



This slide set is about questioning what you see and finding ways to see better. The notes contain links and key words to help you continue exploring the subject.

The screenshot shows a web browser window displaying the 'Eeva and testing' website. The browser's address bar shows 'https://test.site.test'. The website has a navigation menu with 'home', 'testing', 'manuals', 'blogs', 'specifications', and 'etc.'. A sidebar on the left contains a list of categories: 'end user perspective', 'browser based solutions', 'electronic services', 'CMS, CRM, calendars...', 'Validation Manager', 'standardized validations', 'data analysis & reporting', 'test page', and 'new food'. Below the sidebar is a poll titled 'Poll: which do you prefer?' with options 'Customer projects' and 'Product development', and a 'Give feedback' section with a name field and a 'Select reason' dropdown. The main content area features a featured article 'Exploratory testing' with a 'Read more' link. Below this is a text block: '7 years in testing and I'm still finding myself wondering how to it better. Some thoughts I share on my blog (in Finnish, savutesti.blogspot.fi). Tweeting mostly in English as @EevaPursula. Not very active with them.' This is followed by a table of work history:

Started	Company	Position
▶ 2015	Finbiosoft	Software Quality Assurance Specialist
▶ 2011	Innofactor	Quality Assurance Engineer
▶ 2009	Innofactor	Sales and Project Manager

On the right side, there is a calendar for September 2017, a 'Validation manager' logo, and a section titled 'Why developers matter?' with sub-headers: 'How to create a positive cycle for testing?', 'Using cognitive dissonance for your advantage', and 'Taking another view on'.

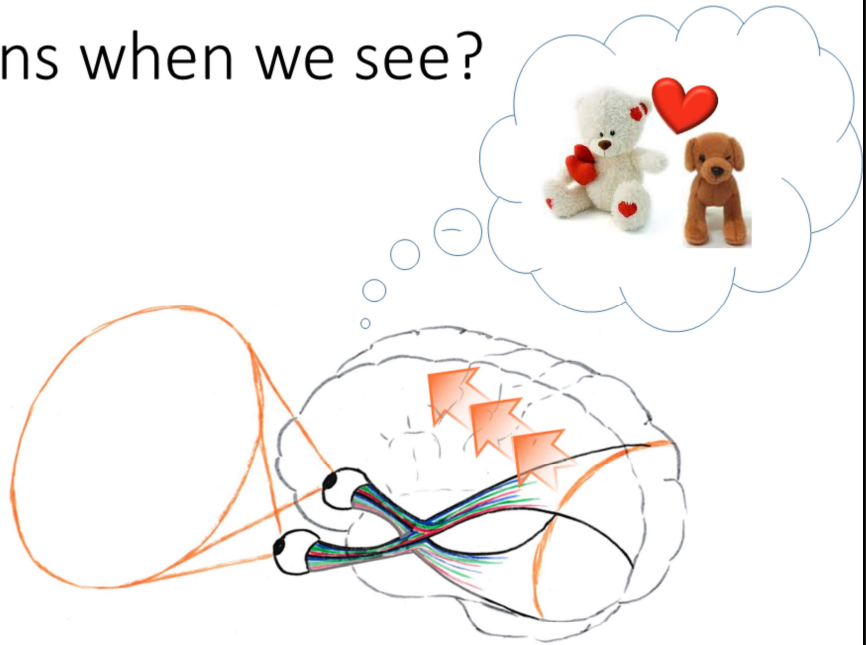
Not seeing accurately enough is very concretely shown when a customer finds layout bugs.

Most things that we'll be going through are applicable to other contexts as well.

What happens when we see?



Youtube / David de Meulles:
Polar bear petting dog



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Eyes detect light in 2D. Visual cortex at the back of your head combines images and does quite a lot of signal processing to make a reasonable 3D interpretation of what is seen. Brains minimize the amount of conscious processing needed for understanding what happens around us

- automatic categorization (label everything that seems familiar)
- automatic prioritization (focus attention on things that seem relevant)
- automatic interpretation about what is the context in which things are happening (scripts, emotions)

Some further reading: the brain predicts what we are about to see
<http://gurneyjourney.blogspot.fi/2011/01/predictive-coding.html>

The original polar bear video can be found at <https://www.youtube.com/watch?v=oUle-4E1qoQ>

New York Post:
"Everyone loves dogs, even polar bears."
"There's nothing cuter than a polar bear petting a dog"
<https://www.facebook.com/NYPPost/videos/vb.134486075205/10158638246235206/>
 9059 likes, 2065 hearts

Daily Mail:
"HEART BURSTS!!!" ❤️❤️❤️
<https://www.facebook.com/DailyMail/posts/1648227058570369>
 14622 likes, 2961 hearts

FOX 29:
"Watching this polar bear pet this dog like a human is one of the best decisions you will make today"
<https://www.facebook.com/fox29philadelphia/videos/vb.59404413854/10154359145378855/>
 7215 likes, 1523 hearts

ABC News:
"This wild polar bear in Canada loves dogs just as much as we do."
<https://www.facebook.com/ABCNews/videos/vb.86680728811/10155027431638812/>
 39006 likes, 10798 hearts

CBC News:
"Polar bear petting a dog"
<https://www.facebook.com/cbcnews/videos/vb.5823419603/10154839667369604/>
 80723 likes, 14558 hearts

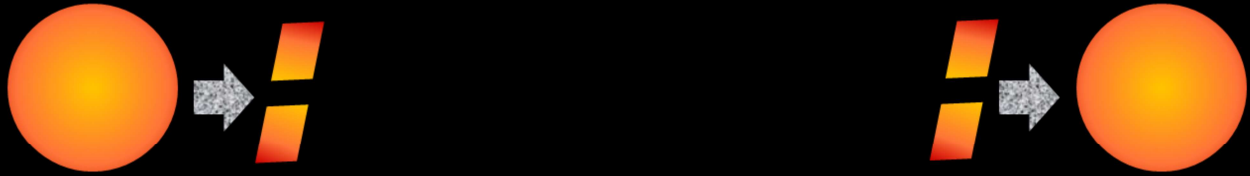
<http://www.sciencealert.com/sorry-to-ruin-your-dreams-but-that-dog-petting-polar-bear-just-ate-a-husky-alive>

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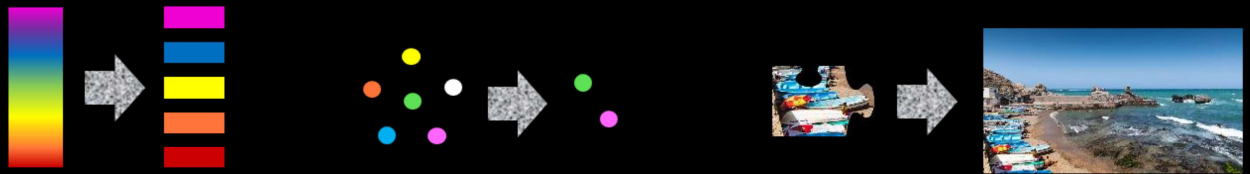
Even the most shares stories may be false interpretations of true events.

The "Disney interpretation" of the story of a friendly polar bear petting a dog lived strong for a couple of days in November 2016 and provoked a lot of positive reactions.

After that, new news articles were published to tell that the polar bear was apparently just playing with his food after all. For example <http://www.sciencealert.com/sorry-to-ruin-your-dreams-but-that-dog-petting-polar-bear-just-ate-a-husky-alive>



The path from our eyes to our minds is long
and there are many steps
where errors can happen!



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Seeing is a little bit like finding a single piece of a jigsaw puzzle and deducing the whole picture from it by thinking back puzzles you've done before – not noticing what else is in the same toy box.

Context defines how we see size



Can you hide the moon behind a 10 cent coin?

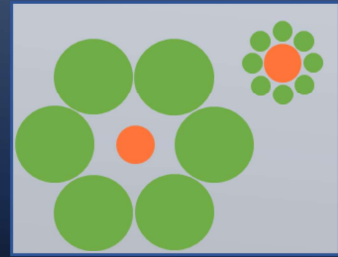


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Ebbinghaus illusion

The orange circle is identical



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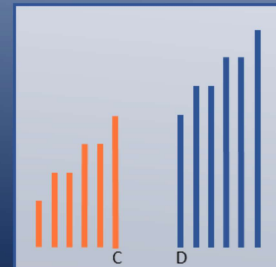
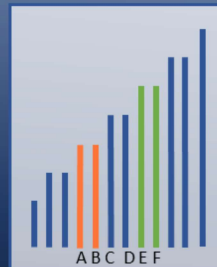
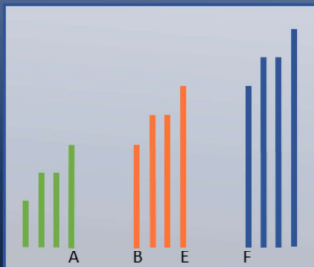
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The moon looks small when it's high, and huge when it's near the horizon where you can compare it to trees or houses. But it's just as big in both cases. Try hiding it behind a small coin that you hold at an arms length to get a standardized reference for estimating the size.

Other examples about how context affects when we estimate sizes:

- Delboeuf illusion
- Ebbinghaus illusion
- Müller-Lyer illusion
- Ponzo illusion
- (more information found in Wikipedia)

Category defines how we see size



Lines of identical lengths appear to be of different size when presented as members of different groups (*Tajfel & Wilkes 1963*)

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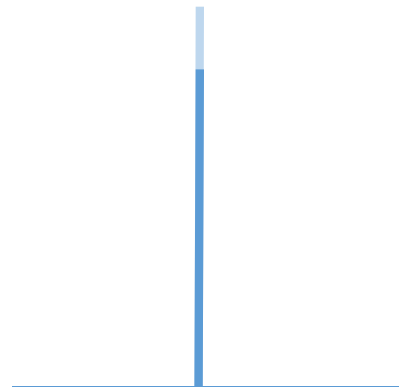
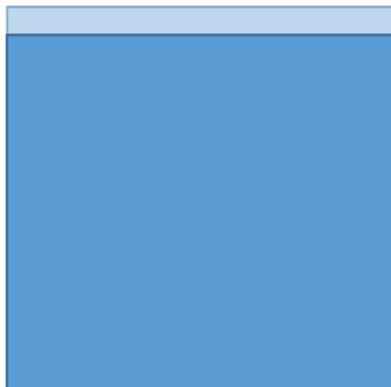
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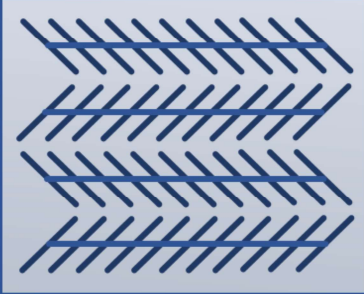
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Each category holds many meanings that affect the way we see items we've labelled to be a part of that category. Categorizing things affect even the way we interpret the length of a line.

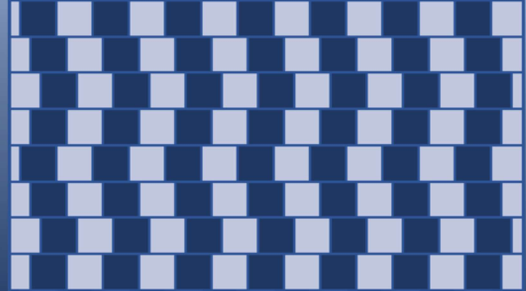
See also Vertical–horizontal illusion: we tend to see vertical lines longer than horizontal lines of the same length. This effect is strongest if the vertical line “stands” on the horizontal line cutting it in half, but it happens also when trying to draw a square.



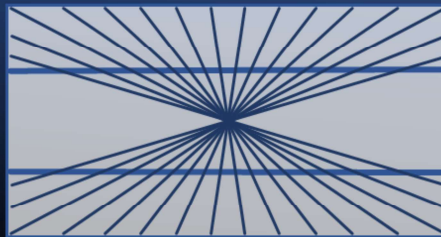
Context defines how we see shape



Zöllner illusion



Café wall illusion



Hering illusion

All horizontal lines on this page are straight and parallel to each other

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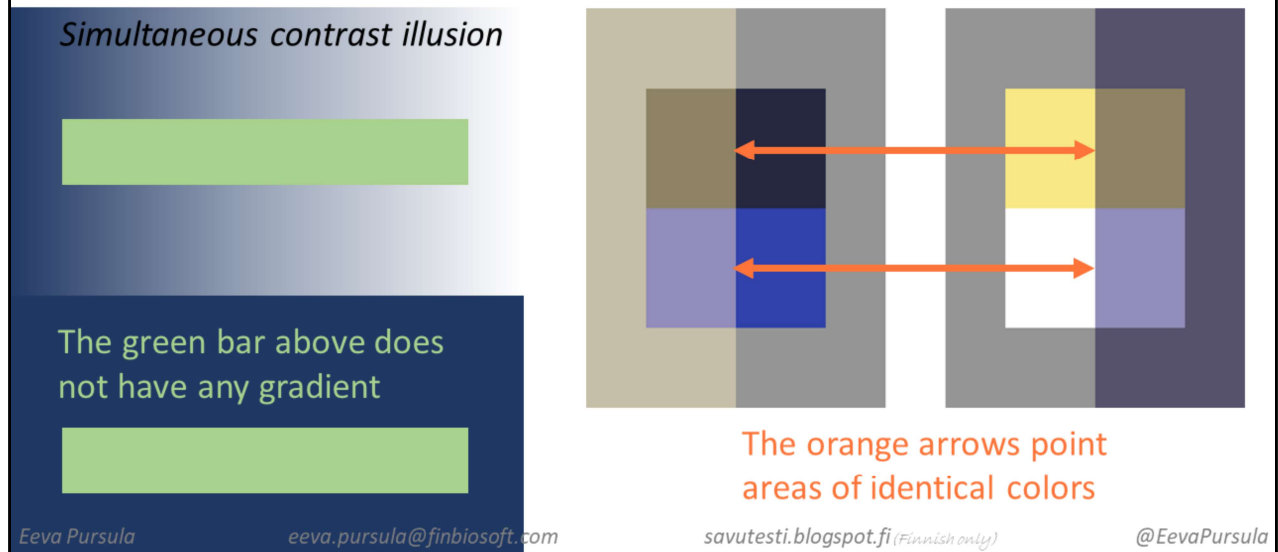
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Context can make lines seem sloped, curved or twisted as your brains try to interpret the image as 3D

- Zöllner illusion
- Café wall illusion
- Poggendorff illusion
- Hering illusion
- Wundt illusion
- Orbison illusion

Context defines how we see shade & color

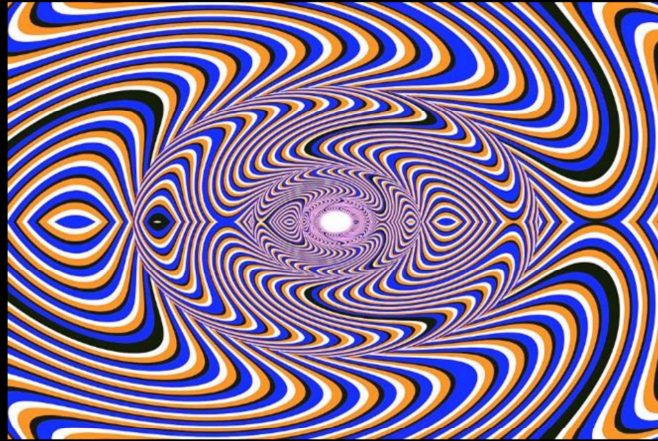


Color only exists inside your head. The wavelength and amount of light that your eyes detect depends not only about the object you are looking at but also about the light in which you see it. When there is less light, the ability of our eyes to detect colors diminishes, but brains are able to correct the signal. Interpretation of shape and light affects how we see colors.

A couple of videos to demonstrate this:

- World Science Festival: How Color Tricks The Eye And Brain
<https://www.youtube.com/watch?v=JHT-VHOFDFY>
- TEDxTeddington - Andrew Hanson - Colour is Crazy
https://www.youtube.com/watch?v=BBWab1K_dzY

Trouble in focusing or interpreting the image can make it look like it moves



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For more moving images

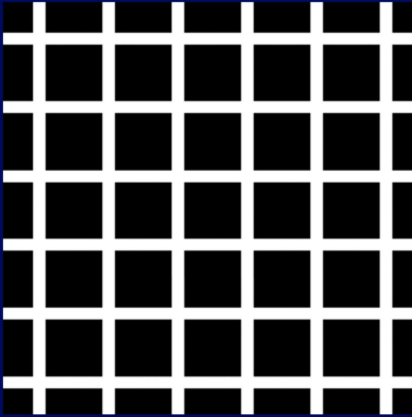
see <http://www.psy.ritsumei.ac.jp/~akitaoka/motion27e.html>

terms for google searches

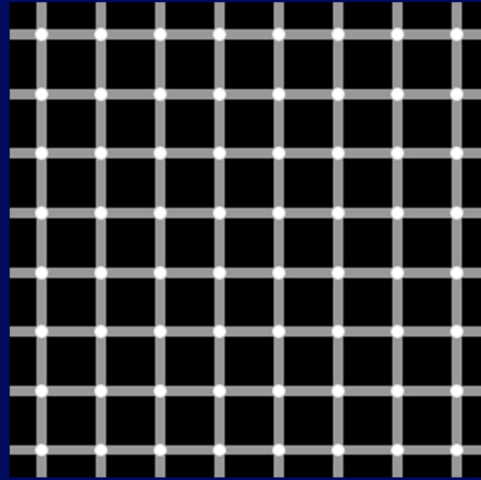
- anomalous motion illusion
- illusory motion
- Akiyoshi Kitaoka

Things are added when we just cannot handle the pattern correctly

Hermann grid illusion



Scintillating grid illusion



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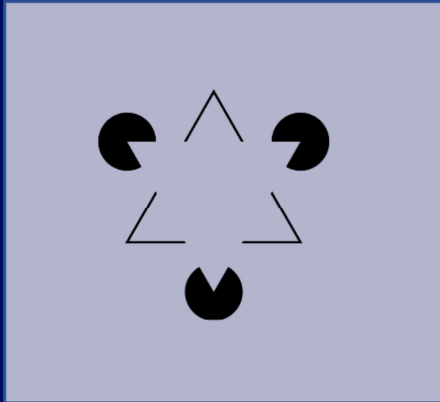
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When looking at grids, dots are added (or hidden) in the intersections. Shape of the grid affects this, with a sine distortion the effect can be made to disappear.

- Hermann grid illusion
- Scintillating grid illusion
- Ninio's extinction illusion
- Stopping the Hermann grid illusion

Things are added when we just cannot handle the pattern correctly

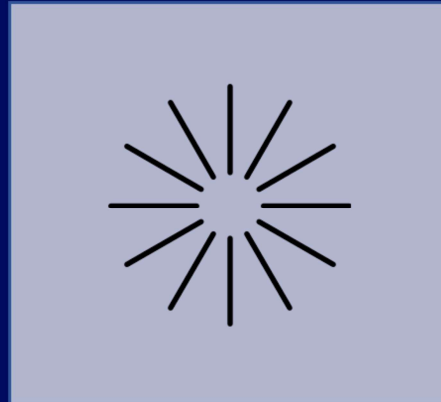
Kanizsa's Triangle



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Ehrenstein illusion



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Illusory contours

Seeing part of an “edge” of a shape can make us see that shape.

The illusory object often seems brighter and to be closer to the viewer than the background

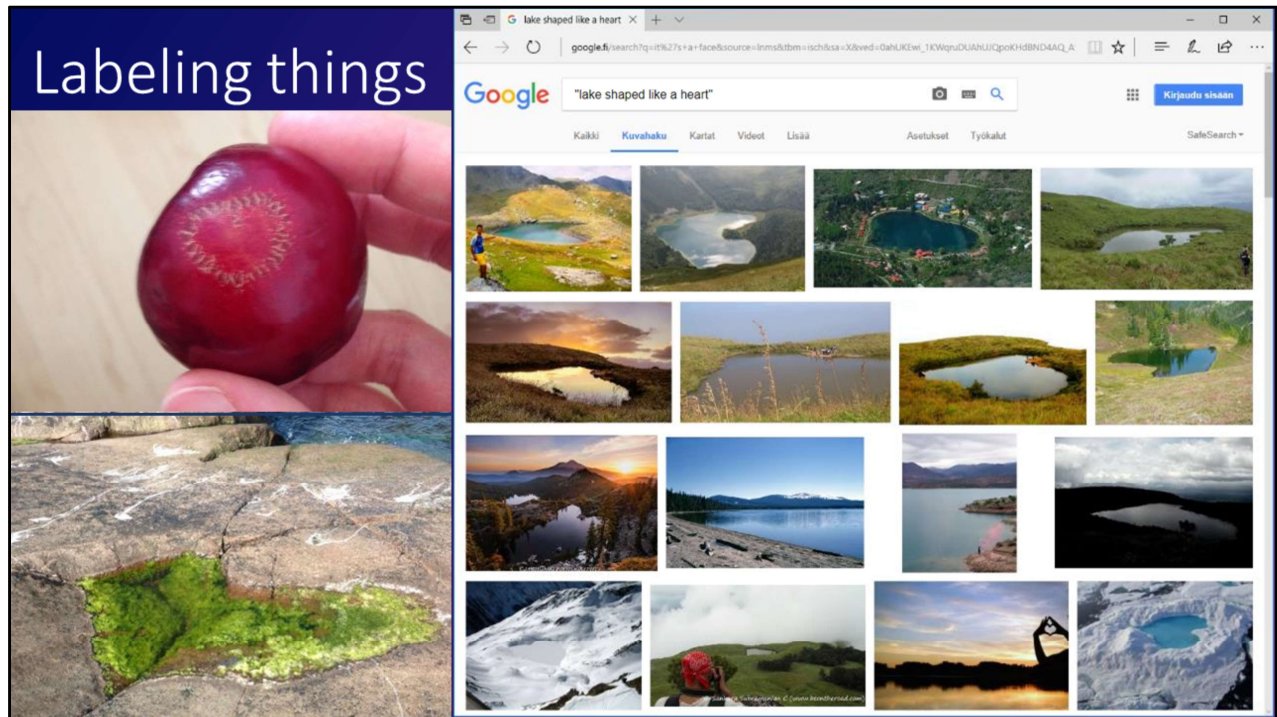
- Kanizsa's triangle
- Ehrenstein illusion

Things are added because
we can't see without it



Stars are nothing but dots on the sky, but the imperfections of the lenses in our eyes make them look pointy

When brains try to interpret an image, trying to make us notice the most relevant things, they may also add things that don't really exist



We tend to see familiar patterns in places where they really do not exist.

Some search terms for finding amusing images

- alive vegetables
- funny shaped fruits
- oddly shaped fruits
- bizarrely shaped lakes
- cloud shaped like

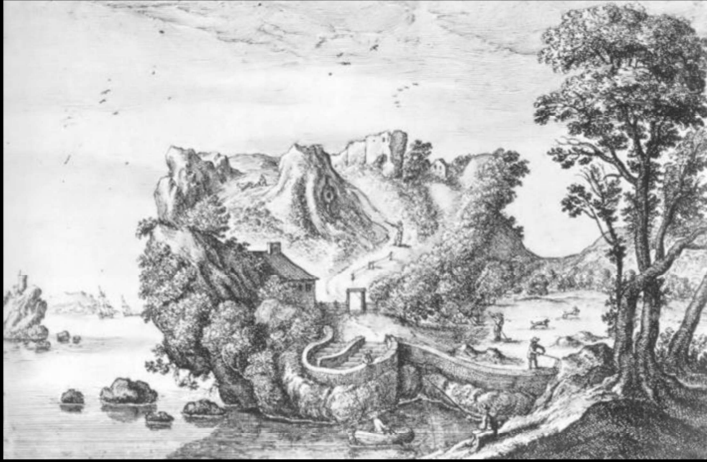


We are especially good in seeing human faces in places where they do not exist.

some examples of pareidolia can be found behind these links:

- <http://www.sadanduseless.com/2017/04/funny-pareidolia/>
- <http://www.quillhammer.com/hey-its-a-face>
- http://www.huffingtonpost.com/2014/02/07/wave-face-patrick-swayze_n_4740363.html
- <http://www.dailymail.co.uk/news/article-2022006/Is-face-clouds-Footage-shows-spooky-shape-shifting-display-formed-Canadian-storm.html>

Hidden faces in art



Wenzel Hollar: Landscape (1607-1677)



Giuseppe Arcimboldo: The Librarian (1570)

A few examples of paintings to study seeing:

Octavio Ocampo: *The General's Family* shows 9 faces in one portrait

Oleg Shuplyak has painted many cool portraits of famous people as landscapes, for example paintings

- *Charles Darwin*
- *Sigmund Freud*
- *Double take*

Giuseppe Arcimboldo: many paintings, for example *The Jurist* (1566) and *The Waiter* (1574)

Pavel Tchelitchew: *Hide-and-Seek* (1942)

William Ely Hill: *My Wife and My Mother-in-Law* (1915)

Old Couple and Musician has three levels of interpretation (claimed to be painted by Salvador Dalí in 1930?)

Some interesting paintings by **Salvador Dalí:**

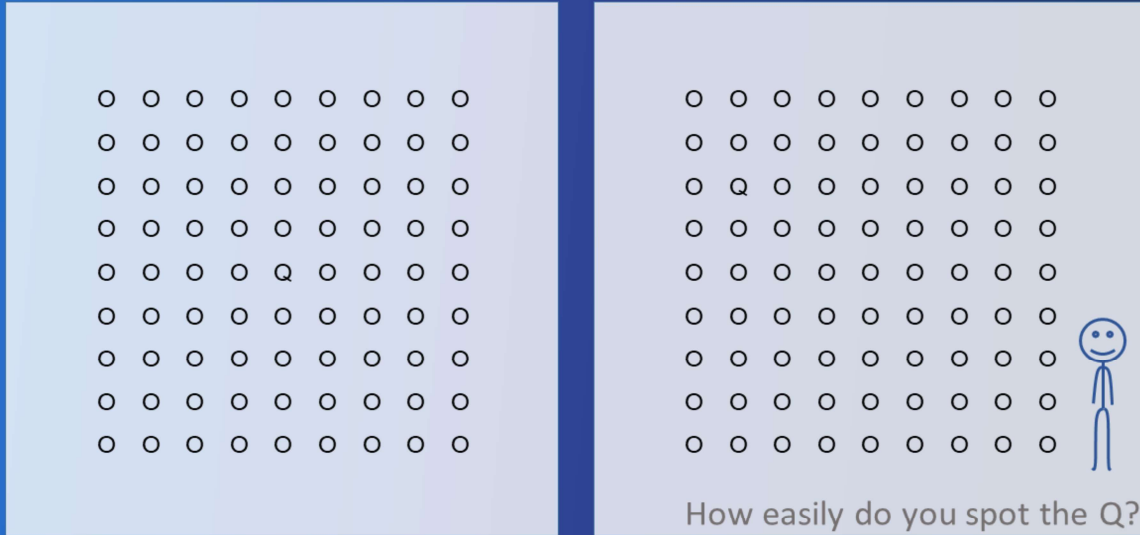
Hidden faces

- *Endless Enigma* (1938) can be seen on 6 different ways
- *Spain* (1938)
- *Mae West's Face which May be Used as a Surrealist Apartment* (1934-35)
- *Apparition of Face and Fruit Dish on a Beach* (1938)
- *Slave Market with the Disappearing Bust of Voltaire* (1940)
- *Galatea of the Spheres* (1952)

Other images playing with multiple interpretations

- *Metamorphosis of Narcissus* (1937)
- *Swans Reflecting Elephants* (1937)
- *The Sistine Madonna* (1958)
- *Gala Contemplating the Mediterranean Sea which at Twenty Meters Becomes the Portrait of Abraham Lincoln-Homage to Rothko* (1976)

Distraction



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On the left it is easy to spot the Q because your eyes naturally focus on the center of the image.

On the right it is tempting to look at the human like figure next to the grid, which makes it hard to find the Q

*“Just when you think you know something,
you have to look at it in another way.
Even though it may seem silly or wrong,
you must try.”*

-- John Keating
*in the movie **Dead Poets Society** (1989)*

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How to see better?

- Try another role
- Switch a project
- Discuss with someone who views things from a different angle
- Do something else

Try to be aware of your interpretations and assumptions and question them

Goals and assumptions

How many bottles of ketchup?



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Are there any figures here?
Can you build a car with these?



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What shape of bread would you eat?



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It's easier to spot a full bottle of ketchup than a nearly empty one, because when looking for ketchup we look for something red <http://hellofatester.blogspot.fi/2013/06/all-ketchup-bottles-are-not-red.html>

When looking at a toy box full of Legos, you cannot know whether something is missing, but you can have many kinds of tasks for exploring the pile. Your goals determine what you will find out about the pile.

The way a bread is cut affects how it tastes and feels. Fixed assumptions on how to cut bread may make it impossible to get kids eat rye bread.

The answer you get depends on what you ask.

We are not always aware what we are asking.

Resemblancies and discrepancies



We need to be able to see resemblance (being part of the same category) in things that are not identical:

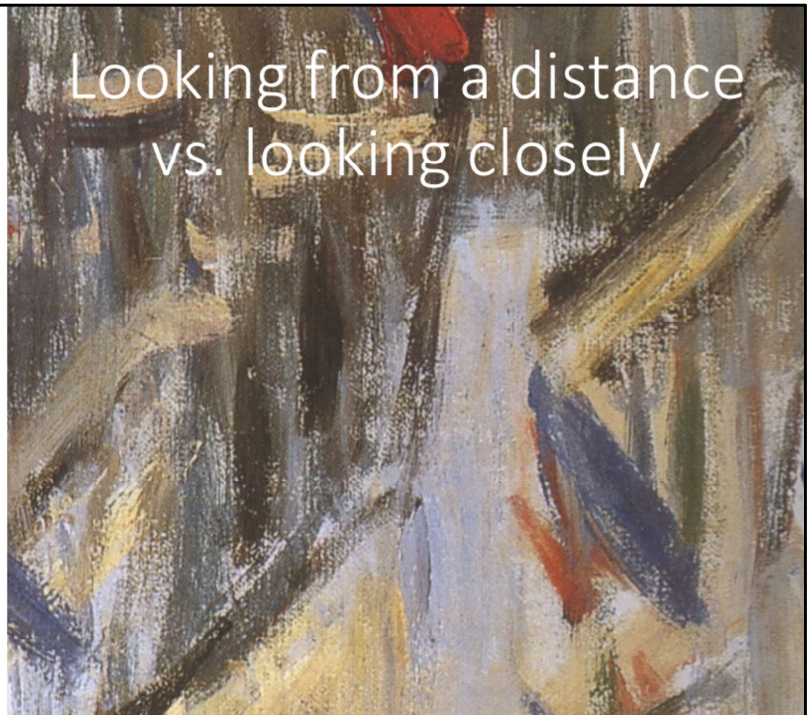
- being able to learn new things by making comparisons to already learned things
- learning easily how to use different items of the same category (e.g. navigate on a new web site)
- coming up with use cases (and types of misuse) to create test cases

We need to be able to see discrepancies (uniqueness of an item in the category):

- how the implementation differs from what it was planned to be
- how the implementation differs from other similar products
- how the implementation differs from similar features within the same product



Claude Monet:
Rue Saint-Denis, Fête du 30 Juin 1878,
Musée des Beaux-Arts



Looking from a distance
vs. looking closely

A few examples of paintings to study seeing:

Claude Monet:

- *Regatta at Argenteuil* (1872)
- *Impression: Sunrise* (1873)
- *Rue Saint-Denis, 30 June* (1878)
- *The Houses of Parliament, Sunset* (1903)
- *Blue Waterlilies* (1916-19)

Paul Cézanne painted many paintings of following themes, some of them particularly interesting:

- *The Gardener Vallier* (1902-1906)
- *Forest* (1902-1904)
- *Mount Sainte-Victoire seen from Les Lauves* (1904-1906)

It's quite common that oil paintings look better when seen from a distance, but it's particularly distinctive in impressionism and expressionism.

Similar effects are still used in more modern contexts, e.g. **Yuri Bondar** (images available in the internet depend on what's on sale)

The developer who builds the product doesn't necessarily see the big picture but only his own small part, and sometimes it's hard to make sense of that part alone.

Looking from a distance vs. looking closely



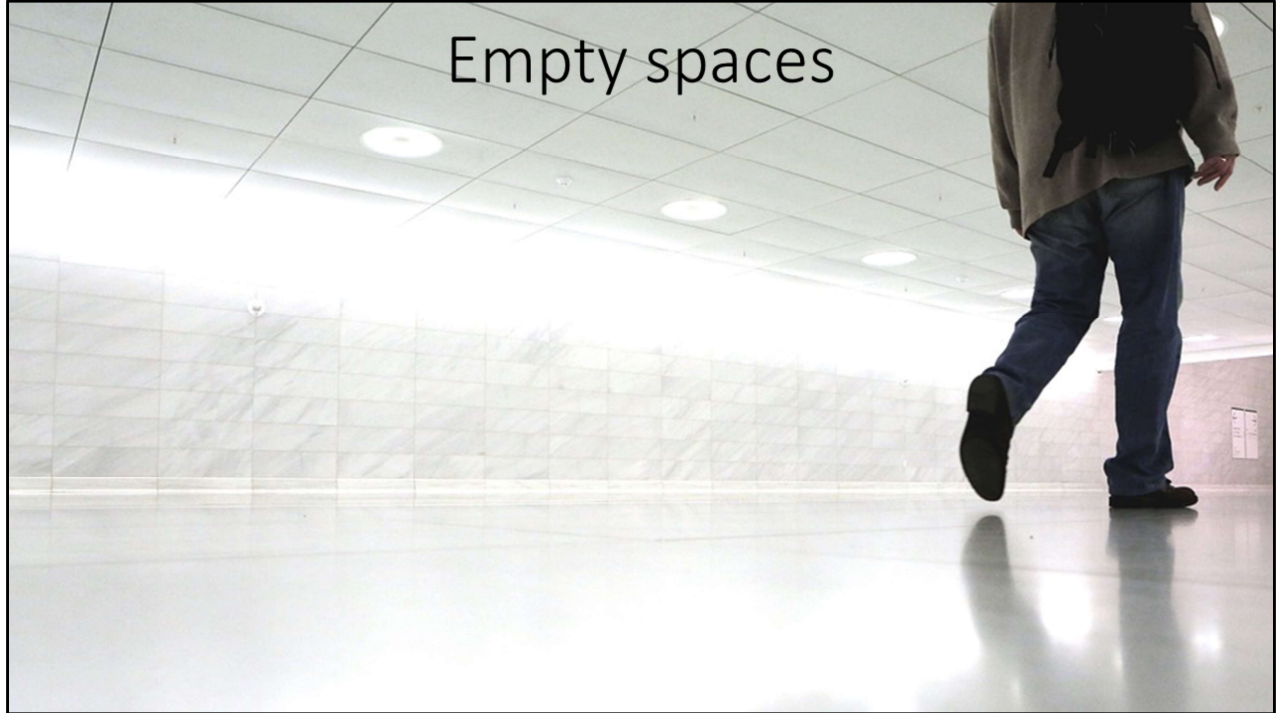
The Penrose triangle

Sometimes details can seem reasonable, but looking from a distance shows otherwise.

Examples of paintings by **M.C.Escher**:

- *Relativity* (1953)
- *Cube with magic ribbons* (1957)
- *High and low* (1947)
- *Concave and convex* (1955)
- *Waterfall* (1961)
- *Belvedere* (1958)

Test also workflows, not just features



Background is also something!

Empty spaces are important!

One way of learning to see better is learning to categorize things you've never looked at.

Examples of paintings by **M.C.Escher**

- *Day and night* (1939)
- *Sky and water* (1938)
- *Encounter* (1944)
- *Three worlds* (1955)
- *Metamorphose* (1939-1940)

Examples of paintings by **Robert Gonsalves**:

- *Ladies of the Lake*
- *Fall Floating*
- *The Phenomenon of Floating* (2012)
- *The Sun Sets Sail*
- *Water Dancing*
- *Big Air*
- *Aspiring Acrobats* (2009)
- *When the Lights were Out*

New level of labeling



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Seeing the model as lines and areas instead of seeing it as a face is essential for being able to draw it well. Otherwise you will just draw a generic face.

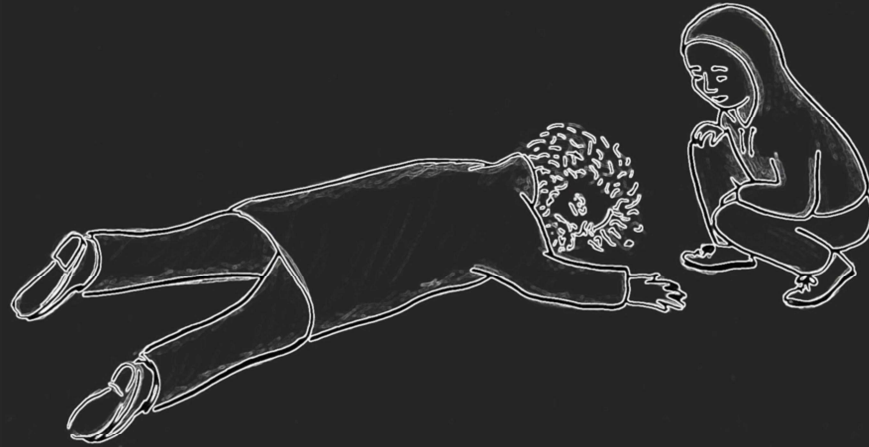
<https://www.slideshare.net/mardev/whyupsideowndrawing>



Testing is not just about doing things (or actively breaking things), sometimes you need to stand still and observe and let the software run into the bug by itself.

- what happens when it's time for timeout?
- what happens when a view is automatically refreshed?
- are there notifications that are linked to some background processes and do they disappear when that process is finished?

Optional stories



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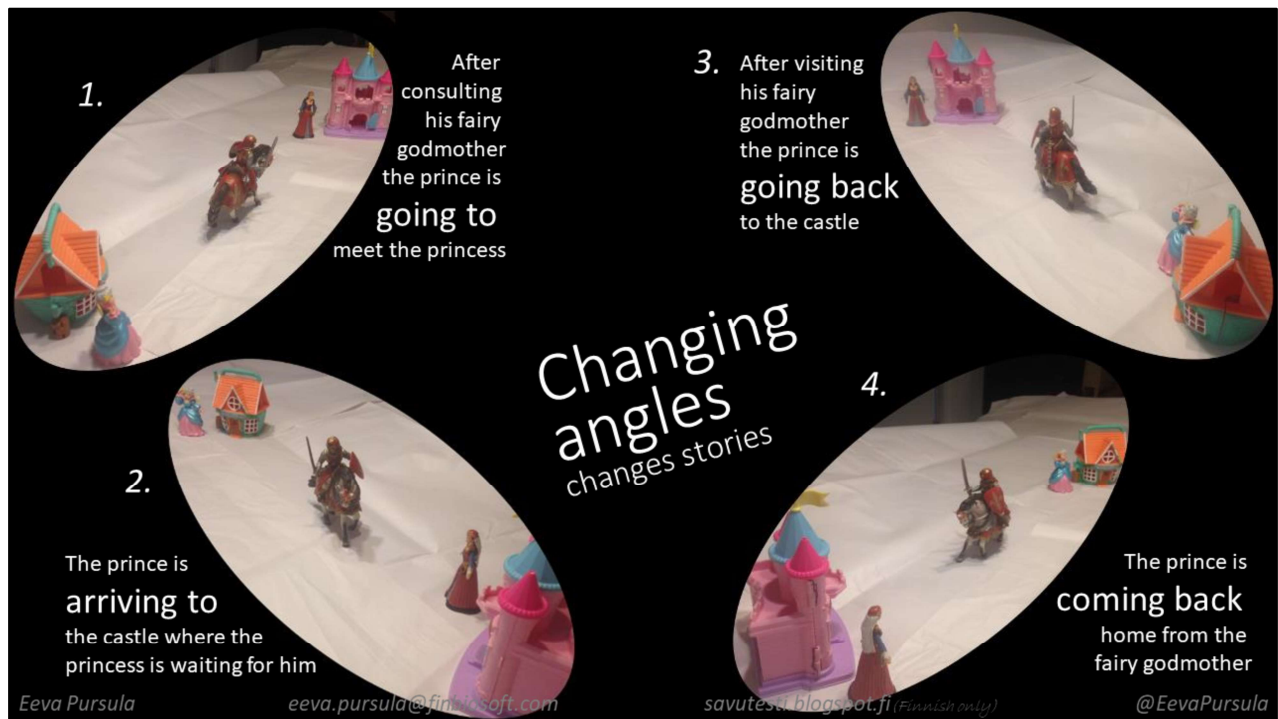
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When looking at the picture, what do you think has happened and what will happen? What optional stories you can come up with? What details affect which story first came to your mind?

- helps you in creating test cases
- helps you in seeing what has not been defined well enough
- helps you in finding your role as a tester

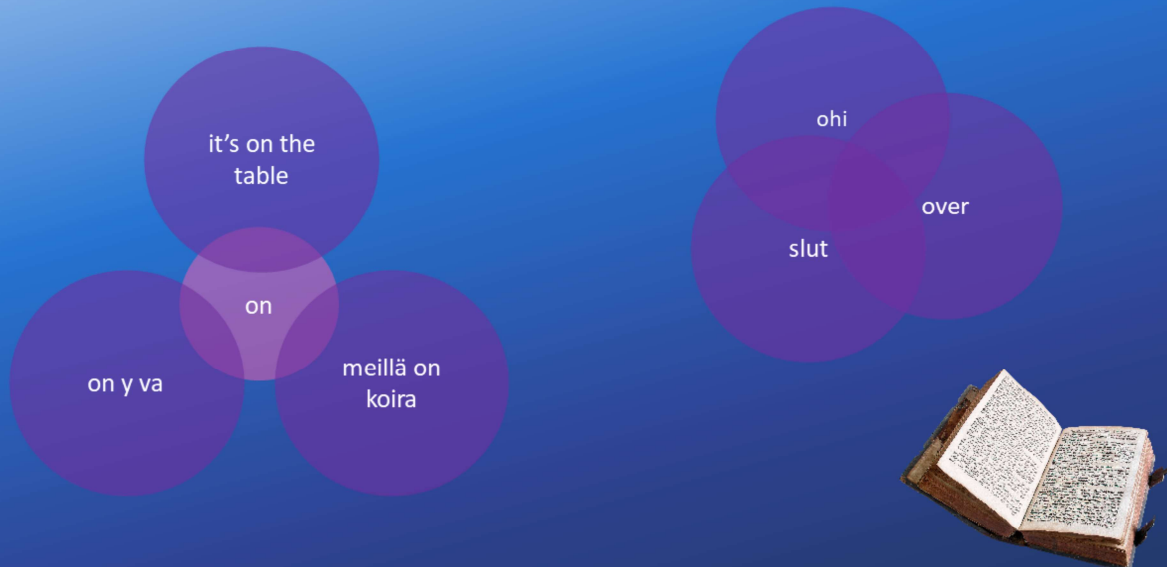


We've been trained to read images in a certain way before we learned to read. You can build a story using images taken from different angles presenting the same situation.

Sometimes it's good to physically change the way you view things.

Sometimes it's good to try to imagine yourself in someone else's position. (Though you can never thoroughly understand the experience of another person.)

Try another logic of labeling



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Find sequences of letters that have a different meaning in different languages

Find words that don't have direct matches on other languages. For example you can play with Google translator, trying how long chains of new translations you can get by simply switching languages. (e.g. Finnish-English starting with "realisoitua" or "luovia")

Read books from authors from different cultures.

Talk with people from different cultures / with different native languages, and people of different kinds of backgrounds.

Choice of words

"She's just too old fashioned to learn IT"

We have a severe usability issue

"Our customers just need some more training"

"This feature is so complicated that you can't really test it"

I did something but I don't quite know how it should work

"We can't afford doing it"

We prioritize something else when deciding what to do with money

"A teases B at school"

"B has confrontations with A at school"

A acts violently and is stealing from B

"C is illegally here"

C has no place to go

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Be aware (and careful) about whose words you use, because the words define what is taken for granted, what is seen as problems, how severe these problems are seen, and what options are seen. What things are investments and what are expenses, what are threats and what are risks worth taking.

Sometimes getting to real problems and finding ways to solve them requires you to refuse using the accustomed language.

Look at
the other hand



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A magician (and a user interface) guides you through the show following a certain path. Looking to directions you are not supposed to look at may reveal bugs and tricks.

To sum up

- Be aware of your goals and intentions
 - Beware of detailed test cases (or if you need them, understand that they may block your vision)
 - Test in sessions (choose a new point of view and dig in to old stuff from a new angle)
- Be aware of your limitations
 - Measure, don't assume
 - Keep an eye on things you are not supposed to look at
- Don't be alone
 - Ask questions
 - Don't be afraid of having two people test the same thing (as long as they don't have false trust on what the other has taken care of)
- Train your brains constantly

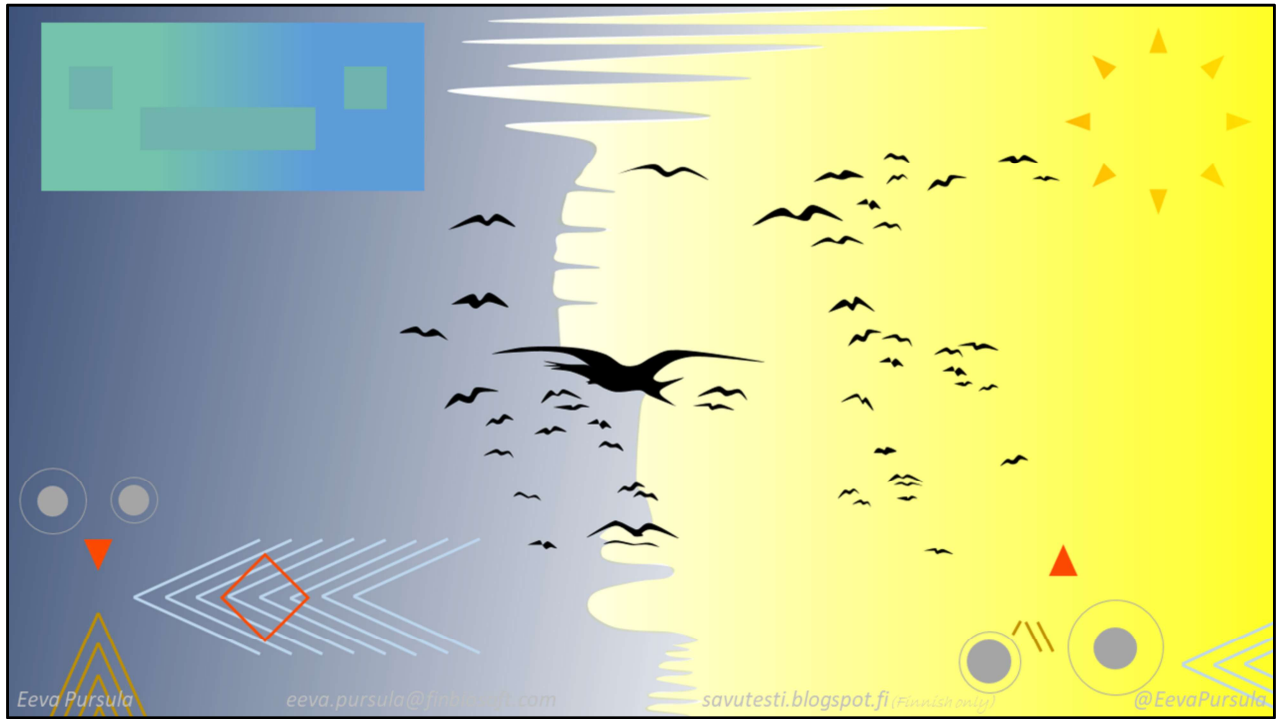
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You may have tested enough, but you have never tested everything.



What do you see here?

Thank you!



Questions?

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