



Chapter 2. Language of the senses

The project that we describe in this chapter has the theme 'Language of the senses'. This theme is based on the research of Asifa Majid and her team regarding the influence of language and culture on sensory perception. The chapter consists of two sections. Section 2.1 describes how different sensory perceptions are spoken of in different languages. Teachers can use this section as substantive preparation before they launch this theme in the classroom. Section 2.2 describes how teachers can handle this theme in accordance with the seven phases of inquiry-based learning. Chapter 1, in which the general guideline of the seven phases is described, forms the basis for this. We therefore recommend the use of chapter 1 as the starting point for the execution of a project in the classroom. This chapter provides the thematic additions.

Project team 'Language of the senses'

This chapter is based on a project designed by a project team in which researchers from Radboud University collaborated with primary schools and the WKRU. The project team 'Language of the senses' worked together during the school year 2015-2016 and consisted of the following people:

Radboud University

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2.1 Language and culture of the senses

Prof. dr. Asifa Majid, Josje de Valk (MSc), Patricia Manko (MSc)

Introduction

Our experience of the world is through our senses: we see, hear, touch, taste and smell. But these experiences are all private, in our own minds.

Humans are special though. We can use language to make this private experience public. When I describe what I see, hear, or smell, I share my inner life – my personal experience – with you. However, there is not just one language spoken. Today, there are around 6000 different languages spread across the world. How do these thousands of different languages express our common human experience? And are all our experiences equally easy to talk about? For centuries, it has been thought that things we can see and hear are relatively easy to talk about, but things we smell are hard, if not impossible to put into words. In fact, Plato said: “the varieties of smell have no name”. More recently, dozens of experiments confirmed this view. People in the West do find it difficult to talk about smells.



Asifa Majid and her team at The Troubadour tell about their research

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Prof. dr. Asifa Majid

I was born in Scotland to a Punjabi-speaking family. Punjabi is a language originally spoken in Pakistan and India. My parents were born in Pakistan; my grandparents in what is today India. I went to school in Glasgow, where I wore my school uniform like all the other kids, ate sandwiches just like the other kids, and talked all day long in English just like everyone else. But when I came home, I changed into my Punjabi clothes, ate Punjabi food, and talked Punjabi to my family. From a very young age I knew people spoke different languages, wore different clothes, ate different food, and practiced different religions. I felt sorry for those people who only knew one language and culture. How much they were missing! I devoured books to learn more about what made people who they were. I read everything I could: science books, textbooks, novels. I knew I wanted to go to university already at a young age. None of my family had been to university, but I knew that was the place to go if you wanted to learn more. The thrill of learning about people, and how the world works has never left me. Doing research for me is exciting every day. It is a way to discover something nobody knew before. And the joy of it is, the job never ends. There is always more to learn.

In fact, Plato said: “the varieties of smell have no name”. More recently, dozens of experiments confirmed this view. People in the West do find it difficult to talk about smells.

Why does this matter?

We live in a multicultural world. In the Netherlands there are nearly 2 million people who were born somewhere else in the world: from Europe, e.g., Spain, Germany, Romania; but also Indonesia, Suriname, Turkey, Morocco. Different people have different languages; different foods they eat; different music they listen to; different religions, etc. By learning about how other language and cultures differ can help us all live more harmoniously together.



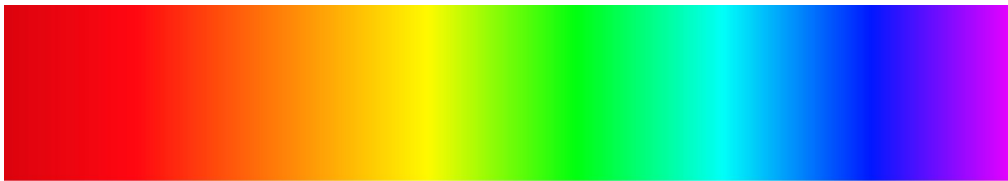
A biligual street sign in Amsterdam

When people live together in multicultural communities, they are also often multilingual. We take it for granted that when we learn a different language we have to learn different sounds and grammar, but often speakers also have to learn different meanings. The concepts from one language are not always so easily mapped onto another. This is important to become a fluent speaker. It is also important to avoid miscommunication, especially, for example when at the doctors or lawyers, where miscommunication can have dire consequences.

Language is also used to advertise products to us: Which snack should we eat? Which shampoo should we use to wash our hair? By understanding how language is used to persuade us, we can make more informed decisions.

Colour

Across the world, languages differ in how many basic colour words they have. Umpila spoken in Cape York, Australia only has 3 colour words: black, white, and red; whereas Dutch, has a much larger repertoire of at least 11 basic colours: black, white, red, yellow, green, blue, orange, pink, purple, brown, and grey. This may seem strange at first, but it becomes clearer when you understand that colour is continuous (see Figure 1). The exact boundary between green and yellow, or red and orange, is not something that is given by perception alone. Instead it is something that language imposes on perception. For example, around a third of the world's languages do not make a linguistic distinction between blue and green colours. They refer to all the shades along this continuum with one word; sometimes referred to by anthropologists as "grue" (green + blue). Vietnamese is an example of a language like this, they call this colour xanh.



The human-perceivable color spectrum

It is not the case that Dutch, or other European languages, always make more distinctions than the other languages in the world. For example, in Dutch both colours in Figure 2 would be called blauw. You could make a distinction between donkerblauw and lichtblauw, but people disagree with one another about where the boundary is between dark and light, and context determines their use. More importantly, the distinction is not obligatory. However, in Turkish, for example, people make a lexical distinction between the two mavi and lacivert. This is also true in Russian, Farsi (spoken in Iran), and many other languages.



Different shades of blue

This variation raises interesting questions to ponder. Some scholars have suggested we are born with colour categories. The cross-linguistic variation poses a puzzle. If we are born with colour categories, which ones are we born with? The Dutch, Vietnamese, or Farsi categories?

We might also wonder where this variation comes from? One possibility is this variation is a result of colour technology. In the natural world, things tend to have a typical colour. For example, bananas are yellow. So mentioning the colour of a banana is not necessary. It only comes in one colour, except from when it is unripe (when it is green) or over-ripe (when it is black). But even then we do not need to mention colour explicitly. We can just refer to the unripe banana or over-ripe banana, to get the colour information for free. It is only when it comes to naming things that do not come in natural colours, that having distinct words for the colours becomes particularly relevant. We, in the West, have developed complex dyeing technologies to colour objects in all sorts of shades. Clothes, cars, furniture, etc come in many different colours. To refer to particular examples of these we now need to distinguish the red from the blue, green, black, etc. In contrast, amongst many Australian communities, like the Umpila, there is a much simpler dyeing technology. There are only three natural dyes used: black, white and red (see Figure 3); and it is exactly these colours which are named in the language.



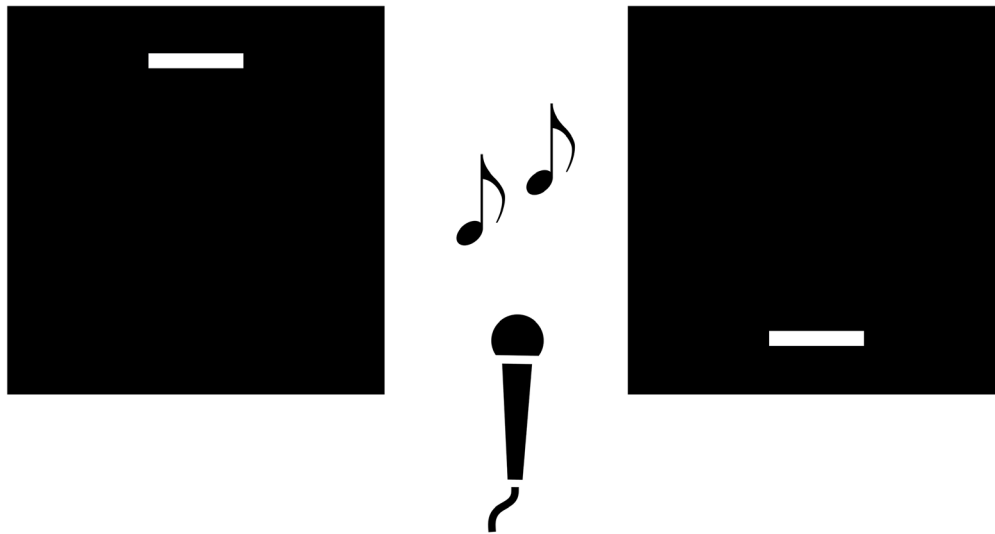
Aboriginal body painting

From examining colour words cross-linguistically, we can see there is much variation across languages. The variation poses interesting puzzles about the development and acquisition of colour categories. In addition, the cross-linguistic variation we find is related to differences in cultural technologies.

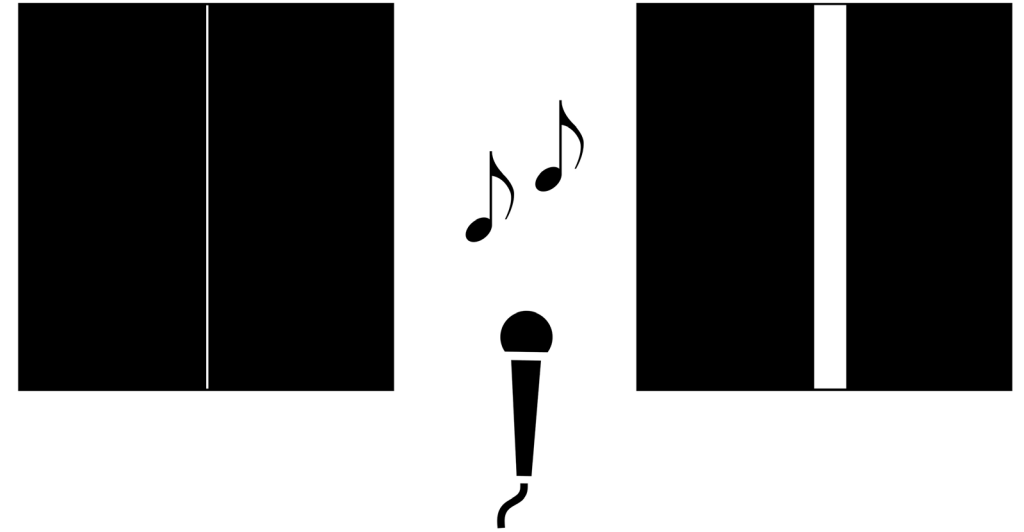
Sound

Just as for colour, there are many different ways to talk about sounds. Even the simplest of tones that only vary in pitch are described differently. For example, Dutch people talk of *hoog* and *laag* tones, but Farsi people talk of thin and thick sounds instead. The Kpelle people of Liberia refer of light and heavy sounds, in Bali and Java people speak of small and large sounds, while the Suyá people of the Amazon basin talk of young and old sounds instead. These are all different metaphors to refer to variations in pitch.

These different ways of talking about sounds seems to influence the way that people think about them as well. In one experiment, my colleagues and I tested Dutch and Farsi people in the lab. People had to do a very simple task. They were asked to hear a tone and sing it back. The tones varied in pitch. At the same time there was an irrelevant spatial stimulus that people also saw. Participants either saw a line that was high or low on the screen, or in a different condition they saw a line that was thin or thick. The line had nothing to do with the sound. By presenting the line, however, we could test whether the visual height or thickness influenced people's experience of the sounds. In fact, we found that Dutch people sang back the same note higher when they were looking at a line that was high on the screen compared to when a line was low on the screen. This visual height manipulation made no difference to the Farsi speakers. They sang the notes back the same way regardless of the height of the lines. But when the Farsi speakers saw a thin line they sang the same note back higher compared to when they saw a thick line. For Dutch speakers the thin-thick lines made no difference to their singing. So, Dutch speakers really do perceive sounds as high and low, but Farsi speakers perceive them to be thin and thick.



The subjects see high or low lines while hearing high or low tones



The subjects see thick or thin lines while hearing high or low tones

This example demonstrates that variation in how people talk about the senses can influence how they think about the senses too. This raises the interesting question of how early these differences arise in development, a question tackled in the background information.

Smell

As discussed in the introduction, for centuries scholars assumed all people were bad at naming smells, and that olfaction was not important. Immanuel Kant declared smell the most dispensable of senses; René Descartes thought smell vulgar; and even the psychologist Howard Gardner argued smell has no value across cultures.

In contrast to the many words for colours in Dutch, there do not seem to be many words for describing smells. Instead, when Dutch people (or elsewhere in Europe) describe smells, they often refer to the source of the smell instead; for example, it smells like a banana, it smells like rose, etc. However, even with these source-based descriptions people are bad at naming smells. When people are presented with familiar, everyday smells like chocolate, coffee, or peanut butter, and asked to identify them without seeing them – only by smelling them – Dutch people are only able to name the object correctly roughly between 20-50% of the time. This can be contrasted with the near 100% accuracy elicited when people name a visual picture of an object.

However, my research with Niclas Burenhult, the world-leading expert on the Jahai people and language, has shown that there are people in the world who are good at naming smells, and who have a complex culture where olfaction is important. Jahai is a language spoken by around 1000 speakers who still live a hunter-gatherer lifestyle in the jungles of Malay Peninsula. By conducting experiments in the field, we have shown that for Jahai speakers, it is as easy to describe smells as it is to describe colors; and it is much easier for the Jahai to describe smells than it is for age- and gender-matched English-speaking participants.



Asifa Majid researches smell words with the Jahai

Jahai has around a dozen different words to indicate different qualities of smell. So, the Jahai have around the same number of basic smell words as there are basic colour words in Dutch. For example, *ha?ét* is the Jahai word for the common smell between tiger, shrimp paste, sap of rubber tree, as well as rotten meat, carrion, feces, musk gland of deer, wild pig, burnt hair, old sweat, and lighter gas; just as red is the common colour of tomatoes, strawberries, fire engines, the stop light on a traffic signal, and innumerable other objects. Some other examples of Jahai smell words include: *ltpit* the smell of various flowers, perfumes, durian fruit, and binturong or bearcat (which smells like popcorn), amongst other things; *cnɛs* is the smell of petrol, smoke, bat droppings and bat caves, some species of millipede, root of wild ginger, leaf of gingerwort, wood of wild mango, etc., *p?us* is a musty smell, like old dwellings, mushrooms, stale food, etc., and *pl?en* is the smell of blood, raw fish, raw meat, etc.



ha?ét is the Jahai word for the smell of a tiger, shrimp paste and the sap of a rubber tree

The Jahai examples shows us that it is possible to have an elaborate vocabulary for smell, and that the Western struggle to name odours must be a result of our culture rather than our biology. Why this might be so is still a puzzle. Perhaps the hunting-gathering lifestyle of the Jahai make smells more salient to talk about. Or perhaps it is the environment that matters. In humid rainforest, smells from the soil, vegetation, and myriad other sources permeate the atmosphere; whereas in temperate Netherlands, wafting smells are dampened. Only future research with other cultures will tell us for sure.

Conclusion

Diversity in word meanings is pervasive. Even for very basic experiences we find differences across languages in how we come to speak of them. Every person, wherever they are on the globe, sees, hears, and smells. Yet when they talk, they carve-up their experiences in different ways. Each language forces its own distinction into what shades of colour are blue or green; whether a sound is high, small, or thin; what smells it notices through language; and so on. This raises fascinating questions about the relationship between language, mind, and culture. Why do these differences exist? Are they related to culture, environment, or something else? And what does this tell us about our minds? We share a common humanity, and yet each language, each speaker is special and different in its own way. How wonderful to celebrate this diversity of our common humanity.

Research into the language of the senses

In phase three of inquiry-based learning students will design their own research project. To demonstrate the link between the students' research and the scientific process undergone by researchers, in the section below we have outlined a research project according to the framework the students must follow. Here, Asifa Majid and her team explain how they researched the different ways in which different cultures discuss sounds.

Research about sound

| | |
|---|--|
| Research question | Does the spatial metaphor people use to talk about sounds (height vs. thickness) influence the way they think about sounds? |
| How do we do this research? Whom do we test? | We tested Dutch and Farsi people in the lab. They were asked to hear a tone and sing it back. The tones varied in pitch. At the same time there was an irrelevant spatial stimulus that people also saw. Participants either saw a line that was high or low on the screen, or in a different condition they saw a line that was thin or thick. The line had nothing to do with the sound |
| Results or expectations (give visual material) | We found that Dutch people sang back the same note higher when they were looking at a line that was high on the screen compared to when a line was low on the screen. Farsi speakers sang the notes back the same way regardless of the height of the lines. But when the Farsi speakers saw a thin line they sang the same note back higher compared to when they saw a thick line. For Dutch speakers the thin-thick lines made no difference to their singing. So, Dutch speakers really do perceive sounds as high and low, but Farsi speakers perceive them to be thin and thick. |
| What do these results mean for society/ the future/ children? | The words in our language influence how we think, even when we are not using language at the time. By learning about how other language and cultures differ can help us all live more harmoniously together. Language is also used to advertise products to us: Which snack should we eat? Which shampoo should we use to wash our hair? By understanding how language is used to persuade us, we can make more informed decisions. |
| What more do we want to investigate? | At what age are children sensitive to these different metaphors? At what age do they learn the words for pitch in their language, and at what age are they sensitive to the sound-space mappings outside of language? |

BACKGROUND INFORMATION

Jahai

The Jahai are a group of around 1,000 people who live in the mountain rainforests of northern Malaysia and southernmost Thailand. Traditionally they lived by hunting, fishing, and gathering, as well as selling rainforest products to neighbours. Their houses are temporary camps of huts or lean-to shelters which they live in for a few days to several months or more, depending on how much food there is in the area. Nowadays most Jahai are semisedentary in regroupment programs established by the Malaysian government. The Jahai speak a language of the same name belonging to the Aslian language family, a branch of the Austroasiatic language family (just as Dutch is a Germanic language, which is part of the family of Indo-European languages).



A Jahai man shows wild ginger

The Jahai believe in a god, Karey, and follow a complex set of taboos and avoidance rules so as not to anger him. Karey's anger is manifest as thunder, lightning, and the emission of odor. Taboos likewise revolve around these senses, structuring how humans manage their relationship with Karey. Breaking them is hm̩ŋ and causes great fear and commotion. For example, laughing while bathing in a river is hm̩ŋ because the laughter attracts the curiosity of Karey, who then perceives the unpleasant smell of human dirt as it is washed away in the river. Similarly, washing uncooked parts of several different species of game animal in the river is hm̩ŋ because the distinct smell of their blood is offensive to Karey.

Broken taboos are redressed by appealing to Karey's senses. Songs are sung to please his ears, and human blood is offered to please his nose. During blood-throwing ceremonies the Jahai make cuts in their calves, collect the blood, dilute it with water, and hurl it into the air for Karey to smell. If he finds the odor pleasant he will be satisfied; if not he will ask for more by thundering.

Traditional Jahai name-giving is also designed to please Karey's senses: personal names are frequently drawn from the species names of fragrant plants and flowers. Healing magic focuses on driving away Karey's sickness causing odor emissions with fragrant smells from perfumes, plants, and burnt resin, kmurjin. Karey himself can be scared off by the smell of burnt crayfish. These are just some examples of the rich smell culture of the Jahai.

Babies and sound-space associations

Do babies have some idea of which sounds are high and low and which are thin and thick? Or do children only learn this once they have mastered the distinctions in their language? To investigate this issue, we also conducted experiments with babies in the lab.

We cannot ask babies directly which sound they think is high or low, so we have to come up with a clever way to find out what babies know without waiting for them to talk (or sing). We use a technique called "preferential-looking". In this method, you show a baby an image or video and measure how long they look at it. The longer they look, the more interested they are in what is happening.

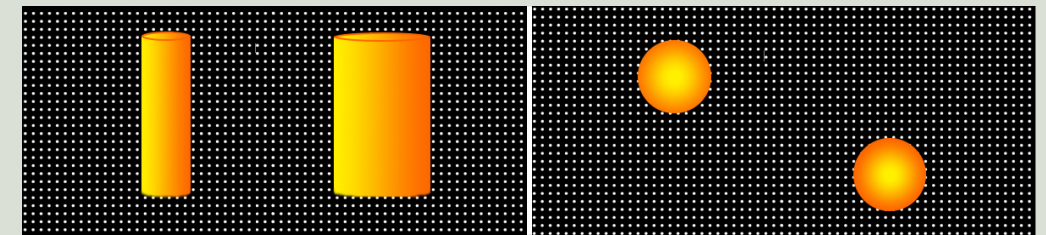


A baby participates in an experiment at the baby-lab of the Radboud University

We showed babies videos that either matched or mis-matched the space-sound metaphors of Dutch and Farsi. Babies either saw a ball moving up and down a screen while the sound either matched the ball's location (e.g., the pitch was high when the ball was high on the screen, or the pitch was low when the ball was low on the screen) or mis-matched (e.g., the pitch was high when the ball was LOW on the screen, or the pitch was low when the ball was HIGH on the screen).

We did the same thing with the Farsi-inspired videos. Babies heard a high pitch when they saw a thin line and a low pitch when they saw a thick line (match) or they heard a low pitch when the line was thin and a high pitch when the line was thick (mis-match).

We measured how long babies watched the matching versus mis-matching videos. If babies have no knowledge of these different associations, they would have no preference for one type of video over the other. They should watch both matching and mis-matching videos for the same amount of time. But that is not what happens. We have found that 4-month-old Dutch babies watch the matching videos longer for both the Dutch high-low association, but also for the Farsi thin-thick association. This means they are sensitive to both the Dutch and Farsi space-sound metaphors before they learn language. In fact, it seems that we are all born sensitive to both associations, but then lose the ability to map those associations we do not use in our language as we get older.



Images from the movies the babies are shown

Further material on language of the senses

- BBC Radio 4 documentary on smell (English; featuring Asifa Majid) <http://www.bbc.co.uk/programmes/b076cg3n>

Some additional material that could also be good to include


- Explore the senses: <http://www.fantasticfunandlearning.com/exploring-the-sensespainting-with-tea-bags.html>
- Bow Wow Meow - animal sounds in different languages: <https://www.youtube.com/watch?v=loMy3kfTMgE>

Scientific papers

- Malt, B., & Majid, A. (2013). How thought is mapped into words. *WIREs: Cognitive Science*, 4, 583-597. See http://pubman.mpg.de/pubman/item/escidoc:1752756:9/component/escidoc:1840538/Malt_2013_thought.pdf
- Majid, A., & Burenhult, N. (2014). Odors are expressible in language, as long as you speak the right language. *Cognition*, 130(2), 266-270. See http://pubman.mpg.de/pubman/item/escidoc:1752755:12/component/escidoc:1878134/Majid_Burenhult_2014_cogn.pdf
- Dolscheid, S., Shayan, S., Majid, A., & Casasanto, D. (2013). The Thickness of Musical Pitch: Psychophysical Evidence for Linguistic Relativity. *Psychological Science*, 24(5), 613-621. See http://pubman.mpg.de/pubman/item/escidoc:1105562:13/component/escidoc:1744188/Dolscheid_Psychological_Science_2013.pdf

2.2 Language of the senses in the classroom!

Project team 'Language of the senses'

In this section we describe how you can set up a project of inquiry-based learning regarding the theme 'Language of the senses' in the classroom as a teacher. At each phase of the inquiry-based learning methodology, we provide activities, practical tips and suggestions. The descriptions in this chapter are based on the experiences of the primary schools De Peppels and De Canadas in Boxmeer, and De Troubadour in Elden. The online appendices to which are referred to by various activities can be found on our website. Whenever you come across this symbol  a reference to the website is made. The materials that are referred to are available on the webpages that were designed for this book.

Core objectives

The follow core objectives may be addressed depending on the width of the scope:

Oral language education

1. The students learn to acquire information from spoken language. They also learn to structurally present that information, either orally or in writing.
2. The students learn to express themselves in form and content when giving and requesting information, reporting, giving explanations, instructing and discussing.
3. The students learn to express themselves in form and content when giving and requesting information, reporting, giving explanations, instructing and discussing.

Written education

8. The students learn to structure information and opinions when writing a letter, report, a form or a paper. They should pay attention to sentence structure, correct spelling, a legible handwriting, layout, and possibly visual elements and colour.

Man and society

37. The students learn to behave with respect towards generally accepted norms and values.
38. The students learn the main points about spiritual movements that play an important role in the Dutch multicultural society and they learn to respectfully deal with differences in the views of people.

Artistic orientation

54. The students learn to use images, music, language, game and movement to express feelings and experiences, and to communicate.
56. The students acquire knowledge about and learn to appreciate aspects of cultural heritage



Phase 1. Introduction

During the introduction phase, students come into contact with the topic for the first time. The goal is to stimulate their curiosity towards the subject and to activate their prior knowledge.

ACTIVITY: TOUCH, SMELL, TASTE

The students use the senses of touch, smell and taste to describe a date as accurately as possible.

Goals

- The students learn to explore with their senses: touch, smell, taste;
- The students learn to describe their observations;
- The students become familiar with the fact that different people describe perceptions differently.

Duration

10 minutes

Work form

The activity is conducted with the entire class, but each student carries out the assignment individually.

Necessities

Per student:

- Blindfold
- Date
- Pen and paper

Activity

The teacher passes a blindfold to all students and has them put it on each other. The teacher informs the students that they have to perform the task in silence. The teacher then gives each student a date, asks one of the students to describe what he feels in three words and writes it on the board. Then the teacher has the students smell the date, has another student describe the smell in three words and writes this on the board. Then the teacher has the students taste the date and has one student describe his sensation in three words, which the teacher again writes on the board. The teacher then collects the remaining pieces of date, after which the students can remove the blindfold.



Teachers at the Winter school discover a raisin with all their senses.

Wrapping up

The teacher reads the descriptions on the board aloud. Can the students conclude that they all had the same object based on the descriptions? Or do some students think they had something else? What words would the students have used themselves? Are certain word choices more accurate than others?

Tips

- The date can be replaced with any other food product. It is useful though if the majority of the students are not familiar with the smell and taste.
- The activity can be extended by performing the same activity with unfamiliar foods that the students bring from home.



Phase 2. Exploring

In the exploration phase, the students explore the topic broadly. This stage is all about gaining knowledge in different ways. The emphasis is on actively personalising the theme by using different activities that the students perform sometimes individually, in groups and as a class. It is important to establish the connection between the activity and what can be learned about the theme. The connection has been described for each activity. The activities described below can also be used in rotating group sessions. It is important however to pay attention to connecting each individual activity to the theme.

Subthemes

Subdividing the main theme into subthemes can help students in formulating a research question at phase 3. By only providing the main theme without its subthemes sometimes gives students too little grip to come up with a research question. Consequently, this can result in the students' questions resembling each other too much. For this reason we have subdivided this theme into subthemes for which we have used the classification of sensory experiences:

- Taste
- Sight
- Hearing
- Smell
- Touch

ACTIVITY 1: TASTE AND TALK

The students test if they can determine whether they are talking about the same or different food based on their verbal descriptions.

Subtheme

Taste

Doelen

- The students become aware that different foods are considered delicious in different cultures;
- The students become aware of words that can be used to describe taste.

Duration


15 minutes

Work form

In groups of 3

Benodigdheden

Per group of 3:

- Jelly beans of various flavours;
- A bowl;
- Two blindfolds;
- Worksheet 
- Pencils.

Preparation

The teacher divides the jelly beans in bowls in advance. Each bowl for each group must have at least five kinds of jelly beans, two of each kind.

Activity

Within a group of three, one student takes on the role of experimenter while the other two are the subjects. The subjects wear a blindfold: they are not allowed to see the jelly bean they will receive. The experimenter gives each subject a jelly bean. The experimenter can decide whether he gives both subjects the same kind of jelly bean or each subject a different one. The subjects then eat the jelly bean and attempt to describe the flavour to each other. They describe the taste in colours, feelings, smells and associations. By describing the taste, the subjects must deduce whether or not they both consumed the same jelly bean. The experimenter records how the subjects described their perceptions and the flavour the subjects think they had. The experiment is repeated at least twice, whereby the students swap roles so that everyone has performed the role of experimenter at least once.

Wrapping up

The students discuss their results: were they able to determine whether or not they had the same jelly bean based on their descriptions? Which words were more accurate in describing the tastes and which were not?



A student from primary school De Peppels eats a jelly bean

Connection to the theme

In English we can describe taste with the words sweet, sour, salty and bitter. Many other languages share these taste words, such as Afrikaans, Hebrew, Greek and Nepali. Some languages combine taste words: sweet and salty or sour and bitter are then described by the same word. Other languages use only one word for salty, sour and bitter. In addition, there are also language-specific taste words such as umami, which comes from the Japanese language.

In different cultures, people eat different dishes. Therefore, it is not surprising that there are languages with completely different taste words than ours. In Gui, an African language spoken in Botswana, they use the word K'ore which describes the taste of eggs and caterpillars, among other things. In Japanese, they use the term umami to describe savoury and meaty tastes. Umami appears in soy sauce, tomatoes, aged cheese and mushrooms. Early last century, a Japanese man by the name Kikunae Ikeda discovered that umami is one of the basic tastes, which is tasted in the middle of your tongue. Since then the word has been adopted by multiple languages. Recently a new taste was discovered: greasy. This word describes the taste of fat, not the soft, creamy feel.

In short, despite major cultural differences, many cultures use the same taste words: sweet, sour, salty and bitter. There are, however, also language-specific taste words which sometimes describe entirely different tastes.

Tips

- You can replace the jelly beans with a different edible good that exhibits variation such as chips or chocolate. Keep in mind to choose the least known flavours.
- Jelly beans are abundantly available, but it can be fun to perform the test with a lesser known or funny taste. Such sweets can be purchased via www.candyonline.nl

ACTIVITY 2: DESCRIBING TOUCH

The students examine whether they can associate the object (the texture) with the correct word in Japanese based on touch.

Subtheme

Touch

Goals

- The students learn to make a connection between sounds and what they feel (textures);
- The students learn that language can express meaning not only through content, but also through sound.

Duration

15 minutes

Work form

In groups of three or four

Necessities

- Five boxes;
- Materials to be placed in the boxes: cotton, pine cone, stress ball, marble and sandpaper;
- Laptop with an audio file with Japanese spoken words that indicate a specific texture
- Worksheet 'describing touch'

Preparation

The teacher prepares five feel boxes each containing a different object as shown below. The teacher also prepares a computer with the audio files of the spoken words. The boxes associated with words 1, 2 and 3 are held separately from the boxes associated with words 4 and 5.

Japanese words and associated objects

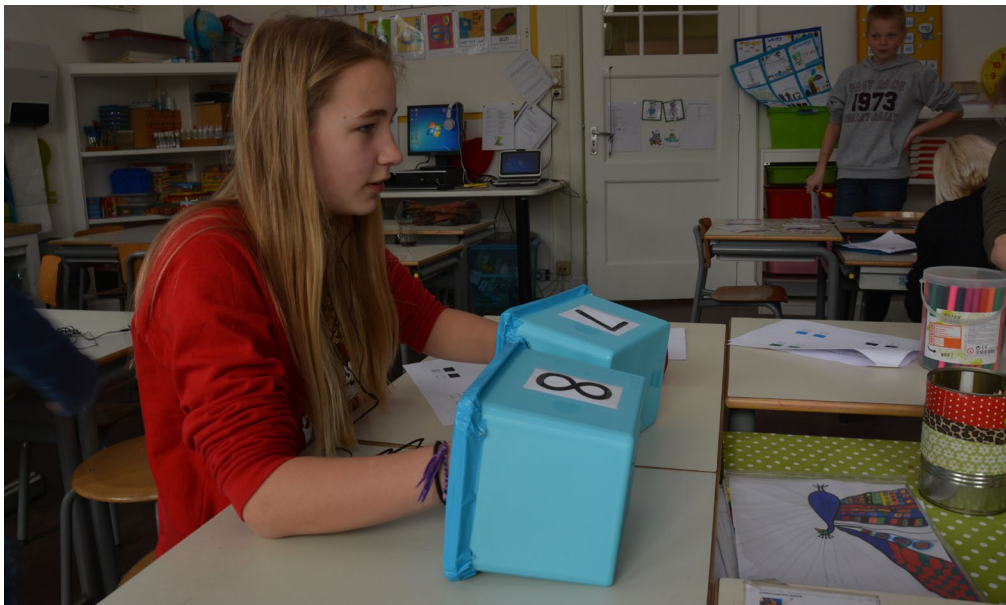
| Nr. | Object | Japanese | English |
|-----|-------------|------------|---------|
| 1 | Cotton | fuwafuwa | Airy |
| 2 | Pine cone | gotsugotsu | Bumpy |
| 3 | Stress ball | gunyagunya | Soft |
| 4 | Marble | tsurutsuru | Smooth |
| 5 | Sandpaper | zarazara | Rough |

Extra words to expand the activity (choose your own object)

| Nr. | Object | Japanese | English |
|-----|--------|------------|---------|
| 6 | | bishobisho | Wet |
| 7 | | betabeta | Sticky |
| 8 | | gitogito | Greasy |

Activity

Step 1: The students conduct this part of the activity individually. In turns, the students listen to word 1 on the laptop and subsequently head towards the first three feel boxes. The students feel the texture of the object within the box and consider which of the three boxes best fits the word they just heard. They repeat this for the two remaining words.



A student from De Troubadour compares the content of two feel boxes to determine which texture best corresponds to the Japanese word that she just heard

Step 2: The students now head to boxes 4 and 5. They take turns in touching the object in the box and attempt to come up with a (non-existing) word for the texture of the object. Then the students listen to the Japanese word that corresponds to the box to see whether the word they came up with resembles it.

Wrapping up

The students discuss their conclusions. Did they all choose the same box for a given Japanese word at step 1? Do the answers coincide with the table? Could the other groups easily associate the made-up words with the correct feel boxes?

Connection to the theme

The meaning of a word does not necessarily have anything to do with how the word sounds. For example, the sound of the word tree says nothing about what a tree is or what it looks like. But with some words, the meaning can be deduced from the sound; we call these words 'ideophones' and they are mainly used to describe sensory experiences. The associations that some words evoke by their sound is called 'sound symbolism'.

Research has shown that certain sounds go together with certain objects. In multiple languages the sound of takete (or kiki) match pointed objects and the sound of balouma (or bouba) match round objects. Takete and balouma are nonsense words, but there are real words for sensory experiences from which meaning can be derived from its sound. In Dutch, these are often words for a particular sound. These words are 'echoic' (also called an 'onomatopoeia'): they imitate the sound they describe. An example of an onomatopoeia would be 'tick tock' which describes the sound a clock makes.

In Japanese and Siwu, a language spoken in Ghana, ideophones are also used to describe textures. In Japanese a slimy object feels nurunuru, sticky feels betabeta and smooth feels tsurutsuru. In Siwu, the people use kpokporo (hard), tɔpboroo (soft), wòsòròò (rough), wùrùfùù (fluffy), nyaka-nyaka (grooved) en fiɛfiɛ (silky).

Tip

To get more students to do this activity simultaneously, the teacher can also prepare the configuration several times.

ACTIVITY 3: DESCRIBING SMELL

The students describe different scents and discover that this is not so easy.

Subtheme

Smell

Goal

The students learn that smells can evoke different associations in different people, which is why they describe them with different words.

Duration

15 minutes

Work form

In pairs

Benodigheden

Per pair:

- Blindfold;
- Pen and paper;
- Six sealable containers numbered 1 to 6;
- Six house, garden and kitchen scents such as:
 - Oregano
 - Old cheese
 - Cloves
 - Anise
 - Vinegar

Preparation

The teacher prepares for each pair six containers to be smelled. The teacher records in which container he places which smell (for example aged cheese in container 3).

Activity

Each pair consists of a student that acts as the experimenter and another student as the subject. The subject is blindfolded. The teacher hands out the first three containers to each group. The experimenter grabs container 1 and has the subject smell it. The subject then tells the experimenter what words come to him in association to the smell, which the experimenter records. This is repeated for containers 2 and 3. Once completed, the subject remains blindfolded until the containers have been removed from sight. The roles are then swapped and the experiment is conducted with containers 4, 5 and 6. Once the subject is blindfolded, these containers are handed out again.



A student of De Peppels smells the contents of the container and describes what she smells.

Wrapping up

The students compare each other's descriptions. Are they similar? Why is that? Are there any unusual descriptions among them? Why did the students write these down? Do the other students understand what is meant by the unusual descriptions?

Afterwards, the teacher announces the contents of the containers and the teacher can check to see whether they smelled correctly.

Connection to the theme

Since Plato and Aristotle, it was thought that it was impossible to describe smells. In many western languages, such as Dutch, smells are incorrectly described in over half the cases. When people give a description of the smell, they often provide a source description: they refer to the object from which the smell originates (smells like coffee, smells like banana). How particular source descriptions are becomes apparent when smells are compared to colours. We do not say that the balloon has the colour of grass (source description), but rather we say the balloon is green (abstract description).

The assumption that smells are impossible to describe is incorrect. A group of hunters and gatherers in Malaysia, the Jahai, is, for example, much better at describing smells than speakers of western languages. An example of a Jahai smell word is ha?ét: tiger, shrimp paste rotten meat, faeces and burnt hair. The researchers discovered that the Jahai use one word to describe different smells, similar to how we use the word 'red' for the colour of strawberries and fire trucks.

Smell is very important in the culture of the Jahai. They have certain smell-related rituals and beliefs. The Jahai, for example, believe that the smell pl?erj is dangerous, because it lures tigers. Cooked food is not eaten when it smells like pl?erj.

Tips

- The pairs can be grouped together to form groups of max three pairs. Each group would then receive a set of containers. Seeing as the groups still receives three containers, the pairs can pass the containers among each other.
- The activity can be expanded by having the pairs guess which description belongs to which container.

ACTIVITY 4: DESCRIBING SIGHT

The students classify colours in different colour categories and see that they do not necessarily agree with the classification.

Subtheme

Sight

Goal

The students discover that colour is experienced completely differently in other cultures and discover what the role of language is here.

Duration



15 minutes

Work form

In groups of four

Necessities

Per group:

- A hefty pile of different coloured cards; for example colour sample strips from the paint shop (keep in mind to cut off any words that may give away the name of the colour)
- A circle divided into six compartments with the words yellow, orange, red, pink, blue and green (see example )
- A circled divided in three compartments with the words light, dark and red (see example )

Preparation

The teacher prepares as many in three and six divided circles as there are groups.

Activity

Every student in the group grabs a number of colour cards and places them quietly on the first circle (with six compartments). The students must choose: the colour cards are not allowed to be placed between two colour words. After all colour cards are placed in the circle, the students engage in a discussion: are there colour cards that possibly belong to a different compartment?

Next, all the students grab another hand of colour cards and place these on the second circle (with three compartments). Just like with the first circle, no colour cards are allowed to be placed between two colour words, which might prove to be difficult. Once all the colour cards have been placed on the second circle, the students engage yet again in a discussion about the location of the cards: are there cards that belong to a different compartment?



The students from De Troubadour place the colour cards on the circle at the colour word they feel best describes them

Connection to the theme

The colour spectrum consists of infinite shades between red and violet. The Dutch language has divided this continuous colour spectrum into segments: black, white, red, yellow, green, blue, brown, purple, pink, orange and grey.

Different languages have different classifications: a colour may be named differently in one language relative to another. For example, the Yebamasa from Southeast Colombia use only one word for both green and blue (sumese). In Russian, they use more than one word: they don't have just one word for blue (like we do), but a word for light blue (goluboy) and a word for dark blue (siniy).

Dutch and German share the same colour words, but some have different meanings. An example is the colour of the middle light of a traffic light. In Dutch, this colour is considered orange, whereas in German it is considered yellow!

Where different colour categories and thus differences between languages originated is difficult to explain. Several factors most likely contributed to this. A biological explanation might be that exposure to UV light influences the formation of the eye's lens, which makes it more difficult to make a distinction between green and blue. This might explain why tropical languages often have only one word for green and blue. Another explanation could reside in culture. The word orange is an example of this. The word orange has only existed since the Middle Ages when oranges were imported into Europe from India and China. The word for the colour orange is derived from orange, the French word for orange, and refers to the colour of the fruit.

Tip

To delve further into the subtheme, the teacher can introduce a language that possesses only a few colour words, as an addition to the activity. The students paint a smooth stone in the style of the Umpila, an Aboriginal Group that creates 'dot paintings' in the colours light, dark and red. For this, the following materials are required:

- Laptop with Aboriginal art images
- Smooth stones
- Paint of Aboriginal colours (white, red/brown, ochre and black)
- Trays for the paint
- Plant sticks
- Newspapers

ACTIVITY 5: THICK OR LOW TONES?

The students associate sounds with certain animations and see that experiences of low or high tones are culturally determined.

Subtheme

Hearing

Goals

- The students discover that different languages use different metaphors for sounds;
- The students discover that the metaphor of their native language influences how they think about sounds

Duration



10 minutes

Work form

Individually

Necessities

Per person:

- Laptop
- Headphone
- Pen or pencil
- Extension cable(s)
- Answer sheet 
- PowerPoint presentation Thick or Low Tones 

Preparation

The teacher copies the presentations to the laptops and sets them to presentation mode. The headphones are connected to the laptops. Adjacent to the laptops lay the answer sheets.

Activity

The students start the presentation and receive a brief introduction on the task. Following the introduction, the students consecutively listen to two sounds four times and watch a short film about two objects. They must then decide which sound best corresponds to which film and fill in the answer sheet.

Wrapping up

The students discuss their answers: does everyone associate the same sound with the same picture? Why did some students choose something different?

Connection to the theme

In Dutch, the words 'high' and 'low' refer to distance, but they are also used for sounds. These are called metaphors. In western languages such as English, German and Dutch, we speak of high and low tones, but in other languages, different metaphors are used. For example, Kpelle-speakers, living in Liberia and Guinea, refer to light and heavy sounds.

Farsi-speakers from Iran and Turkish speaking citizens speak about thin and thick sounds. Suya-speakers situated in Brazil use yet a different metaphor: they refer to sound as either young or old.

Babies have no command yet over language, but they are capable of associating tones with both high and low metaphors, and thin and thick metaphors. As they grow older, the metaphor of their native language becomes more of an influence. This can be tested by having people listen to a sound while seeing a bar which is high/low or thin/thick on a computer screen. Dutch adults speak of high and low sounds, and are influenced by the height of the bar. When requested to repeat the tone, they sing at a higher tone when presented with a high bar relative to a low bar. Adult speakers of Farsi, which speak of thin and thick tones, are influenced by the width of the bar. The metaphor of your native language, therefore, has an influence on how you perceive sound. Regardless, research shows that you can still understand the metaphors of different languages. Even though you do not refer to sounds as young or old, intuitively you understand that young refers to high and old refers to low.

ACTIVITY 6: ANIMAL DIALECT

The students try to identify the sounds of several animals and try to link a glossary of animal sounds from different languages to pictures of animals.

Subtheme

Hearing

Goal

The students learn that when one talks about sounds, certain words exhibit a relationship between the form and the meaning of the word. The students explore this relationship and research how this differs in different cultures.

Duration

10 minutes

Work form

This activity can be part of a circuit or be done with the entire class. The students perform the assignments individually.

Necessities

Per student:

- A pen or pencil
- The document 'Animal dialect' [🔗](#)
- The document 'Animal dialect-answers' [🔗](#)
- Pen of potlood

(If necessary, the students can share the answer sheet, so that a copy does not have to be printed for each student.)

Activity

The students receive a glossary of animal sounds in various non-Dutch languages and pictures of animals depicted with speech bubbles. The students write the English word (or the word in their own language) for the animal sound in each speech bubble (for example "woof"). Afterwards, the students insert the animal sounds that match the different animals in the remaining speech bubbles.

Wrapping up

The students check their answers with the answer sheet. They then compare their answers in groups and share their experiences.

Connection to the theme

The relationship between the meaning and the form of the word is often arbitrary. For example the form of the word 'chair' says nothing about what a chair is or what it looks like. It might as well have been called 'pans'. But there are also words for sensory experiences where the meaning can be derived from the form. This is referred to as 'sound symbolism'. In western languages, this is especially true of words that denote sound. Think of the sound of something exploding (bam!) or a ticking clock (tick tock).

Animal sounds are also an example of this, such as a rooster's 'cook-a-doodle-doo' or the 'ia' of a donkey. In many languages there are similarities between the words for certain animal sounds, but every language has its own interpretation of the sound (compare the English 'cook-a-doodle-doo' to the French 'cocorico'). This has to do with the fact that we do not precisely mimic or imitate the sound, but rather give it a name. By giving the sound a name, the word must automatically comply with the rules of a particular language. For example, certain sounds that one particular language uses differ from those used in a different language. Furthermore, animal sounds are also dependent on the culture. In any given culture, predominantly the sounds of pets are named, animals that are important to society and that we often encounter. For example, we wouldn't really know what the sound of a camel is in English, whereas the inhabitants of the Gobi Desert (where camels are native) would have one!

Tips

- The assignment can be expanded by adding more animal images and sounds;
- The students can also be given loose paper strips with words instead of a glossary, so that they can paste these in the speech bubbles;
- As a finale, a film featuring people from many different countries imitating all kinds of animal sounds can be presented to the class: <https://vimeo.com/25215616> [🔗](#).



What do cats in Japanese?



Phase 3. Designing research: research question and research plan

PHASE 3A. THE RESEARCH QUESTION

Below are five research questions that students from the primary schools De Peppels, De Canadas and De Troubadour have formulated and researched. Where necessary, the questions were slightly adjusted for clarity. These questions can serve as an example for the teacher as to what types of questions students may propose. Teachers who do not yet feel confident with the inquiry-based learning methodology can potentially consider to provide these questions as research questions to the students. Yet, with proper guidance, the students are capable of coming up with their own research question; after all the questions below were devised by students. Therefore, keep in mind not to guide the students too much.

For each question, we have indicated the corresponding subtheme and the connection to the research as described by the researchers in the first part of this chapter.

- Do toddlers use the words sweet and sour when describing taste? (Subtheme Taste)*
Different languages use different metaphors for sound: Dutch uses high and low, Farsi uses thick and thin. The research conducted by the researchers has shown that babies who cannot yet speak are capable of understanding the metaphors of different languages. This implies that you only start thinking in terms of the metaphors of a language once you learn it and until that time remain sensitive to all metaphors.
- What is the difference between how toddlers and students from grade 5 and 6 name shapes such as circles, trapezoids and hexagons? (Subtheme Sight)*
The research conducted by the researchers, as described in section 5.1 and the activities described above, focuses on the articulation of sensory experiences of the senses smell, taste, touch and colour distinction. This research question builds on the research based on the sense of sight by conducting research on the perception of geometric forms and the extent to which a difference in language exists between young and older children.
- What is the difference between a seven year old and a seventy year old in their descriptions of something sweet, something sour and something salty? (Subtheme Taste)*
The research conducted by the researchers focuses on the differences in descriptions of taste between different languages. This research question touches on this by examining whether a difference exists in the descriptions of taste between different age groups within a given language.
- What do the children of the middle class prefer the least: watching a film without hearing anything or not being able to see it? (Subtheme hearing, Sight)*
This theme focuses on sensory experiences. This research question ties into this by researching how the loss of sight or hearing affects the experience of watching a movie and which sense the children would rather miss.



A student from De Peppels participates in a research project by her classmates.

5. *What names do the children of our schools give colours that are sandwiched between two colour groups? (Subtheme Sight)*

The research conducted by the researchers has shown that some languages use only one word for a colour category, for example blue, while other languages make a distinction between light blue and dark blue as separate colour categories. This makes it easier for speakers of that language to identify shades of blue. This research question ties into this by researching how indefinable shades of a particular colour are identified, especially when this colour is sandwiched between two other colours (for example turquoise in between green and blue).

PHASE 3B. THE RESEARCH PLAN

An example of how a detailed plan ideally looks like can be found online [🔗](#).