confused

- What a mess! but about the colours of a rainbow, at least, we know that they're seven, red, orange, yellow, green, blue ... ehm... ok, indigo, and violet!.

- Sure? only seven? and what is indigo, for example? do you see any indigo object, here?

(looks to the audience, searching for denim garments and showing them to Giulia)

Indigo is actually the name of the chemical which is used to dye cotton in denim.

So, of course, "indigo colour" is nothing but "the colour of indigo"! But soon we'll be back on indigo...

It is common that we recognize the existence of something at the same moment that we find a word to describe it.

It happens in each aspect of our lives.

Sensorial experience is a question of consciousness and words.

We are even *more or less* aware of our body's properties and behaviour, but actually we're mostly describing them with words we have been given, and if we've not been given...

words, words, words...

3 The Disembodied Lady

The aspects of things that are most important for us are hidden because of their simplicity and familiarity. (One is unable to notice something because it is always before one's eyes.) The real foundations of his enquiry do not strike a man at all.

—Wittgenstein

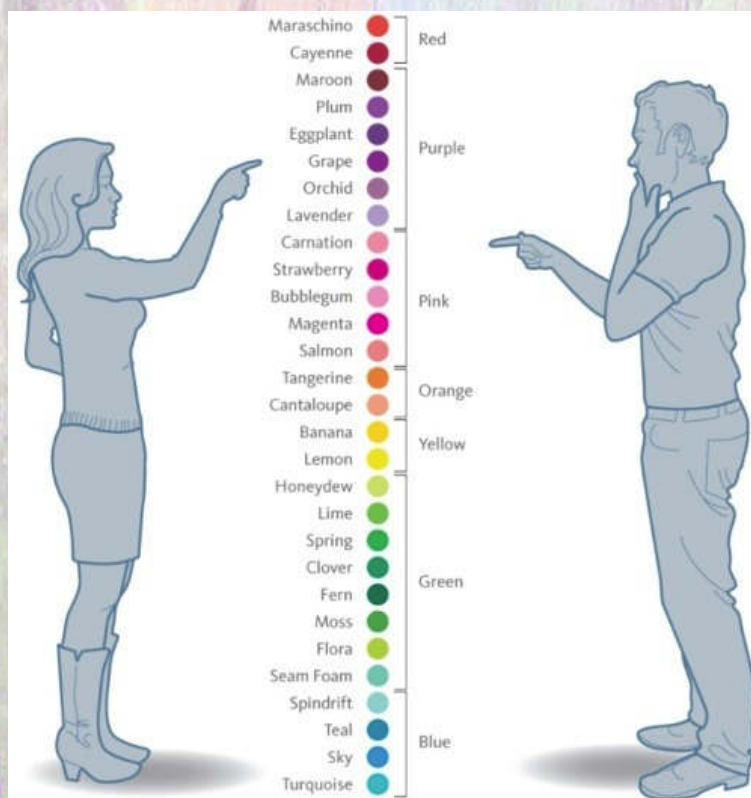
What Wittgenstein writes here, of epistemology, might apply to aspects of one's physiology and psychology—especially in regard to what Sherrington once called our secret sense, our sixth sense'— that continuous but unconscious sensory flow from the movable parts of our body (muscles, tendons, joints), by which their position and tone and motion are continually monitored and adjusted, but in a way which is hidden from us because it is automatic and unconscious.

Our other senses—the five senses—are open and obvious; but this—our hidden sense—had to be discovered, as it was, by Sherrington, in the 1890s.

He named it **proprioception**', to distinguish it from 'exteroception' and 'interoception', and, additionally, because of its indispensability for our sense of ourselves; for it is only by courtesy of proprioception, so to speak, that we feel our bodies as proper to us, as our 'property', as our own. (Sherrington 1906, 1940.)

Oliver Sacks: The Man Who Mistook His Wife for a Hat

Colour, the words about colour and their often confused and misleading meanings...

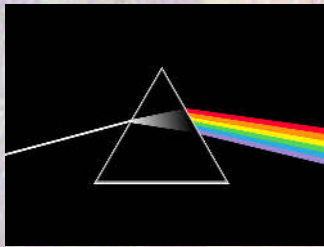
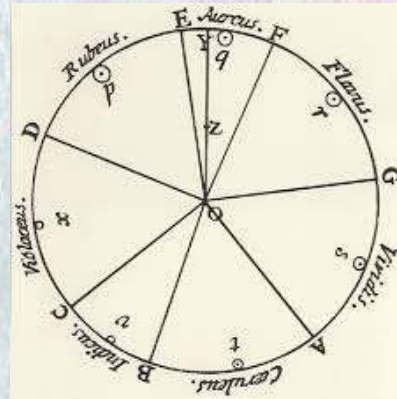


It is *not* true that women are more able than men to distinguish different colours (although colour vision anomalies are slightly more common in males): simply in most cultures women are more trained in using related words



But... who decided that the colours of the rainbow are ROYGBIV, and when, and why?

A famous alchemist, interested in mundane affairs, who liked the number 7 very much, and quite good also at mathematics and physics...



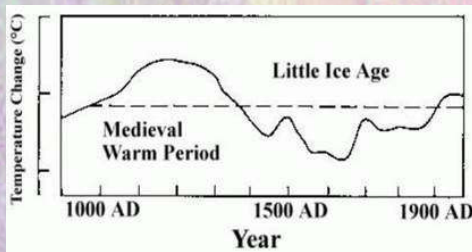
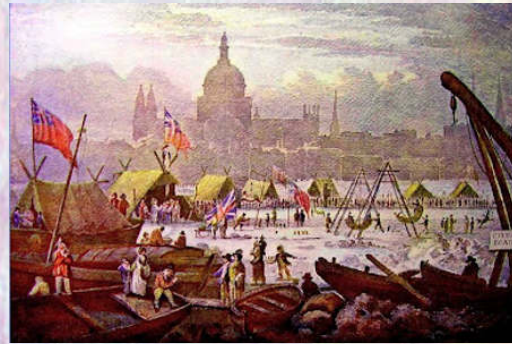
Two different forms of science communication, about the origin of the "seven colour mythology"

<https://youtu.be/7i9Alry7Fis>

<https://www.youtube.com/watch?v=bf7WT6TLy8s>

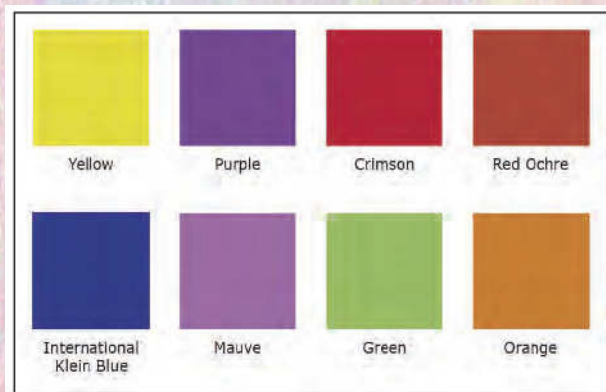
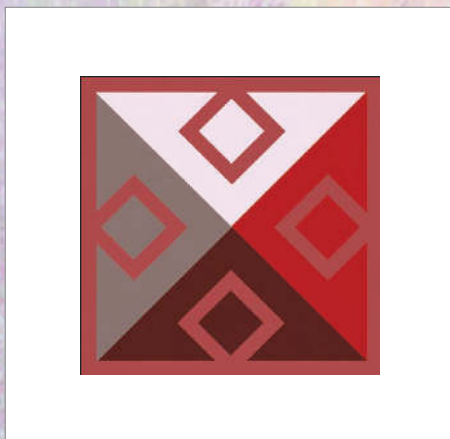
There are some further considerations. Newton needed to use words which were easily associated to colours in common speak, but he had very few examples of really saturated colours like those in the spectrum. He lived in foggy and rainy southern England, in the middle of the Little Ice Age: not so many colours around...

It is clear that his *blue* was probably a cyan-aquamarine, and *indigo*, the last of seven, was possibly the only kind of common blue shade generally known in his area... but unfortunately it is really unsaturated, not-spectral !



Two pictures taken from a paper that appears really interesting for CLIL work about colour. It deals with all aspects of the *words* and of their often conflicting meanings.

<http://jaic.jsitservices.co.uk/index.php/JAIC/article/download/39/35>



Then we can introduce other relevant issues

Natural indigo

Resources

Natural vs synthetic

Sustainability

... and what they really mean for real people

A real indigo cauldron”

<https://youtu.be/E1TdueSATpE>

The way natural indigo is extracted (if you like it!)

<https://youtu.be/UEMcjmyjoOY>

Even more organic” details!

<https://youtu.be/UEMcjmyjoOY?t=287>

Cochineal

https://youtu.be/lmoT6wJz_vU?t=102

The aim of this presentation was not to show a really structured CLIL lesson, but to introduce some of the procedures that we tried here at the *Setificio* of Como, to teach chemistry and CLIL in different ways...

2nd sketch: a classic of chemistry and literature

*Double, double toil and trouble;
Fire burn, and cauldron bubble!*



Indigo!