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# PREFACE

Greetings dear  
Idunnaren,

In a world that tends to think black and white, categorizes everything, and loves labels, Lifeline will break through those imaginary boundaries and show you that spectra are all around us. Whether it is about gender, the sexuality of animals, or the moral spectrum, our writers have prepared the most interesting and entertaining articles for you. We are proud to introduce a new rubric: Mythbusters, where we will debunk common scientific misconceptions. Additionally, next to this, in these trying times, you can entertain yourself with our review or challenge yourself by solving the Iduzzle. In my opinion, spectrum is one of the coolest themes we have had, as we can cover everything from gender, sexuality, autism, do everything rainbow-themed and adorn the whole magazine in the fieriest of colors. These times call for color and we hope to leave you less confused about boundaries than Putin is.

We hope you enjoy this Lifeline, love our articles, learn something new, and crack your brain on the Iduzzle!

Lots of love,



Dear readers,

Another Lifeline, another special theme. Spectrum. A word that reminds me of inclusion, but also of extremes. A spectrum, in the vaguest sense of the word, includes everything that lies between the two outer ends of that particular spectrum. Everything can be put on a spectrum, such as electromagnetic light, autism spectrum disorder, and antibiotic activity. But while everything can be included, every spectrum also has its extremes. The outer ends. Black and white. Right and wrong. We live in a day and age where radicalization might be our biggest enemy.

But we also see another trend, coming back to the word 'spectrum'. In the modern usage of this word, there has been a shift where it is used more and more for the implied unification and inclusion of everything in between. I think we should all strive to continue this trend and put a halt to polarization.

Make love, not war.

*Thomas Westerhuis*

Chairman of GLV Idun 2021-2022

The Lifeline is the independent textual organ of the Groninger Levenswetenschappen Vereniging (GLV) Idun and is released quarterly.

Number of copies: 350

Printed by Orangebook, Rijen, November 2021

Editor in chief: Marit Bonne

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This edition features contributions by Bas van Boekholt

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Cover page designed by Marit van Kampen

# SCIENTIFIC

By Anette Hallik, Jelle de Jong & Marit Bonne

## NEWS

### *Revealing the hidden in plain sight*

When you want to discover a new animal, you might think about going on a jungle expedition or going diving at a coral reef. Now imagine you aim to identify a new species of bird. It is a blessing that you don't need to carry an enormous encyclopedia with you. For information about the ten thousand already discovered bird species you can just use a phone. Even with this benefit, it is still a challenge to find what you are looking for. Opposite to the loud and flamboyant birds of paradise, it can be very hard to identify the more modest birds, quietly hiding in the undergrowth. How do we discover the species that have evolved not to be noticed? Currently, camera traps are used, which need to be maintained and it can take long to obtain a result. Researchers have come up with a new, better tool; a DNA vacuum. The tool has been tested at a zoo; the results were stunning. Not only were species from the exhibit where the sample was taken identified; even animals from surrounding exhibits came up in the readings. On top of this some species used to feed the animals were also identified. With this new method, the only thing left to do is to get some air samples, sequence, match the DNA with that of the database and see if there are any anomalies. The discovery of new species was never this easy.



### *New legs for frogs!*

As certain animal cells have to know how to grow a working limb, the instructions for that are stored somewhere inside these cells. Recently, scientists have worked out a chemical cocktail - a mixture of chemicals and drugs that boost the growth of a functional limb after amputation. Obviously, this method needs to be tested on many different species, but for now it has been tried on frogs. A back leg of 115 adult African clawed frogs (*Xenopus laevis*) was amputated by a research team. The fraction of the frogs who received treatment with said chemical cocktail for 24h after amputation showed incredible differences in regrowth of the limb. Without chemical treatment, a dysfunctional small stump was formed, as would happen when a human limb is amputated. The legs that the treated frogs grew were almost as functional as the original limbs and by refining and improving the cocktail and treatment details, it is possible that pre-amputation movement is achieved. This cool research is doing its first steps now, but the small successes now give hope that one day this could be imposed on humans, so even we could regrow our limbs after unfortunate accidents.





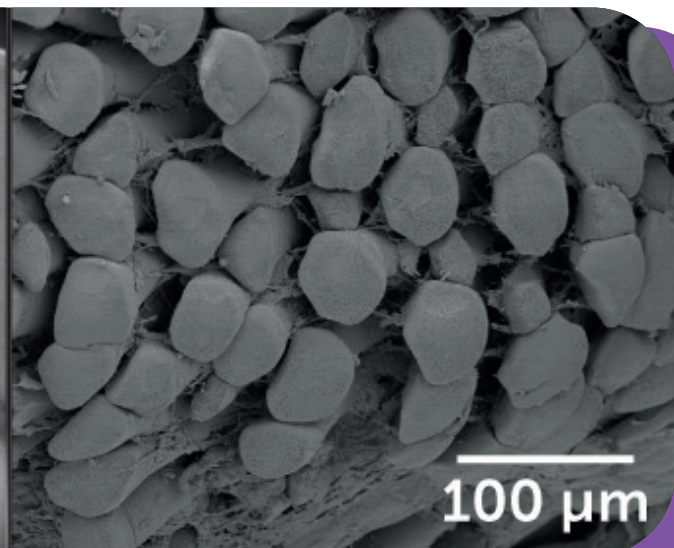
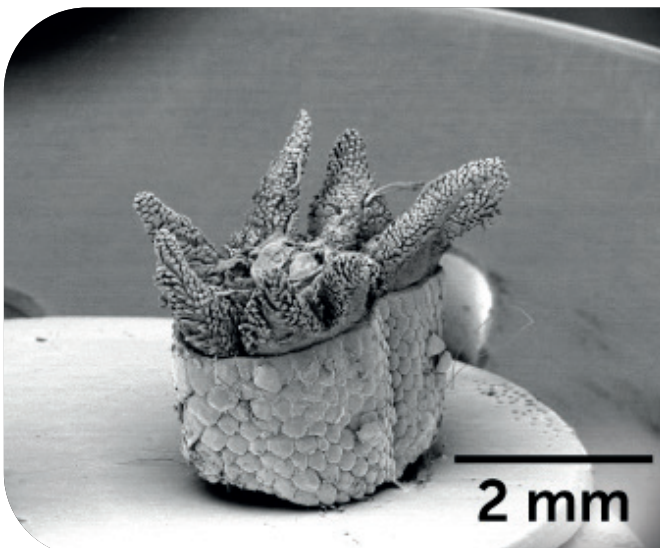
## *To lo(o)se or not to lo(o)se*

Of all cool party tricks in the animal kingdom, the lizards easily win. With their famous detached tails, they are remarkable creatures that take a big risk. With just one wrong move, their tail can unintentionally fall off. Therefore, one major question arises: how do their tails stay on?

The tail of a lizard contains segments that resemble a structure similar to plugs into sockets. These segments, called fracture planes, allow for a controlled break-off of the tail, depending on how much the reptile needs to sacrifice. The plug-in-socket structure consists of eight cone-shaped muscle bundles where the plugs fit perfectly in the corresponding sockets. This allows for the perfect amount of attachment: the tail can snap off whenever it's needed, but won't come off easily.

In microscopic pictures, the prongs were revealed to be fully covered in micropillars. Researchers expected that these pillars acted like a Velcro, and thus would interlock within the socket. However, it was shown that the microstructures gave an imprint that resembled fingers pressed on clay and therefore weren't providing any extra grip. Or so they thought. The micropillars showed to play another important role: whenever a fracture is emerging, the pillars will slow the spread of this fracture to give more security to the lizard's tail, thus preventing accidental break-offs of the tail.

This adaptation is essential in the survival of lizards, as the self-amputation acts as a powerful defense mechanism and stops the lizard from becoming a meal, it is also very costly. A lost tail can affect the ability to run, mate, leap and escape, so it should only come off when necessary. Evolution has made the lizard's tail into an example of the Goldilocks' principle: it's not too tight, nor too loose, just exactly good.



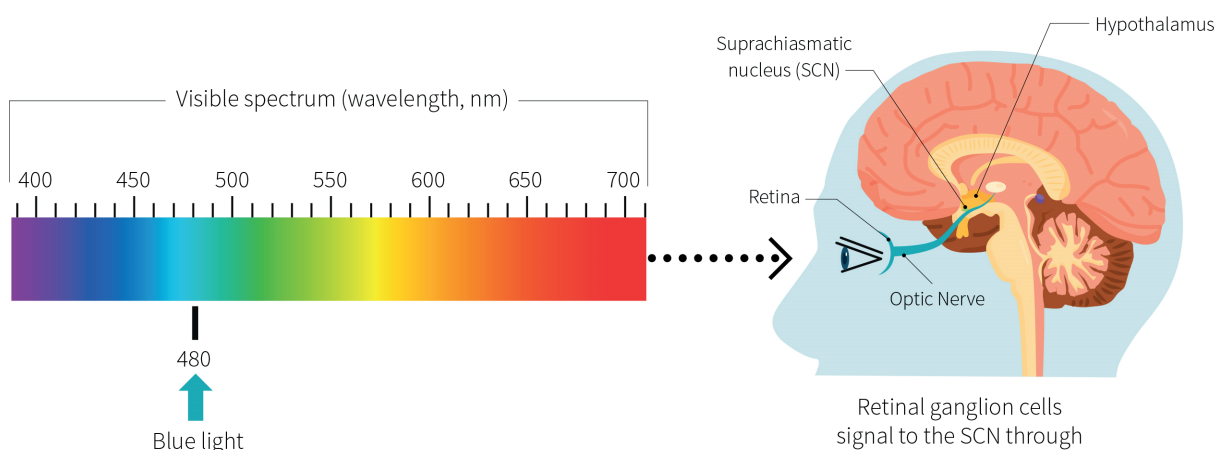
# COLOUR ME EXCITED

## HOW COLOURS INFLUENCE YOUR MOOD



By Nadia van Eekelen

**For this article I will start with a scenario. One that we are all awfully familiar with. You studied hard for an exam and spent days in the UB. Then, the exam date comes and you enter this horrifying building that is completely orange. There is not a little spot of another colour to find: you're in the Aletta Jacobshal. The walls come at you, it's crowded and it smells like fear. Why they chose to paint everything one colour is already a huge mystery, but of all the colours, why orange?**



Several studies show the effect that different colours can have on our brain and body. After years of research, we understand how humans see colours. However, colours also have non-visual effects. The retinal ganglion cells are neurons that are located near the inner surface of the retina of the eye. They connect the light input in the eyes to the visual processing systems in the brain, but they also send signals to the hypothalamus, which is a brain region that has nothing to do with forming visual images.

The hypothalamus controls your hormone system and is responsible for many functions, including regulating body temperature, regulating emotional responses, controlling appetite, and maintaining your body's daily physiological cycles. The retinal cells that form the pathway between the eye and the hypothalamus are specifically sensitive to the shorter wavelengths of the visible spectrum: blues and greens. This means that there is an actual physiological mechanism through which colour can influence your mood, but also for example your heart rate and attentiveness.

Warm colours, such as red and orange, seem to activate our survival mode. A research group in the University of Leeds found that red light causes the body to prepare for a fight-or-flight response and thus, increase the heart rate and blood pressure. Cool colours, like blue and green, seem to lower the heart rate. The power of cool colours to calm the body by lowering blood pressure and reducing respiration has many applications. It is the reason why surgeons dress in green or blue scrubs and

why suicide rates at railway stations in Tokyo fell by 74% after installing blue lights at the platforms.

Knowing this makes it even more absurd to paint an entire exam hall orange. A more tranquil colour would have made so much more sense. However, some research suggests that the colour orange increases the oxygen supply to the brain, stimulating mental activity and getting you ready to 'get things done'. Which is exactly why some scientists have suggested to paint exam halls orange: to motivate the students.

Whoever was responsible for the colour of the Aletta Jacobshal probably read this advice and decided to take it to another level, imaginably with the students' best interests in mind. But orange can be an overwhelming choice, because of its high energy and brightness. The colour easily leads to overstimulation, which is why its best in small doses. Luckily for us, the actual space in which we do our exam is not orange.

Even though there are some contradicting results on the effects of different colours on the body and mind, it is clear that light can influence us in ways that go much further than just colour vision. Since the colour of the exam hall is probably not going to change, let's view it in a positive way. The dazzling orange will prepare you for the exam. It gets your heartbeat racing, blood pumping, and oxygen flowing to the brain. You're awake now and ready to nail the exam.



# QUEERNESS IN THE ANIMAL KINGDOM



By Lisanne Leenheer

***“But I just don’t think it’s natural.” You might have heard it before; this phrase is sometimes used by someone to justify their discomfort about queer people or the concept of queerness. It’s quite an interesting argument if you think about it. For example, why would it matter if it’s natural or not; is ‘not natural’ a synonym for wrong? As biologists, we might also wonder: is it true? Is it unnatural to be queer?***

Before we begin to think about this question, let’s define queerness. The word queer is often used as an umbrella term to describe people who aren’t romantically or sexually interested in the opposite sex (not heterosexual), or whose gender identity doesn’t correspond with their birth sex (not cisgender). The word natural can mean different things in different contexts, but when someone uses the ‘not natural’ argument they’ll usually have the following definition in mind: *“Natural; as found in nature, not involving anything made/done by people”*. So, is queerness really something uniquely human, or is there more queerness in the animal kingdom? Before we dive in, we should address a couple of things. Firstly, if queerness really would be exclusively human, this does not necessarily mean it’s unnatural. Some would argue that humans are natural (again: it depends on your definition). That being said, for the sake of this article we’ll use the definition as described above. Secondly, while reading this article, please ask yourself why it’d even matter if queerness is natural or not. People do lots of wonderful ‘unnatural’ things every day, like writing books or providing others with medical care! Now, let’s find out: Can non-human animals be queer?

Some argue that non-human animals cannot have a gender identity, as gender itself is a human-constructed concept. The thing is that gender is a bit abstract and doesn’t have an unanimously accepted definition. Still, most experts agree that the existence of socially determined gender norms is an essential aspect of gender and gender identity. In many Western cultures, for example, the gender norm for women is to be caring, while men are expected to be brave. A second criterium for gender is an internal sense of identity. This may sound vague, but since

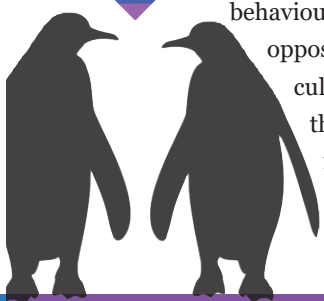
gender is often about how someone feels on the inside, it really is a crucial aspect. When a person or animal shows behaviour that in their culture is associated with the opposite sex (e.g. a stay-at-home dad in Western culture), this alone of course does not make them gender fluid or transgender. This makes it very difficult to know whether gender identity exists in non-human animals. Although we can observe their behaviour,

we can’t simply ask them how they feel or what they think. So, finding out whether gender-queerness is exclusively human is quite difficult. What we do know, however, is that it’s not uncommon for animals to be both male and female at the same time or to change sex during their lives.



And what about other types of queerness? Well, there is plenty of homosexual and bisexual activity to be found in the animal kingdom. A famous example is that of Roy and Silo, two male chinstrap penguins that formed a couple. They ignored potential female mates, displayed classic mating behaviour, and successfully raised a healthy (adopted) daughter. But penguins are not the only animals that can be queer. According to primatologist Frans de Waal, bonobos display sexual behaviour in virtually every partner combination; studies suggest that most bonobos are pan- or bisexual. Another interesting example comes from the New Mexico Whiptail lizard, a female-only species which reproduces through parthenogenesis (eggs don’t need to be fertilized to develop into embryos). These lizards engage in same-sex mating behaviour, which has earned this species the nickname “lesbian lizard”. These are just a few examples, but there are many more.

So, can non-human animals be queer? The answer is pretty straightforward: Yes! There is plenty of queerness to be found in nature. Maybe the question we should be asking ourselves is: how natural is it to be hostile to others purely because of their sexual orientation or where they fall on the gender spectrum?



# MEMES

Big companies:  
\*make their logos rainbow  
during pride month\*



Nick Chiappini 🏳️‍🌈  
@ndchiappini

Whenever I mess up an experiment I  
just think of what a pigeon considers a  
successful nest



## adonitology

A **religion** where followers worship big **curvy**  
women's **butts**.



# INTERVIEW WITH PHD STUDENTS

Hello, my name is Mathieu Renard. Before my PhD, I studied Organismal Biology and Marine Ecology in the south of France (University of Nice and Marseille) and did my master thesis on the generation of transgenic lines in squids using CRISPR-Cas9. I was born in Belgium, raised in Italy, studied in France, and am now working in Germany.

1. *Why did you choose to become a PhD instead of getting a job elsewhere?*

I love science and research, and getting a PhD is an essential part of the journey to become a researcher in academia. It is the moment you show you can handle a project on your own.

2. *What is the topic you are focusing on?*

Now I am a PhD student in the Laurent lab at the Max Planck Institute for Brain Research in Frankfurt. I am currently working at the intersection between development, behavior, and neuroscience, studying the developmental aspect of the incredible cephalopod camouflage system. I've been interested in cephalopods since I started freediving in Marseille. My encounters with octopuses in the wild definitely triggered an immense fascination for these animals.

3. *What is the best/worst thing about being a PhD?*

As a PhD, you are, for the first time in your academic career, pushing at the boundaries of global human knowledge. The things you do have never been done before. It's an incredible feeling to be continuously at the front line of a new world full of discoveries to be made. I think there are two bad things about PhD. One is the low income (compared to other jobs requiring similar skills), a reality for the entire field of academic research, unfortunately. The second one is that PhD can be very stressful.

4. *What advice would you give to someone who wants to become a PhD?*

Think carefully about what you want to study and with whom. A PhD is a long journey, you want to make sure it is a good match between you and your project, and between you and your PI (principal investigator) as well. Surround yourself with people you can talk to, both about your project and your mental health.

5. *What do you think is the biggest misconception about being a PhD?*

That is a tough question. I think we need to deconstruct the idea that because you are a PhD student, you must be super smart and know everything about anything. That is not true. To me, the best qualities of a scientist are not knowledge and intelligence, but curiosity, passion, and perseverance.

6. *Do you have any plans for the future yet?*

Not sure yet. I am contemplating different options, including: staying in academia with a post-doc or doing science communication on Youtube!



I am Simone, 25 years old and from Munich, Germany.

Before starting my PhD a few months ago, I did my BSc and MSc in molecular biotechnology. If you had asked me at the start of my MSc, I would have never told you I want to do a PhD - I just hadn't found a research topic yet that interested me enough to spend a few years working on. This changed when I did a research internship in the US, where I worked in basic neuroscience for the first time and was mesmerized by how complex brains are and how much we can still learn about them. For me, this kind of fundamental research felt like a playground, and all of a sudden, I was dying to spend some more years diving into the world of neural circuits! Since I have just started my PhD, I might not be able to give optimal advice (I have yet to experience most of the challenges that are part of this journey). However, if you are unsure about doing a PhD, I encourage you to find research areas that truly excite you (like, start from your favorite lectures or seminars and go from there) and try doing an internship in a lab that does this kind of research or at least reach out to a few scientists to hear their opinion and advice. And check out @thoughtsofaphd on Twitter for some more insights on PhD life!



# HOW MOODRINGS WORK

## HOW OUR EMOTIONS SHOW ON JEWELRY



By Juultje Eenink

Mine had dolphins on it and my friend's had the shape of a penguin: moodrings. My fascination with these somewhat tacky pieces of jewelry did not stop after that one phase where everyone wore them in middle school. The colour change seemed almost magical, right? Turns out, it is science. Bummer, I know, but the changes the technology of this ring brought on are in fact somewhat magical. It changed colour and it also changed our world.

This story begins in 1975 with a sick child, or rather, a piece of tape. Marvin Warnick watches his friend checking their kid's temperature by using a piece of thermotropic tape. This tape was the inspiration for the moodring. You put it on your forehead and it would change colour, this way you could see what the corresponding body temperature was. Very useful to examine if your mood was "fever" or not.

Marvin Warnick, a jewelry designer, however, wasn't all that interested in the kid's fever. At the side of this sick child's bed, he was struck by inspiration. Once home, he experimented and placed liquid crystals, the technology from the thermotropic tape, under glass, added a band to it – et voila! – the first moodring was made.



### "LIQUID" "CRYSTALS"

The first thing you need to know about liquid crystals is that the name is very misleading. As it turns out these molecules are neither liquid nor crystals. They are in a state in between liquid and crystal, or rather three states.

In each of these states, the molecules arrange themselves differently. There is the nematic (unorganised) phase, the smectic (some order) phase and the chiral (aligned) phase. In each of these phases the crystals are ordered differently and thus reflect light differently. In other words: in each of the phases the whole of these molecules appears to have a different colour. The colour changes, therefore, occur by phase changes of the "liquid" "crystals".

These phase changes can be brought on by different things. In the case of both the thermotropic tape and the moodrings the phase changes were caused by changes in body temperature.

The mood predicting factor is based on the blood flow that occurs with certain emotions. This bit of pseudoscience is the basis of the moodring, as more bloodflow to the hands would make the hands warmer and thereby different emotions would be seen as different colours in the moodring.

### CHANGING THE WORLD

While the interpretation of the mood ring and connecting it to certain moods is a piece of pseudoscience, the technology behind the ring is not. As mentioned before, the phase change can be brought on by different things. In LCD screens, or liquid crystal (yes!) display screens, the phase changes are brought on by changes in the magnetic field.

The molecules let polarised light (light waves on just one plane or "direction") go through in different amounts in the different states. Displaying different colours in different stages, that are controlled by a magnetic current.

By now we don't find LCD screens all that special anymore. But at the time this was invented, the only displays were those thick, big, heavy CTR-screens. This new LCD technology made displays lighter and more energy-efficient, and that affected the whole world. It was used in space engineering, health care, TVs, (smart)phones, and many more areas. In some way or another it affected everybody's life in the western world.

### A VALUABLE RING

We should all be able to see the value of this technology. But back in the 1970s the moodrings themselves were valuable too. Brought to market by Joshua Reynolds in 1975, who had coincidentally the same idea as Warnick, they were marketed as "portable biofeedback aids". Reynolds was a marketing exec and sold those rings for what would today be 250 dollars for the silver version, and 1152 dollars for the gold version, making him a millionaire in just 3 months.

Unfortunately for Reynolds, the technology behind them could not be patented. Quickly, copies of the rings were made and sold cheaper. Much cheaper. Reynolds was bankrupted, but the rings became a true rage.

Stars such as Barbara Streisand and none other than Muhammad Ali wore them. The latter felt so inspired by this magical piece of jewelry that he wrote a poem about it. Upon this poem I want to end this piece- a true ode to the mood ring:

*The  
moodring reflects  
my feelings  
When I show blue,  
I hit the ceiling*

*Muhammed Ali*

# HE? SHE? THEY? ME?

## THE COLOURS OF THE GENDER SPECTRUM



By Anette Hallikr

We are all acquainted with the spectrum of sexual orientation: the LGBTQ+ community is global and the sexualities and their differences have already been explained. This article is for those who were a bit confused when 'he/him', 'she/her', 'they/them' suddenly appeared on everybody's Instagram bio. It's for all of us who desire to understand themselves and their peers better; as the binormative standards need to fall. We are more than that!

We are exploring the definition of gender and gender identity, because nobody is truly 100% male or female; there are so many more genders than just the two of them.

The gender spectrum actually consists of two graphs: the first one represents the perceived gender, the second one that person's actual gender. Perceived gender is given to us when we are born. The doctor who catches you from your mother's womb

life. That is called social transition as it is how others perceive you as. To change it, transgender people usually get a new haircut, new clothes that match the gender they actually are. Additionally, in some cases binders, which help people with breasts feel more comfortable in their body. Then, pronouns can be chosen. Mostly non-binary, bigender and agender people prefer the pronouns 'they/them' but in actuality, it is up to anyone. You can have whatever pronouns you wish. In today's world we should always ask a person about their preferred pronouns before assuming anything. Besides pronouns, people often also change their name to feel more themselves. After these transitions, society will hopefully perceive those people as their actual gender, no matter what it is. Some people choose to undergo medical transition that includes both hormonal and psychological therapy and many types of surgeries.



and then closely inspects your genitals has to make a decision 'Male or female?' Hopefully one day that will change and the label of gender won't be pushed upon us on birth. The question itself seems easy enough, does the baby have a penis or a vagina? In actuality, 1 in 2000 people is born with non-regular genitals and moreover, for example in the case of a failed circumcision, the doctors have actually changed 'male' to 'female' on papers. So it's purely up to them as to what goes on your documents, and as you are a mere infant, nobody is concerned with what gender you actually are.

Actual gender is what a person ACTUALLY feels themselves like. Male, female, bigender, agender, non-binary or gender-fluid. The list is long and obviously not definitive.

You might see that most used term in gender identification: transgender, is not mentioned in the gender dictionary. That is because transgender means anyone whose perceived gender and actual gender do not match. Therefore, it does not at all matter what the perceived and actual genders are.

Perceived gender is also influenced by boy's blue dungarees and car tracks, girl's princess birthday cakes and fairy dresses. Thankfully, perceived gender can be changed throughout one's

life. There also are people whose bodies don't fall under any categorization due to deviation from 'regular' female/male physical body composition: hormonal anomalies, non-regular genitals et cetera. This once again is not something rare; it happens more often than you might think. These people are called intersex; personally I think that they should not have male/female labels stuck on them at birth, nor should anyone else.

Gender is way more complicated than our binormative society believes. No people can be divided under just two labels. Human brains and bodies are complex and so is their gender and sexuality. Just as you cannot assume one's sexuality by looking at them, likewise you cannot see anyone's gender. The gender spectrum is wide and it is beautiful. Appreciate all the colours. To avoid insulting anyone, always ask first!

### GENDER DICTIONARY

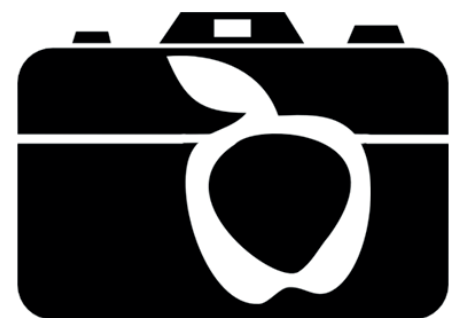
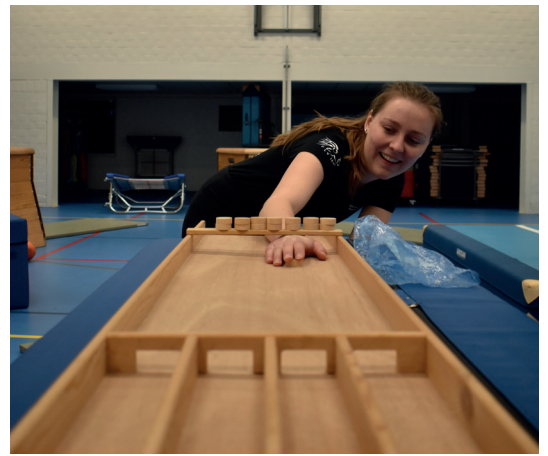
**BIGENDER/DEMIGENDER** - SOMEONE WHO DEFINES THEMSELF AS BOTH MALE AND FEMALE

**AGENDER** - SOMEONE WHO DOES NOT HAVE A GENDER

**NON-BINARY** - SOMEONE WHO HAS A GENDER THAT IS NOT MALE NOR FEMALE (THIRD GENDER)

**GENDERFLUID** - SOMEONE WHOSE GENDER CHANGES IN TIME





# INTRODUCING... THE NEW-BEES

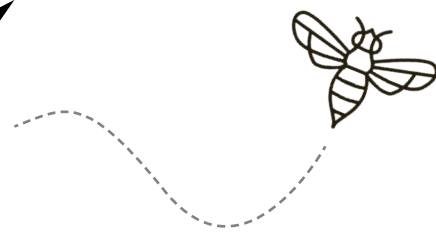


Hey reader,

My name is Cecile, I'm a 20-year-old Biology student. I'm in my second year and have a great interest in anything neuro/brain-related. When looking for an interesting activity to do besides studying where I could meet new people, I stumbled upon LifeLine and was immediately sold by the creativity and diversity of the magazine. So I applied and here we are: I will be writing articles that you will hopefully find worthwhile reading :) What I enjoy doing in my free time is anything considered creative, from drawing to sewing and from painting to journaling, I simply love getting those creative juices flowing. Furthermore, I have a 'slight' (this is debatable) obsession with cats, loose leaf tea, and Taylor Swift. Don't blame me, they all captivate you in the very best way possible, I can assure you. I'm very excited to start writing articles for future editions of the LifeLine!

See you soon,

*Cecile*



Hi guys!

My name is Chay (pronounced as Jay and not Shai, Kai, Ke, Gay or Tjai) and I am one of the new members of Lifeline. I am currently in my third year of Behaviour & Neurosciences and my hobbies are horse riding, going to concerts, traveling, and reading. Something I really like is lasagne bolognese and dogs. Can't wait to start working for Lifeline and hang out with the best committee of Idun!

Kisses,

*Chay*



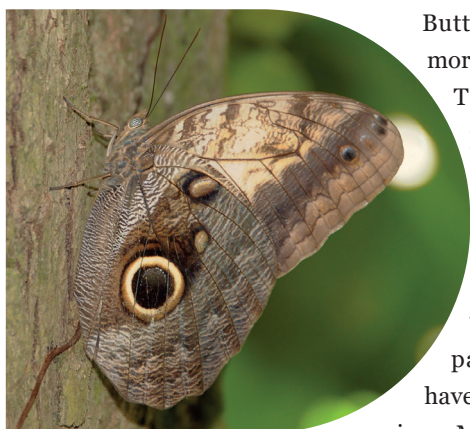
# BUTTERFLIES

## AND THEIR SPECTRUM OF COLOURS



By Roos Slijfer

Butterflies belong to the *Lepidoptera* (*lepidos* means ‘scale’, and *ptera*, ‘wings’) order of insects. It is one of the most widespread and widely recognizable insect orders in the world. Butterflies show many variations of the basic body structure that have evolved to gain advantages in lifestyle and distribution.



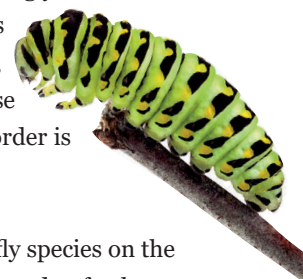
Butterflies are characterized by more than three derived features.

The most apparent is the presence of scales that cover the bodies, wings, and a proboscis. The scales are modified, flattened “hairs”, and give butterflies their wide variety of colours and patterns. Almost all species have some form of membranous

wings. Mating and the laying of eggs

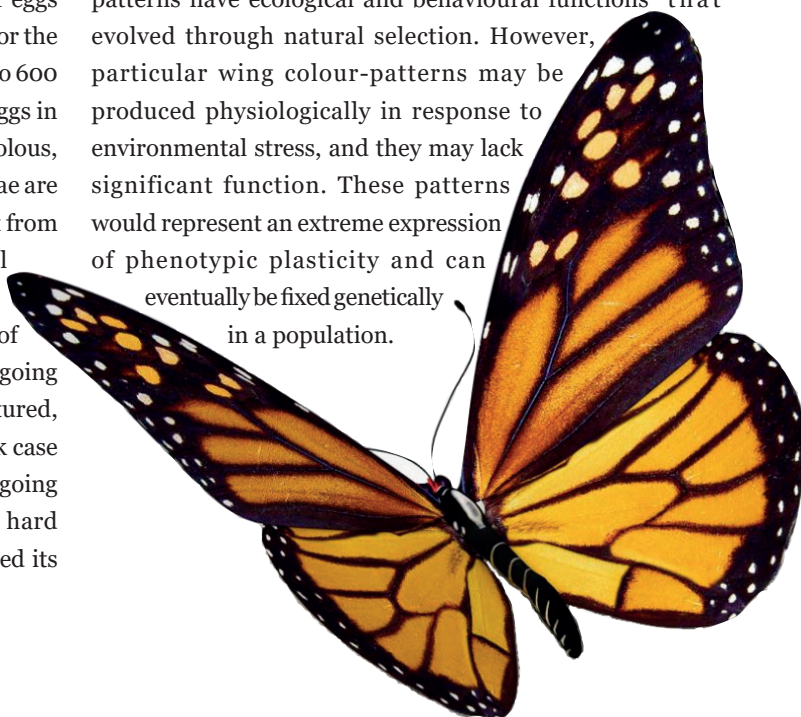
are carried out by adults, normally near or on host plants for the larvae. In many species, the female may produce from 200 to 600 eggs, while in others, the number may approach 30,000 eggs in one day. Like most other insects, butterflies are holometabolous, meaning they undergo complete metamorphosis. The larvae are commonly called caterpillars, and are completely different from their adult moth or butterfly forms, having a cylindrical body with a well-developed head, mandible mouth parts, three pairs of thoracic legs, and from none up to five pairs of prolegs. As they grow, these larvae change in appearance, going through a series of stages called instars. Once fully matured, the larva develops into a pupa. A few butterflies spin a silk case or cocoon prior to pupating, while others do not, instead going underground. A butterfly pupa, called a chrysalis, has hard skin, usually with no cocoon. Once the pupa has completed its metamorphosis, a sexually mature adult emerges.

The *Lepidoptera* have, over millions of years, evolved a wide range of wing patterns and coloration. Accordingly, this is the most recognized and popular of the insect orders with many people involved in the observation, study, collection, rearing, and commerce of these insects. A person who collects or studies this order is referred to as a lepidopterist.



There are more than 18,000 named butterfly species on the planet today. From possibly one ancestor, a parade of colours and shapes have burst forth, populating forests, savannahs, fields, and gardens with patterns and textures. Each species has developed a strategy to make the most of their biggest asset and defining feature: their scaly wings. *Lepidoptera* rely on colour in every aspect of their lives: sparring, courting, mating, and hiding. They can see more of the visible light spectrum than humans can - a little further into the red end of the scale. Like many insects, *Lepidoptera* are also able to see ultraviolet light. This level of colour sensitivity is vital, not just for finding flowers but also for finding perfect camouflage backgrounds and for seeking out other butterflies. It is especially useful for fluttering after romantic partners and for sparring males. A common use of colour is as a defense against predators. Some species have developed large eyespots on their wings, tricking predators into thinking they have come face-to-face with a much larger creature. The owl butterfly is one example of this. Its yellow ringed eyespots look to us like the feathery face of an owl.

It is generally accepted that butterfly wing colour-patterns have ecological and behavioural functions that evolved through natural selection. However, particular wing colour-patterns may be produced physiologically in response to environmental stress, and they may lack significant function. These patterns would represent an extreme expression of phenotypic plasticity and can eventually be fixed genetically in a population.



# MORAL SPECTRUM OVER TIME



By Lauren Hansen-Manguikian

What is morality? Generally speaking, morality is what we think of as right and wrong. Like many other things, this exists on a spectrum. For example, killing someone is worse than not washing your hands after going to the bathroom. We know this because we have an aversive reaction to things that ‘feel’ wrong, and this feeling can be a strong reaction or a milder one.

It’s hard to say exactly where this feeling of ‘wrongness’ comes from. The feeling that killing another person is wrong is so strong and widespread among cultures we might think it is baked into our DNA. But some cultures think it is very wrong to kill a cow, while others find it perfectly normal. Like most things, each person’s moral spectrum is most certainly a mix of both nature and nurture. Culture has a huge influence on our opinion, and culture creates the laws we abide by. Most interesting to me is, the law can be thought of as a moral spectrum in itself: a representation of the moral spectrum that exists in a given society. There are actions that merit the worst punishments, and there are actions that merit minor punishments. The degree of punishment is an indication of the wrongness of an act.

Two trends are noticeable throughout the legal history of the western world that I think shed light on how our moral spectrum has changed over time. Greater harm is related to greater punishment, and higher status is related to greater punishment. The first trend can be seen by the fact that even in the past, killing is almost always punished greater than stealing. Stealing is harmful, but not as harmful as death! The second trend refers to the importance of who is being harmed. Stealing from a king, for example, would be punished even greater than killing a peasant. So while the degree of harm has an influence on the degree of punishment, so does the status of the recipient (and wrongdoer).

While both these trends are most definitely present in our laws today, there is also another sneaky trend that is visible over time. A trend that, I believe, represents moral progress in society. I believe the laws we have today, as messed up as some are, are better than the laws we had in the past. I believe that the criminalization of child labor and slavery, and the decriminalization of homosexuality, is evidence of moral progress. So what are we progressing towards then? How can we continue this trend?

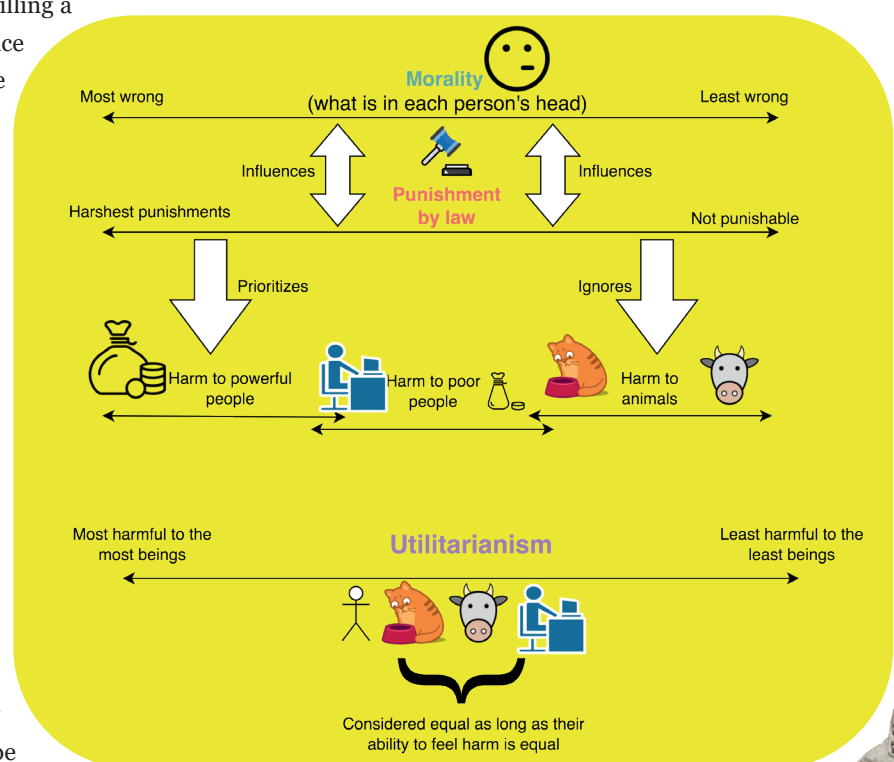
Where I see moral progress occurring in society is in the changes that make our laws become more and more oriented towards causing the least harm, regardless of the recipient. So, the first trend that I described is increasing, while the second is decreasing over time. For example, laws explicitly allowing or requiring certain groups of people to be

harmed more than others become fewer and fewer. This trend can be seen among race, gender, and sexuality. To be clear, we are far from an equal society, I am only describing a trend moving in a particular direction. If one were to predict the end result of such a trend, what would it look like?

Utilitarianism is the ethical theory that states that happiness is the most important factor in determining right and wrong. In its simplest terms, the actions that cause the most happiness are right, and the actions that cause the most harm are wrong. Utilitarianism makes no distinctions between who is the recipient of the harm; as long as they can feel harm they are included. This means that a fully utilitarian set of laws would punish harshest the transgressions which caused greatest harm to the greatest number of beings with the capacity to suffer.

We are far from such a society, but I believe it is our innate qualities of empathy that move us in this direction. Like I discussed earlier, our moral feelings are the result of nature and nurture. If there is one thing that is definitely nature, it is empathy. When another human or animal is in pain, we sense it, and we feel a bit of that pain too.

As our quality of life continues to rise, we become less numb to the pain and suffering of those around us. We start to include lower status people and animals into our circle of empathy, and, by doing so, our laws change. Soon, we may even include conscious computers or plants into our circle of empathy. But how do we determine what harm to these beings looks like? Now that’s a philosophical quandary for another day...



# TYRIAN PURPLE

## FROM SNAIL TO EMPEROR



By Jelle de Jong

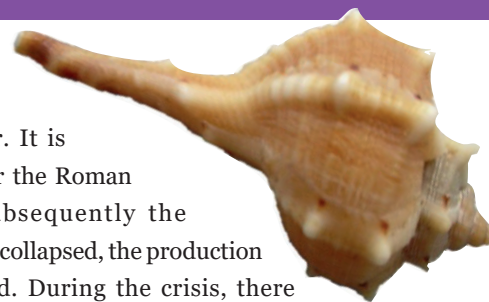
Like the light from our sun, most light sources emit a broad spectrum of light. However, when we see this light, we don't see the specific colours; it's all added up. Some molecules are capable of taking away certain parts of this spectrum, while the remaining part is reflected. In nature these molecules can be found everywhere in the form of pigments and dyes. Pigments like chlorophyll and carotenoids are responsible for the green of plants and the orange of carrots. Rarer pigments that look blue and purple can be found in plants like *Indigofera tinctoria* and sea snails. While dyes like these make the world more colourful, how dyes do this is not by adding, but by taking colour away! Remember; a dyes' appearance is caused by the light that is reflected, not the light that is absorbed.

Nowadays our chemists can synthesise dyes, the use of dyes had a long history that relied on a lot of creativity and sacrifice (of snails). The dying of clothes in fashionable colours and the painting of vivid murals made the production of dyes an important part of the ancient economy. While many dyes are easy enough to discover just by spilling wine or eating berries; some colours have been more elusive. The most elusive of all colours might be "Tyrian" purple. One of the only naturally occurring sources of purple dye are the predatory sea snails of the Muricidae family.

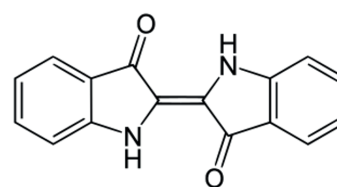
At a time, sometime before 1200 BCE, someone living at the mediterranean sea, (possibly in Tyre, an ancient coastal city of current Lebanon) discovered the purple pigment; Tyrian purple. A single gram of the pigment, which is just enough to colour a pair of socks, required the sacrifice of about ten thousand sea snails. It is no surprise that the use of this pigment remained a luxury for thousands of years. The production of the dye was so ridiculously expensive that the production was strictly regulated; at the height of these regulations, only the Roman emperor himself was allowed to wear purple.

To this day purple is still seen as a royal colour. It is thought that after the Roman empire, and subsequently the Byzantine empire collapsed, the production of the dye ceased. During the crisis, there was simply not enough money to subsidise the production anymore.

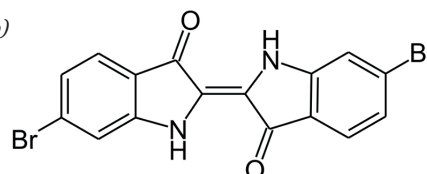
The surprising thing is, on the other side of the world, the same thing happened. One member of the Muricidae family lives near the Yucatan peninsula, in the Gulf of Mexico. Amazingly (not for the snail), in ancient Mexico, the Aztecs discovered the same use for this snail. Exactly like in ancient Eurasia, the Meso-American purple dye was reserved only for the most important ceremonial clothes.



(a)



(b)



*Indigo; the pigment that is used to dye jeans (a). Tyrian purple; the pigment that was used to dye the emperor's clothes (b).*

As mentioned earlier, the chemical mastery over dye production allows us to wear any colour we desire. Once elusive dyes like indigo have become commonly used dyes; take a look at your jeans or some other blue denim product. The near exact same molecule is used, as can be seen in the illustrations. Whenever you want to, you can wear clothes dyed much like the cloaks worn by Julius Caesar.

WHENEVER YOU WANT TO, YOU CAN WEAR CLOTHES DYED  
MUCH LIKE THE CLOAKS WORN BY JULIUS CAESAR

# MARIT'S MYTHBUSTERS

## CHAMELEONS CHANGE COLOR TO MATCH THEIR ENVIRONMENT

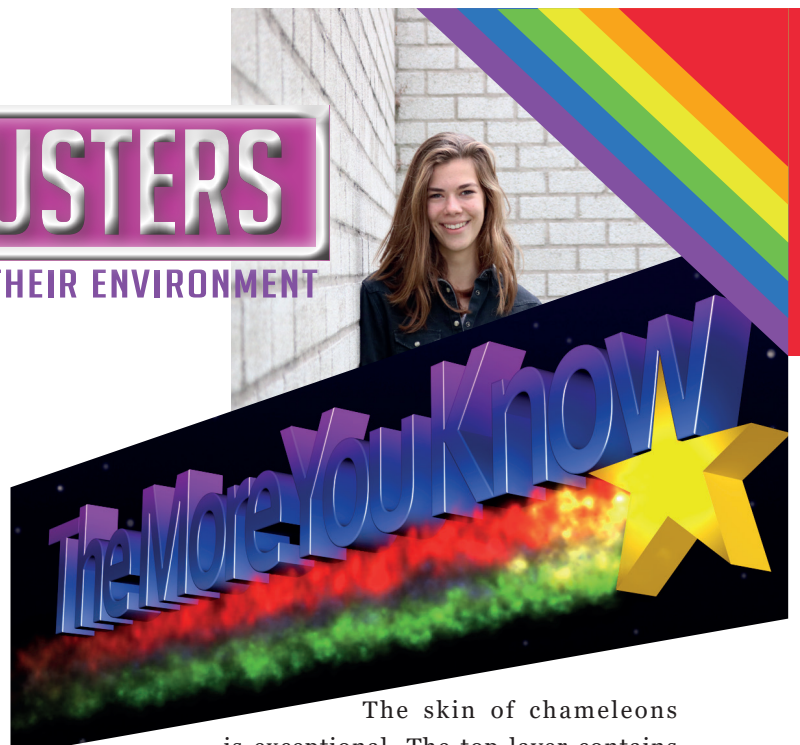
*They say knowledge is power, but what if this knowledge is total nonsense? When you fall on your tailbone, you won't get blind and when you get a jellyfish sting, please don't pee on it. You will be surprised how many biological misconceptions have rooted in your mind and that of others. In our new rubric 'Marit's Mythbusters', I will debunk common myths that many of you believe are true.*

An animal that is almost magical. Put it in front of patterned wallpaper, a chessboard, or any other background, and the chameleon will adapt its skin to match its surroundings. While the chameleon is indeed capable of displaying a wide spectrum of colors, the goal of changing its skin color is not camouflaging.

It is essential for chameleons to blend into their environment. They lack dangerous teeth, poisonous fangs, or skin, and are everything but the Usain Bolt of the reptiles. Chameleons are helpless when attacked, thus they try to avoid their predators at all costs. Contrary to popular belief, this does not require color-changing skin. Rather, the natural state of the lizards' skin is often enough to completely blend into the environment, resembling branches or leaves. Instead of changing color to hide, chameleons can alter the amount of melanin (pigment) in their skin cells, allowing them to blend into a darker or lighter environment better whenever they want.

So, if chameleons can hide pretty well without changing their color, why possess the ability? As in most cases, communication is key. A dark female signals aggressiveness so horny males will leave her alone, while a neutral-colored display says 'I am available to mate!' and acts as a signal for submission. Fiery-colored and beautifully patterned males are dominant and ready to fight, while dimly colored chameleons will turn their display 'off' to avoid a bloody fight. It is almost like the sign on a hotel room door: 'do not disturb' or 'room service only' (and then a very special kind of room service hehehe), but instead shown on the actual skin of chameleons. I am almost jealous.

Since chameleons are ectothermic, or cold-blooded, they can use their color-changing skin for temperature control. As mentioned before, the lizards can control the amount of melanin in their cells and increase the amount to accelerate warming up on a cold but sunny day, and vice versa.



The skin of chameleons is exceptional. The top layer contains pigments, with very small guanine crystals underneath that are stacked in a network much like a grid. These crystals can be brought to an excited state, increasing the distance between the nanocrystals, which in turn reflects light of a longer wavelength (reds, oranges, and yellows). In a relaxed state, the crystals are closer to each other, thus reflecting shorter wavelengths (blues and greens). How exactly chameleons control the stretching of the crystals, is a mystery for now.

So, when someone mentions: 'Chameleons change color to blend in!!!!!!', you can tactically say something like: 'They do not need to change color to camouflage, they use it predominantly for communication! Isn't that cool?', and you helped to fight another misconception in our society.

*'The more you know'*



# IT'S A SPECTRUM NOT A GRADIENT



By Meiske Pieters

You probably have a stereotypical idea of an autistic person. A smart guy, who doesn't make eye contact, can't pick up sarcastic comments and isn't empathetic. You know, Raymond with savant syndrome in Rain man. Quite odd when you realize savant syndrome is pretty rare, with only 1 in 10 of autistic people showing it to some degree. But there is much more amiss with autism representation.

Like the title says, autism spectrum disorder, like the condition is officially called, is not a gradient. You can't line up autistic people from a little autistic to very autistic. They all have to tick a few boxes, described in the Diagnostic and Statistical Manual of Mental Disorders (DSM) and summarized here below.

## A. DEFICITS IN SOCIAL COMMUNICATION AND INTERACTION

1. SOCIAL-EMOTIONAL RECIPROCITY
2. NONVERBAL COMMUNICATIVE BEHAVIOURS
3. DEVELOP/MAINTAIN RELATIONSHIPS

## B. RESTRICTED, REPETITIVE BEHAVIOURS, INTERESTS OR ACTIVITIES

1. STEREOTYPED OR REPETITIVE BEHAVIOURS
2. RITUALIZED PATTERNS IN BEHAVIOUR
3. FIXATED INTERESTS WITH ABNORMAL INTENSITY AND FOCUS
4. HYPER- OR HYPOREACTIVITY TO SENSORY INPUT

## C. PRESENT IN EARLY DEVELOPMENT

- D. CLINICALLY SIGNIFICANT IMPAIRMENT IN FUNCTIONING
- E. NO BETTER EXPLANATION

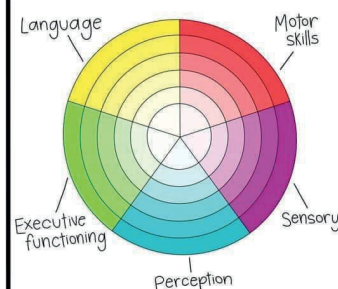
More specifically, a person with autism might not use hand gestures while talking or engage in imaginative play. They can be hypersensitive for light and sounds, or hyposensitive to internal stimuli (called interoception) like hunger, or both. These are only a few examples, but all are related to social communication and behaviour. Of course, there can be a difference in how severe each sign is manifested.

Autism is more frequently diagnosed in men than in women. It could be that the sex distribution is 50/50, but it just isn't recognized in women. Especially women without an intellectual disability are less likely to be diagnosed. Some researchers suggest there actually is a Female Autism Phenotype (FAP), which represents similar characteristics but expressed in different ways. It also includes other characteristics that aren't mentioned in the current diagnostic criteria at all. This isn't surprising since these criteria are predominantly based on autistic men. Women with autism can, just like autistic men, have trouble with social rela-

What People Think  
the autism spectrum  
looks like:



What it can  
actually  
look like:



tionships. It simply differs in nature of the difficulties, according to the FAP theory. They can also have special interests, but in different areas, like animals, fictional characters, or psychology.

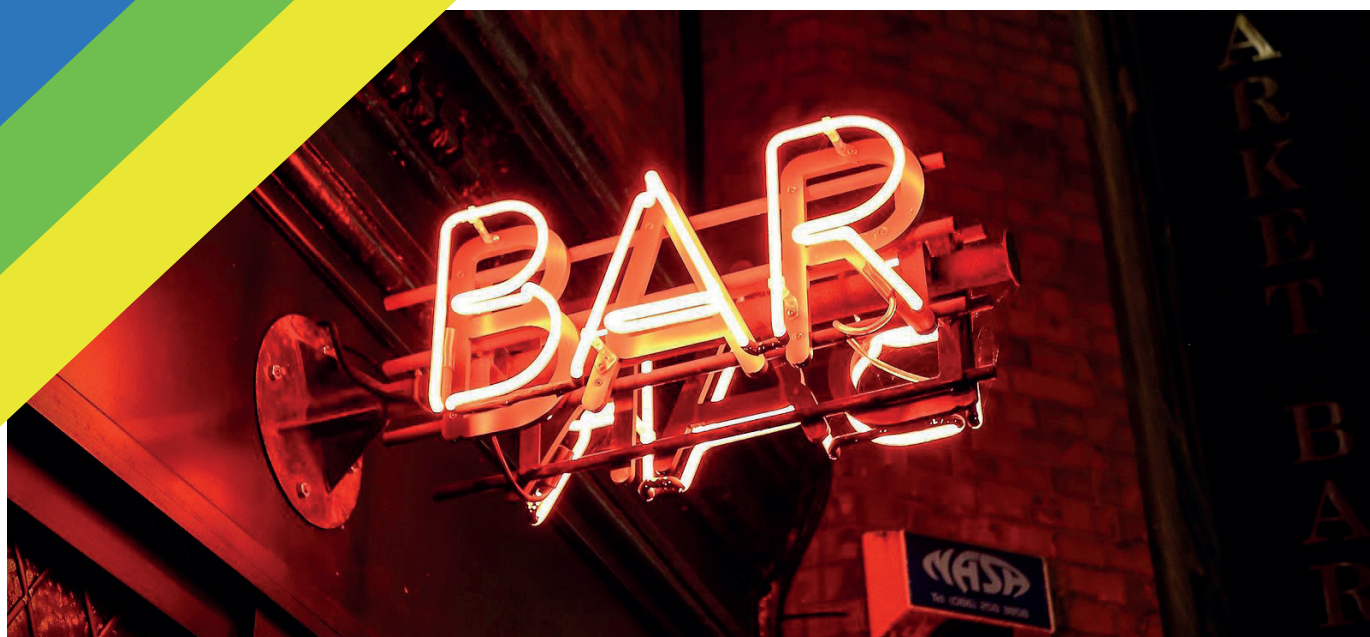
Another characteristic relates to one of the criteria of autism, namely expression of emotional difficulties. Instead of externalising problems, autistic women are more likely to have internalising problems such as anxiety and depression.

Another aspect of the female phenotype is camouflaging. This involves using conscious (or unconscious) strategies, that are learned or just developed. By doing this they don't seem autistic. Autistic women may for example force themselves to make eye contact or stop talking about their special interest. This compensation is done by using alternative cognitive strategies, such as learning to recognize different facial expressions to mimic them. This might explain why women appear to have better social and communication skills than man.

Although there is evidence that supports the female autism phenotype, it's not (yet) included in the DSM. More research has to be done to determine if the characteristics are indeed a female expression of autism, or simply a variation of the stereotypical autistic behaviours.



# REVIEW



We already have analyzed all types of spectra in this edition of Lifeline, and have seen them in illnesses, colours, and genders. We have seen gay animals. So for the review of this edition we needed to find a way to combine us, students, and all the colourful spectra that have accompanied us these last months. What do students do? Even more than studying? They go out and party! This is where we thrive. Some might say that students at nighttime act like a bunch of animals, and for all honesty, why shouldn't we? So we collected our Lifeline family and attended the most colourful night out one can see in the student city of Groningen. For your sake, we tested all the gay bars in this town, so next time when you feel the lack of little sass in your life, you can just follow our guidance and have the coolest night of your life!

We decided to go out on a Thursday, as this is THE student party night. For our (small) selection, we discovered three different bars.

This is the Lifeline's guide through Cafe de Prins, cafe Out of the Closet (Uit de Kast), and Groningen's only drag bar - House of Scandal.

“  
TOO FANCY FOR  
THIS B\*TCH

# RAINBOW PARTIES IN GRUNN



By Anette Hallink

## “ RATCHET ENOUGH FOR ME

First stop of the night was Cafe de Prins. What a lovely place! The light was pink!!! The location was approved by lifeliners, it is very much next to Vismarkt. And Febo, so night munchies ain't a problem. The drinks menu was excessive, the prices were affordable and the bartender was cute and friendly. They even had a separate shots menu. Although we would avoid The Dutchess- apparently tastes like essential oils. Our favourite feature was the tealights that were placed INSIDE the brick wall. Nice touch! Events included drag nights, bingos, and girls' nights. In the evening we were there, there were no events but they seemed like fun. The crowd was surprisingly older in age than we anticipated, most people were around 40-50, but it is nice to see the older gay community also having fun together. Ladies' bathroom door said 'Princesses'.

Unfortunately Out of the Closet cafe has to be partly exempted from our review as our experience there was very brief and we decided to give them a second chance. When we arrived there, the signs suggested that they were open, although it was in a bit of a sketchy alley. We squeezed ourselves in, and the room was completely empty. We were discussing the situation when the bartender told us to move on as they were closed. That confused us a bit, but don't judge a book by its cover or a bar without partying there, maybe other nights there would be full of life and party. But this mishap quickly guided us to the last stop of the night.



Groningen's only drag bar - House of Scandal - gained the highest ratings of our party squad. Usually, this bar fills the street with colourful lights and music. That night, it looked dark and mysterious and for a second we were afraid that they, as well, were closed unexpectedly. But no! There was a dark and cozy night in progress, in contrast to the usual colourful and smoke-machine-filled loud parties there. In any case the vibe was very enjoyable. The sassy and witty bartender won everyone's hearts. The drinks might have been a bit more expensive than at Cafe de Prins, but the selection was endless, as the bartender was improvising drinks that you requested. For example, ask for a pink drink, you get one, and oh how pink it is. The events there are loud, banging, in-your-face-gay and very much fun. Their events range from drag bingo nights to drag karaoke and regular drag nights with live performers. Every other night there is just amazing dance music and nobody stands in your way when you want to dance on the stage. The bartender and bar owner have been spotted dancing on the bar very often! Great sight. The atmosphere was cozy, pictures of beautiful drag queens on the walls, and although quite a small room, it felt very nice for a party. It is maybe not as central as Cafe de Prins but it certainly is not far, it's right next to A-brug, between Westerhaven and Vismarkt. We liked this bar a lot!

In the end, the lifeliners had a very fun and queer evening. We will, for sure, repeat our gay bar evenings and suggest you all to try them out aswell! They might be much more fun than you think! Keep calm and party on!

Rubric	Cafe de Prins	House of Scandal!
Location	7	7
Drinks	7.5	9
Service	9	10
Crowd vibe (hot people)	7	9
Events	6.5	9.5
Aesthetics	8	9
Average	7.5	8.9

# BAS EN Z'N BEESTJES

Beasts by Bas



By Bas van Boekholt

When I was given the very open-ended theme of “spectrum” for this lifeline, my mind went running in all directions. I could talk about the chameleon and how they are able to magically morph into all colours on the colour spectrum? Or maybe the mantis shrimp which has the ability to see outside the “normal” spectrum including the polarization of light? Or even the porpoise which can hear sounds from frequencies as low as 75 Hz to as high as 150,000 Hz (~7,5x larger than our human ears can pick up!). I have to say, if there is one thing apparent in my choice of amazing animals it's that I have a fondness for animals that fall outside “the spectrum”. The strange creatures that lurk in crevices of the unknown but still deserve their time in the spotlight; The ones that even science is just starting to figure out. I'm searching for those cases where evolution really shows how far specialization can be taken, and this edition is no exception! Any guesses? Okay, how about a clue? This animal's Thai name is P'som-sett, which roughly translates to “mixture” as this animal does look like a product of a very cozy night between a pig and an anteater. Still haven't got it? Okay well then let me introduce you to, the one, the only, theeeeeee terrific tremendous Tapir!

Tapirs are the only members of the genus *Tapirus* in the otherwise very empty family Tapiridae. They have been around for more than 20 million years and are often called “living fossils”. They are the most primitive large mammals in the world and used to roam in the jungles on all continents around the globe (excluding Antarctica). Living in the shadows of the trees munching on fallen fruits, fresh leaves and ferns were all they wanted, but alas life is never so simple. When the climate changed some of the tapirs' evolutionary cousins ventured off to grasslands that were better suited for larger herbivores and became what we now call the rhinoceros and horses. The tapirs stuck it out and today there are four genetically different species, of which three live in Central- and South America and one in Southeast Asia. Unfortunately, decreasing habitat, hunting pressures, and climate change have all had a negative impact on the tapir's livelihood, and all four species are classified as endangered.

The most distinguishing prehensile nose. While you might think it looks sort of like an elephants' trunk, these two features evolved separately. However, just like a trunk, it has a whole range of functions. Tapirs use their nose for finding food, collecting it off the floor or on a shrub, and even as a snorkel during swimming! Males also use their nose to ‘sniff’ for females that are in oestrous. When tapirs are born they look nothing like their parents, with woolly fur, white stripes, and dots all over the place. However, these accessories camouflage the infant in the shadows of the trees so they are safe until they grow into the

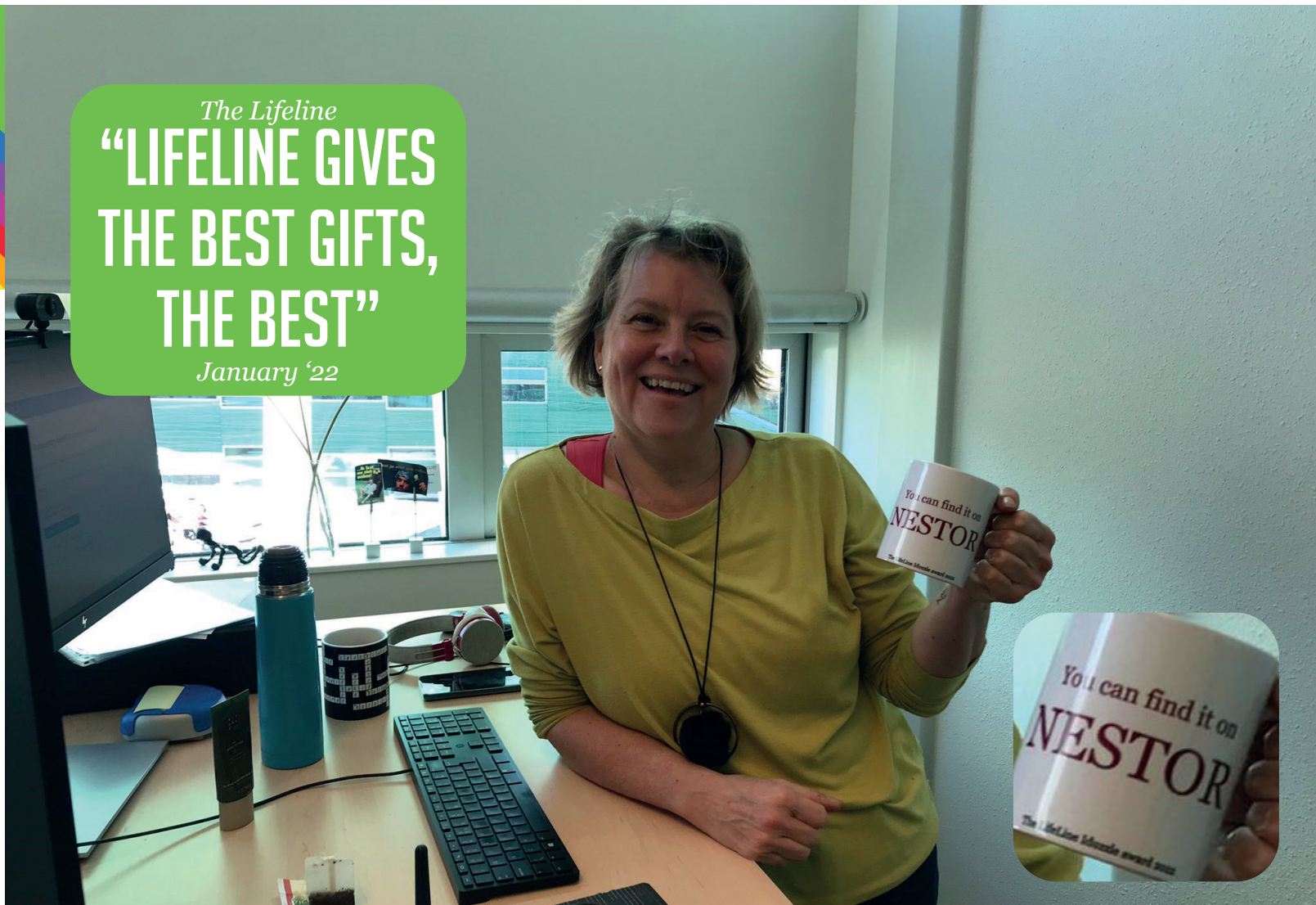
largest terrestrial animal of the Amazon. Being this big, Tapirs don't really have any natural predators (except for humans). They are a lot quicker than they look and their special thick thick skin (*Tapiro* literally means fat in Brazil) will fend off an initial attack of, for example, a jaguar. If the predator keeps hanging on the Tapir simply walks into the river, submerges itself, and patiently waits till the predator has let go, sounds like a good strategy to me. In general, they love to hang out around the river where they use it to cool off, graze from some underwater plants growing on the river floor, and even get the occasional spa treatment from passing fish who eat the parasites from their skin.

Of all big mammals, Tapirs are the least studied. We don't yet know if they are monogamous and until recently it was thought they lived quite solitary lives. In addition, they make these weird high-pitched whistles which we think they use to communicate but not a lot is known there either. However, we are starting to find out how important the Tapir is for the ecosystem it is a part of. Many fruit-bearing plants are dependent on the digestive tract of a Tapir for survival, making them critical curators of the rainforest. Because of all of the unknown about our strange long-nosed friends, Tapirs remain shrouded in mystery and have an almost mythical status in the human cultures where they are present. In Asia, tapirs are thought to eat nightmares and their name means ‘dream thief’ in Chinese and Japanese. On the other side of the world indigenous communities in South America worship tapirs in a different way, there they are a symbol of vastness, and the Milky Way is even called the ‘way of the tapir’.

I think we can all agree that these graceful giants of the forest deserve to be seen and heard. I don't know if we should expand our spectrum of cool animals or just get rid of the whole idea of a spectrum at all. All I know is that Tapirs are fascinating and that I am glad I got to nose around in their wondrous life before presenting them to you!



*The Lifeline*  
**"LIFELINE GIVES  
THE BEST GIFTS,  
THE BEST"**  
*January '22*



# OOOG VOOR NATUUR

**De wereld om ons heen verandert elke dag door menselijk ingrijpen, dichtbij en ver weg. Dat is ook goed te zien aan de (her)inrichting van stad en platteland.**

Wij vinden het belangrijk dat bij al die plannen aandacht is voor duurzame ruimtelijke ontwikkeling, herstel van biodiversiteit en effectieve natuurbescherming. Daarvoor is goed ecologisch advies nodig, gebaseerd op betrouwbaar onafhankelijk onderzoek, vakkundige analyse en voortdurende verbreding en innovatie. Dat is waar wij ons bij Altenburg & Wymenga al sinds 1988 voor inzetten.

ook  
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Amsterdam

Altenburg & Wymenga



ECOLOGISCH ONDERZOEK

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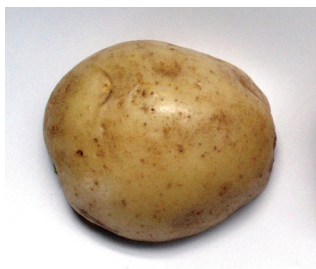
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By Juultje



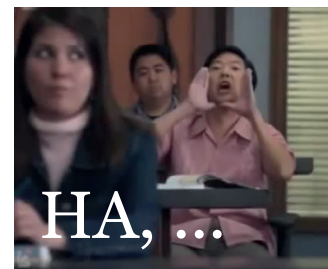
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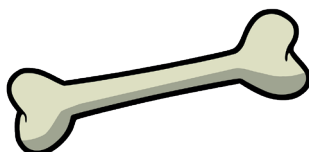


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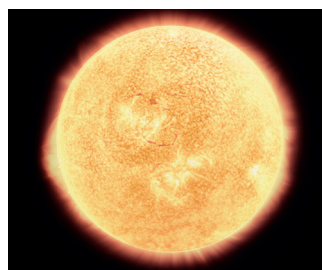


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## EXTRA HINT



SCAN ME

For the fourth image



The previous Iduzzle was won by **Allegra Melli**. Congratulations! They have won a marvelous prize, which they are very happy with! Would you like to be mentioned here in the next Lifeline? Please submit your answer to the Iduzzle to [redactie@idun.nl](mailto:redactie@idun.nl) before May 30<sup>th</sup>.

Answer to iduzzle 66: There are no passengers on spaceship earth, we are all crew.