

Life through a different lens: the brain science of autism



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Research focus in autism:
mental health, self-injury, suicide,
ageing, sex differences, female
presentation, late diagnosis.





Diagnosed autistic aged 28

Psychiatric history: 'dyspraxia',
anxiety, depression, eating
disorders, queried borderline
personality disorder...

Behavioural presentation with
self-injury and suicidality



So before we
start... what is
autism anyway?

When you think of autism...



Autism:

a **neurodevelopmental** condition



Autism:

a **neurodevelopmental** condition

- Differences in social interaction
*might struggle with social conventions
(verbal and non-verbal)*



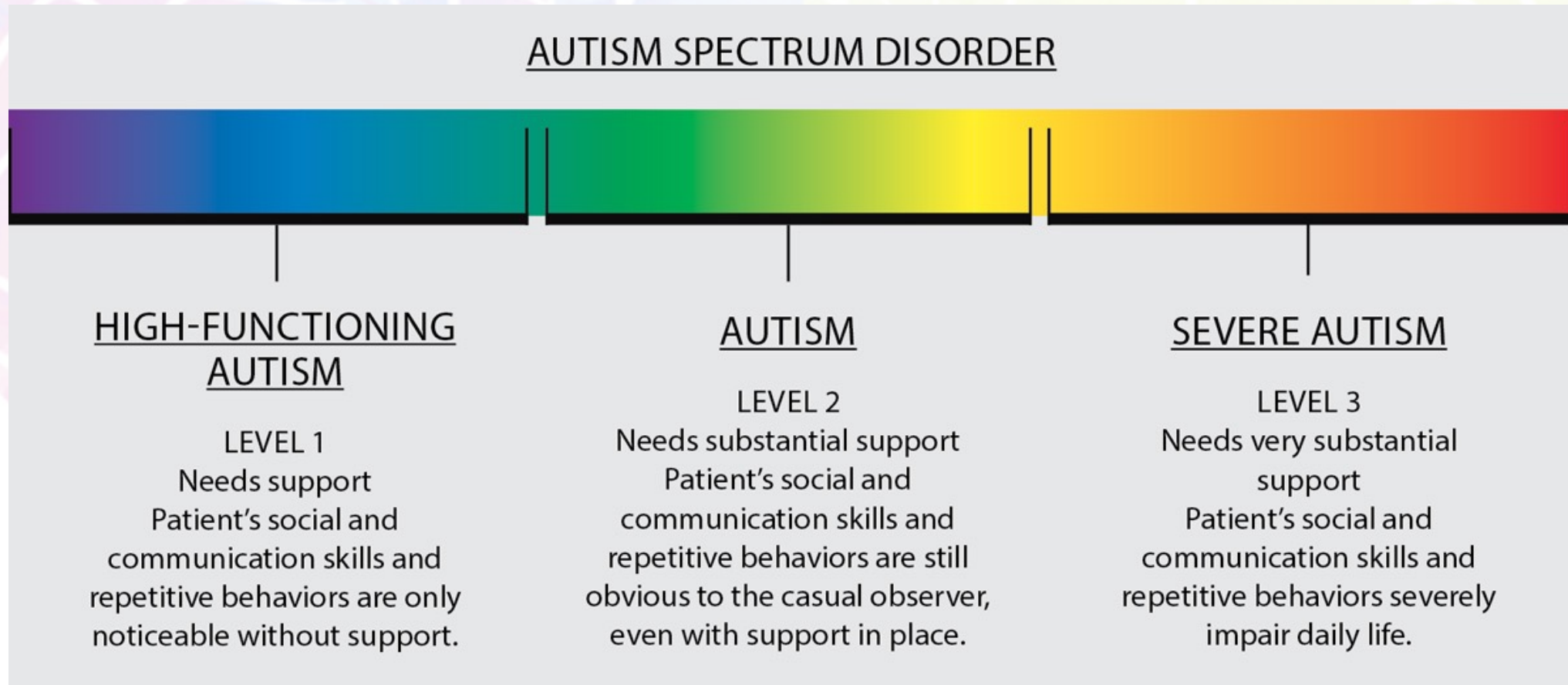
Autism:

a **neurodevelopmental** condition

- Differences in social interaction
*might struggle with social conventions
(verbal and non-verbal)*
- Preference for routine, predictability
and sameness; intense interests;
sensory differences



There's a lot of diversity, which is captured in diagnostic manuals:



1 in 68?

Autistic people are
found across all
ethnicities and SES
backgrounds.

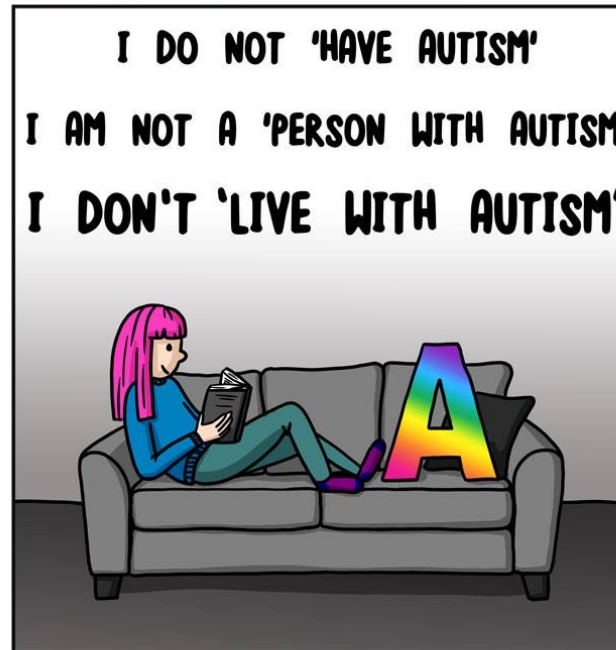
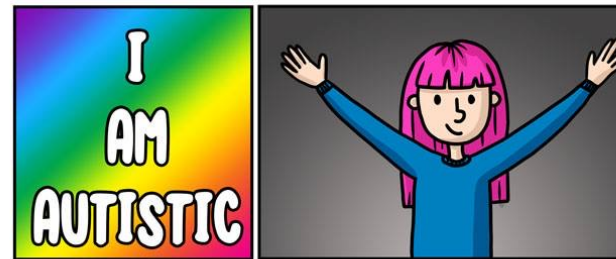


Boys/men are more likely to be diagnosed as autistic, but it may be that we're worse at detecting girls and women!

Autistic people are more likely to be non-binary or transgender.



You might have noticed I say “autistic people” rather than “people with autism”...



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As a society,
we have lots
of stereotypes
about autism
and autistic
people

More
common in
males?

No sense of
humour

Doesn't make
eye-contact or
gesture; robotic

Doesn't get
sarcasm

Antisocial

Unempathetic

Not a good
team player,
colleague, friend

Cold,
uncaring

More common in males?

No sense of humour

Doesn't make eye-contact or gesture; robotic

There is

Doesn't get sarcasm

NO Antisocial ONE

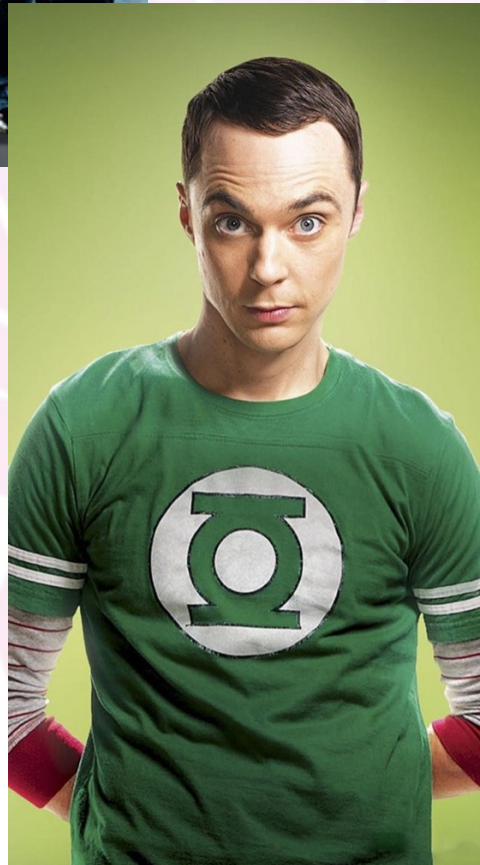
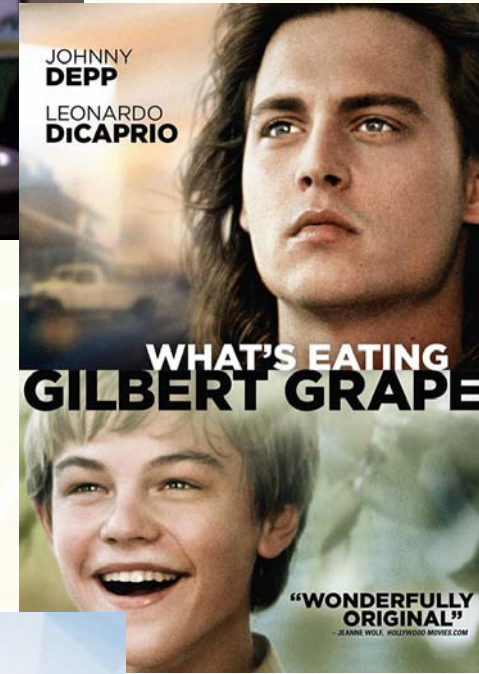
'TYPE'

Unempathetic

of autistic individual

Not a good team player, colleague, friend

Cold, uncaring



There will be some autistic people who 'present' in these ways...

But we're also:



singers



comedians



Screenplay

writers

(* wrote Ghostbusters!)



actors

activists



Autism is sometimes experienced as a 'hidden disability'... You can't tell just by looking at someone.

Camouflage – especially in girls and women.



Possibly not knowing how to respond to office banter; 'small talk'

Struggling to take in spoken information in real time

Sensory differences; can't tune things out

"Socially awkward"; not reading between the lines

Perfectionist; doing things in the same way, predictably, whole-heartedly, conscientiously

Often trying to fit in and "pass for normal"

Highly, highly **ANXIOUS**

© Mademoiselle Caroline, Julie Dachez, "Invisible Differences"



My own impression of being autistic:

It's like everyone got a big book of social rules, "How To People", when I was looking the other way.



Over the years, there have been many attempts to explain autism.

These range from the **AWFUL** (refrigerator mothers)...

Some doctors tried to say autism was caused by the lack of warmth from the moms of autistic children

They call this the refrigerator mother theory



Over the years, there have been many attempts to explain autism.

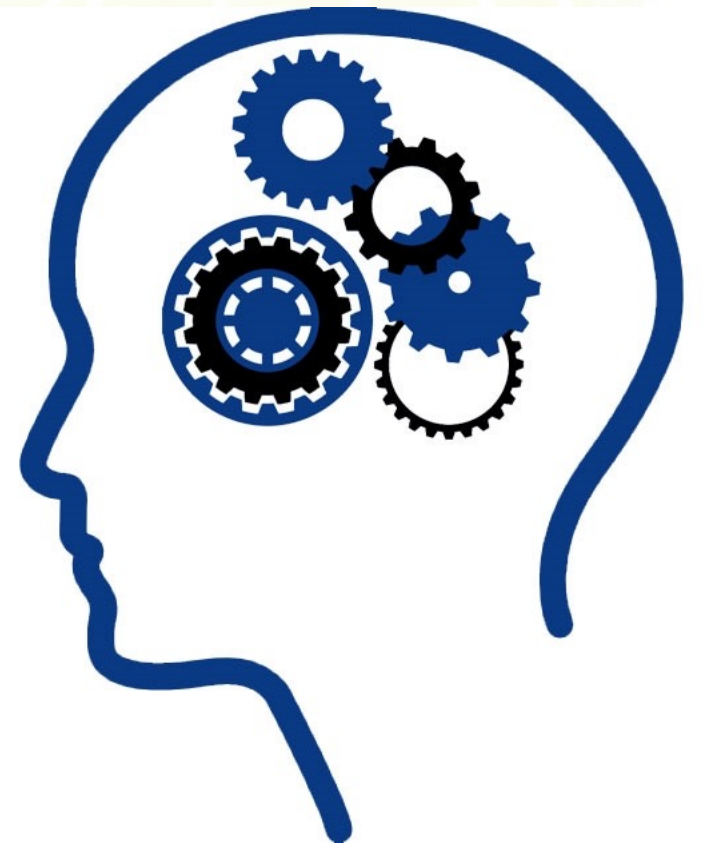
... to the at-least-it's-*biological*-but-still-bloody-**AWFUL**...



AUTISM CAUSES VACCINES.

Over the years, there have
been many attempts to explain
ASC.

... to the psychological.





Difficulties with
mind-reading



Autism



Difficulties with
mind-reading



Autism



Difficulties with
executive function



Difficulties with
mind-reading



Autism



Difficulties with
executive function



Tendency to focus
on details and
neglect the whole
picture



Difficulties with
mind-reading

Autism

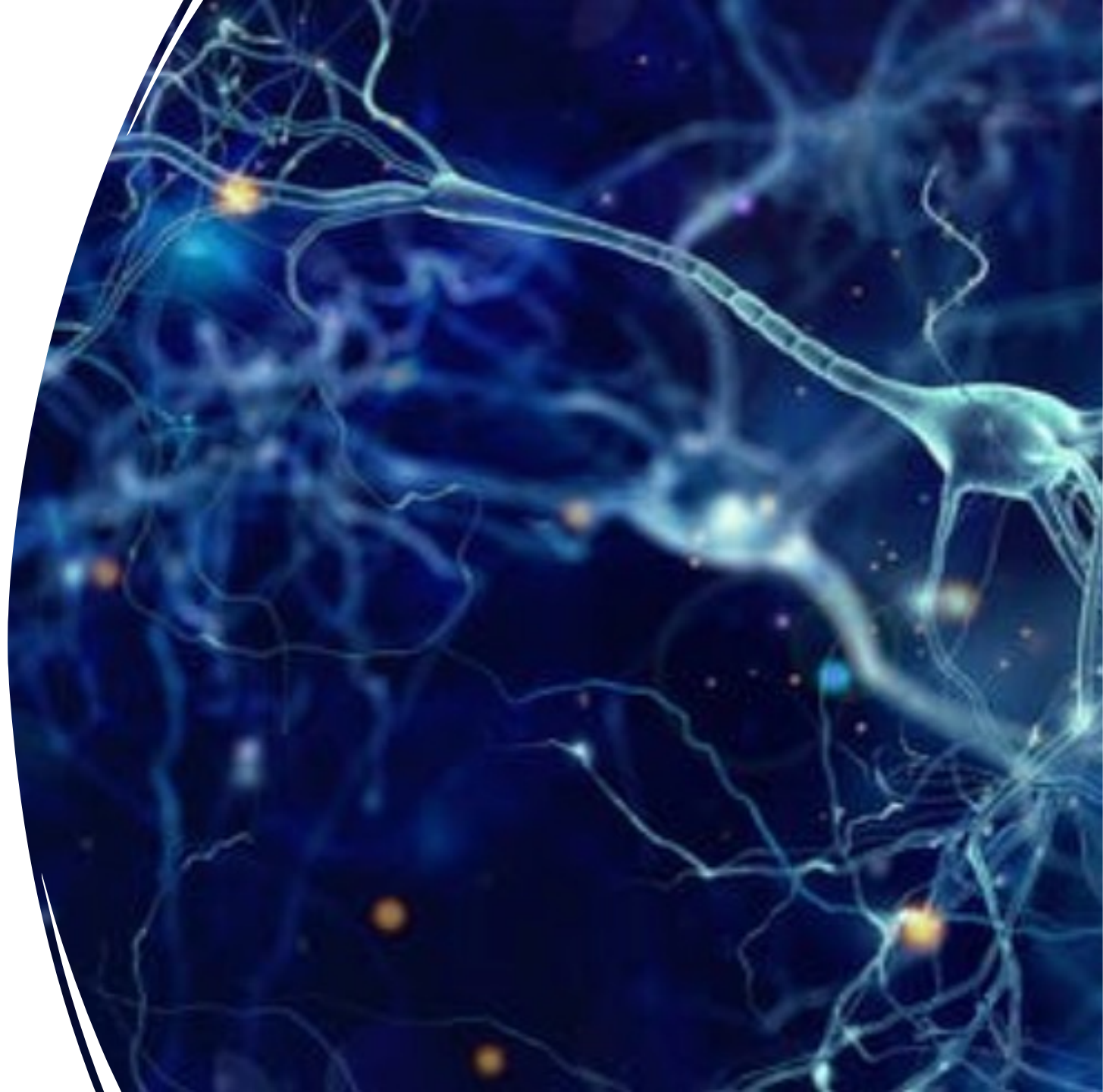


Difficulties with
executive function



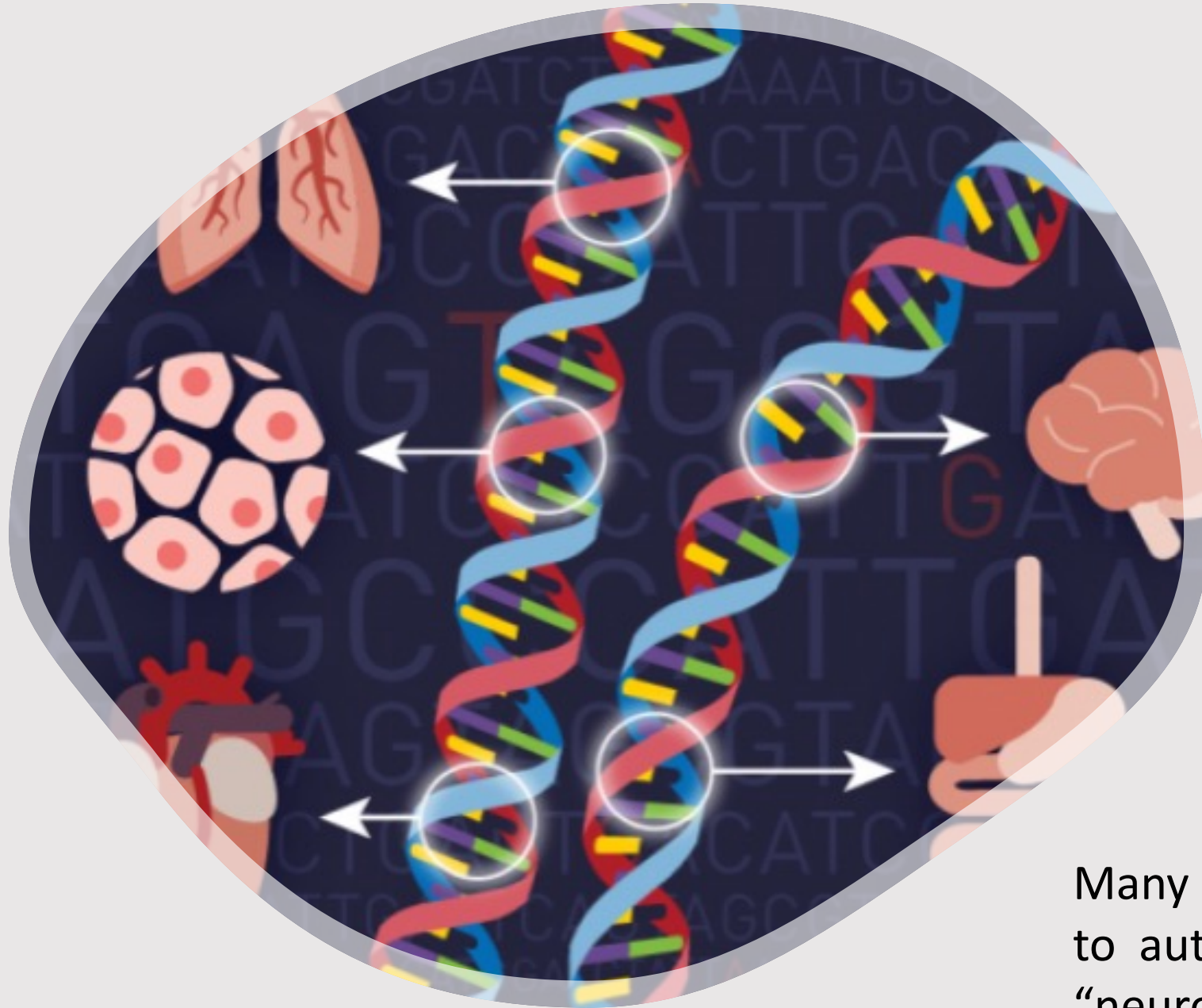
Tendency to focus
on details and
neglect the whole
picture

If we want to understand
autism, we need to look
at genetics and the brain



Most identified genetic variants have their strongest effect during the **mid-to-late prenatal period** ...

... affecting the formation of brain cells, synapses, connections.



Many genetic “roads” to autism - and likely “neurosubtypes”!

... scientists can
see differences
which mark out
autistic babies
from 6-12
months onwards





Neurological “soft signs” are often the earliest behavioural markers...

The brain-environment interaction and the snowball effect

Early differences in the brain, and their behavioural correlates (e.g. movement and attention differences), affect how an infant interacts with the environment and people...

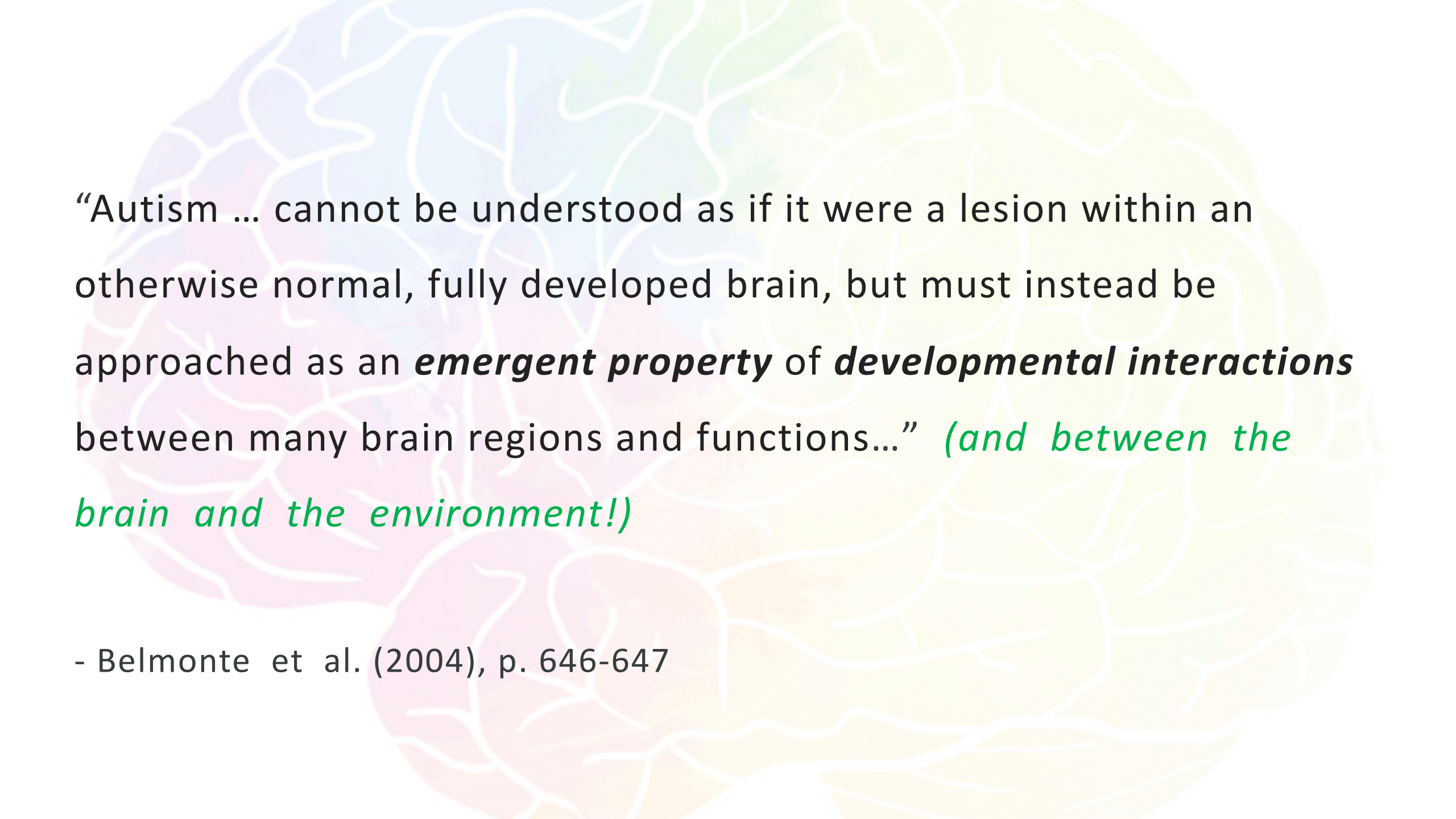
... And being able to interact with the environment/people is **CRUCIAL** for cognitive and social development - and further brain development.



The brain-environment interaction and the snowball effect

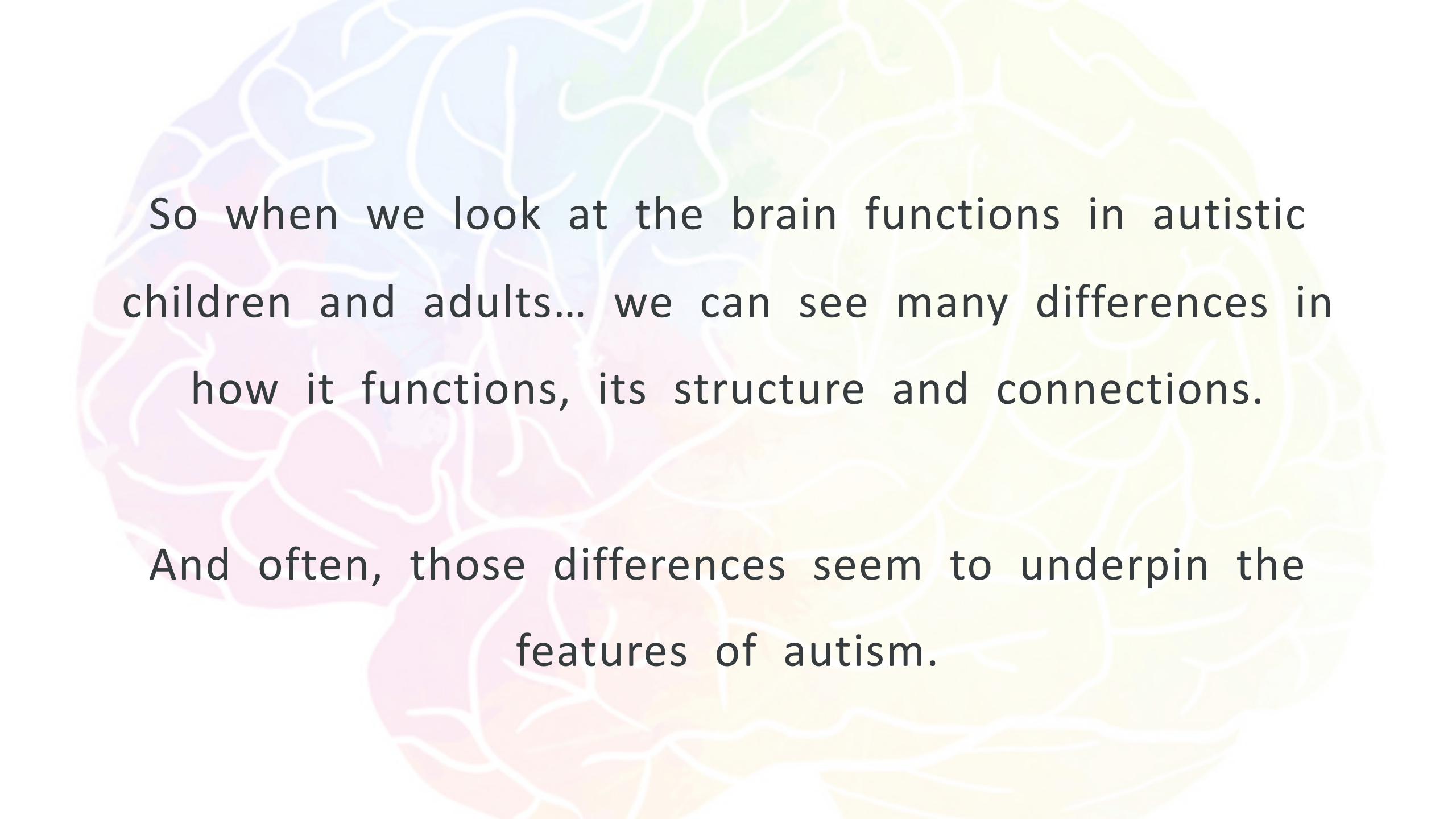
For e.g.: being able to reach for faces and objects (~3 months) is associated with increased attention to faces and objects ... and opens up further learning opportunities!





“Autism ... cannot be understood as if it were a lesion within an otherwise normal, fully developed brain, but must instead be approached as an ***emergent property*** of ***developmental interactions*** between many brain regions and functions...” *(and between the brain and the environment!)*

- Belmonte et al. (2004), p. 646-647



So when we look at the brain functions in autistic children and adults... we can see many differences in how it functions, its structure and connections.

And often, those differences seem to underpin the features of autism.



Let's look at just a few examples!



‘Mind-reading’ is dependent on communication between a network of brain regions...



The better you are at it, the greater the connectivity between social parts of your brain.

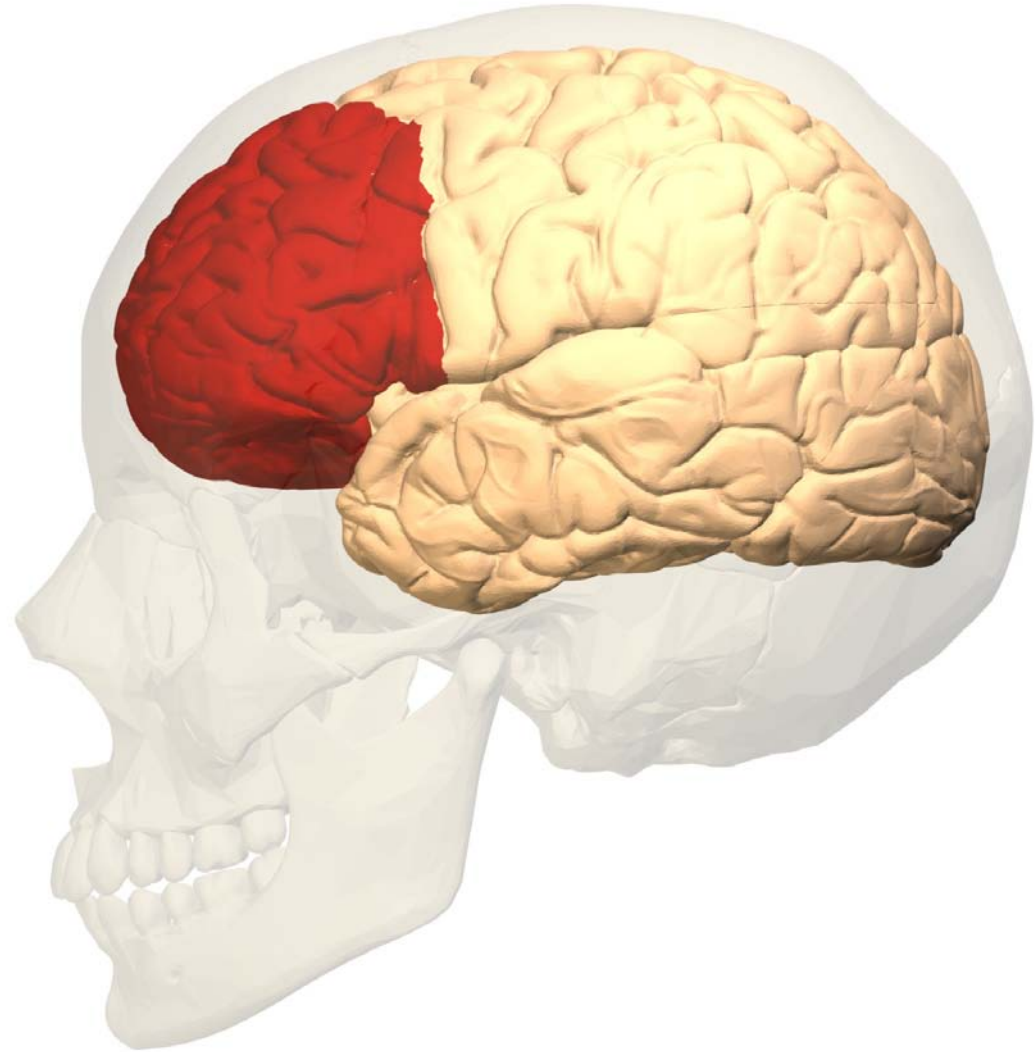




- ORGANIZE, PRIORITIZE, ACTIVATE WORK
- MONITOR AND SELF-REGULATE ACTIONS
- UTILIZE WORKING MEMORY & SHORT TERM RECALL
- MANAGE FRUSTRATIONS AND MODULATE EMOTIONS
- REGULATE ALERTNESS, SUSTAIN EFFORT AND SPEED
- FOCUS, SUSTAIN AND ABILITY TO SHIFT TASK ATTENTION

CREDIT: [HTTP://COGX.INFO](http://COGX.INFO) (DR. BROWN)

Being able to control our behaviour and adapt to a changing environment relies on the prefrontal cortex and its connections with other brain regions



... and also relies on connections between areas on the surface of the brain, and areas deep within.

These connections are atypical in autistic people – and the more different they are, the more difficulty people have “restricted and repetitive behaviours”.

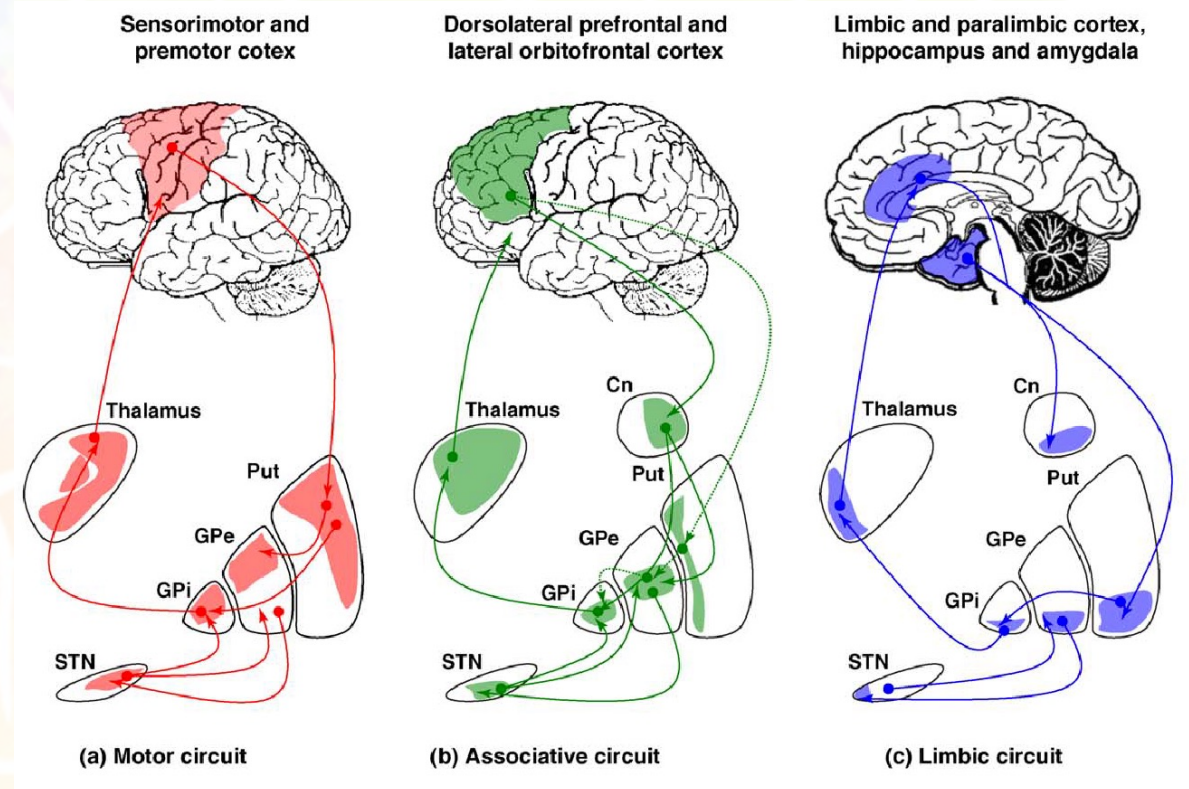


Image: Krack et al. (2010)

A person might have a limited repertoire of learned behavioural responses to a situation, and relying on routines and repetition reduces the demand on this small repertoire.

It also reduces the need to formulate new plans spontaneously – which is very difficult if those brain connections are not working ‘normally’.

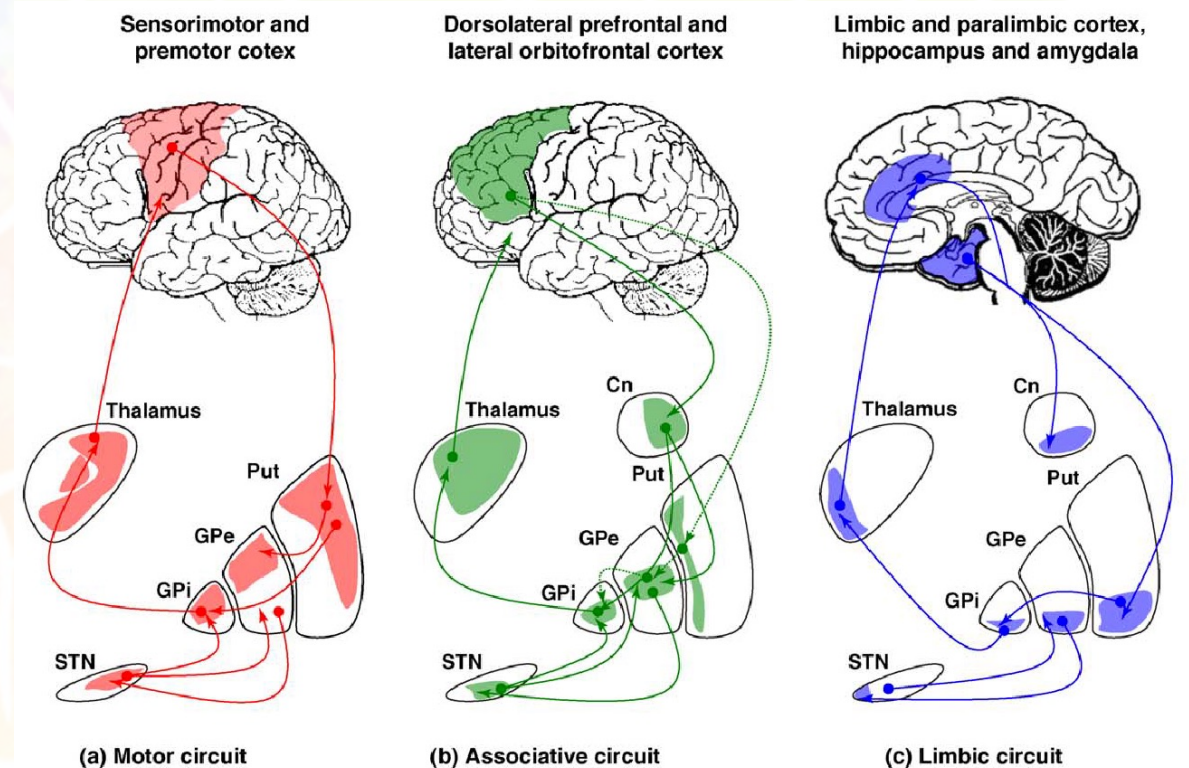


Image: Krack et al. (2010)



Sensory sensitivities cause huge distress and are linked to poor mental health...



It seems that when people have sensory sensitivity, the sensory regions of the brain are activated to a greater extent by normal, annoying noises – like traffic! (**Green et al, 2013, 2015**)

And it gets worse...



Emotion-processing regions become active: the amygdala, prefrontal cortex and hippocampus.

What's more... the lack of control from other regions, like those responsible for controlling attention, means that autistic people are ***unable to tune out*** sensory stimulation.

Brains vary within the general population - and autistic brains vary even more, in terms of their structure and connections.

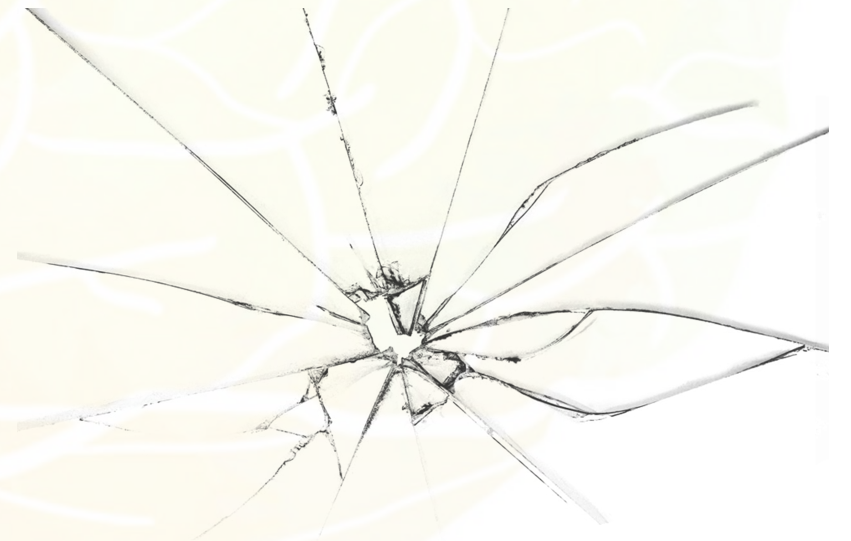
Features of autism are 'real' - they have a biological basis.

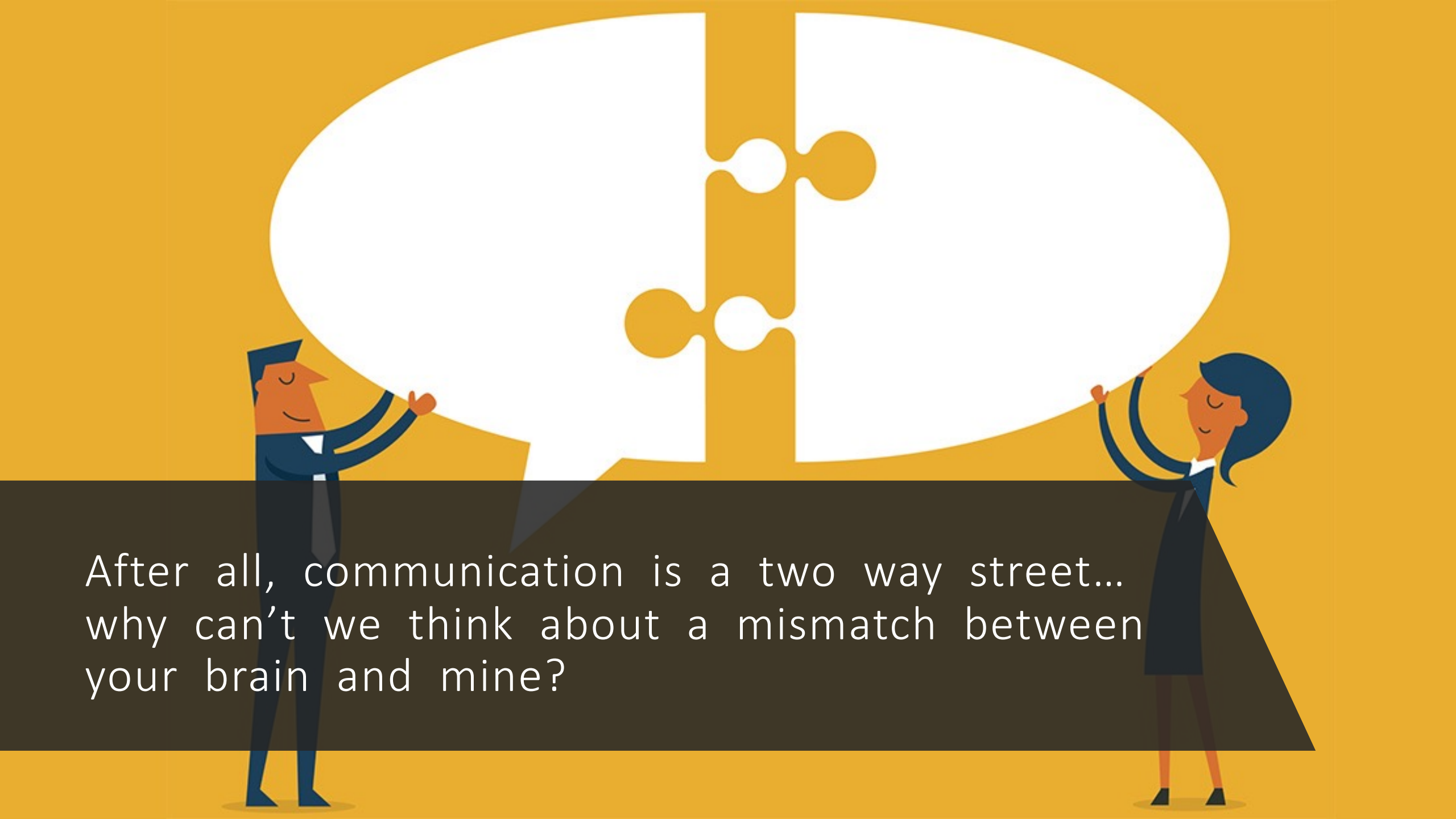


We need to change the conversations we have about
autistic people

Historically, autism theories are about '**deficits**'...
presenting a stigmatised autistic self that is
damaged or deficient.

Stigma has a **huge** impact on mental health
and wellbeing of autistic people.



An illustration on a yellow background. A man in a blue suit and a woman in a blue dress are standing on either side of a large white puzzle piece. The puzzle piece is shaped like a speech bubble and is being held up by both of them. The puzzle piece has several interlocking tabs and sockets. A dark grey speech bubble tail points from the puzzle piece towards the text below.

After all, communication is a two way street...
why can't we think about a mismatch between
your brain and mine?



Thank you so
much for
listening!

Resources for auties and allies

[Advice about autism from the horse's mouth](#)

A [wealth of resources](#) on pretty much every autism-related (and disability-related) subject!

Resources for [kids, teens, adults and parents](#) – screening tests (including for adult men and women), advice around sleep, mental health, etc.

[Autistic self-advocacy network](#)

Struggling with mental health? Resources for crises [here](#) and [here](#); and here is the page for [autism mental health awareness!](#)

Click [here](#) for one of the best articles I've ever read on autism in girls and women

[Just found out](#) that you're autistic (or wondering if you might be)? Follow on from this page to the friendliest facebook page on the net.

We don't yet have a scientifically-verified, standardized screening tool for girls and women – but lots of people like this [unofficial checklist](#)

If you're a fan of the written (or drawn) word:

(Please note that I haven't read all of these – but those I haven't, I want to!)

[Neurotribes: How To Think Smarter About People Who Think Differently](#)

[The Neurodiversity Reader](#)

[The Neurodiverse Workplace: Advice for Employers](#)

Being diagnosed as an adult:

[The Electricity of Every Living Thing](#)

[Invisible Differences](#)

[I Think I Might Be Autistic](#)

[Love, Partnership or Singleton on the Autism Spectrum](#)

[Aspies on Mental Health](#)

[Guide to Good Mental Health on the Autism Spectrum](#)

[Divergent Mind](#)

For girls and women:

[The Spectrum Girl's Survival Guide and Survival Toolkit](#)

[Camouflage: The Hidden Lives of Autistic Women](#)

[Women and girls: from early childhood to old age](#)

[Super-safe Living on the Autism Spectrum](#)

[Nerdy, Shy and Socially Inappropriate](#)

Resources for thinking and speaking more inclusively



Creating more accessible online spaces

Click [here](#) to read more about ableism in language – and [why the language we use to talk about autism matters](#)

Historically, people have talked about “high functioning” and “low functioning” autism – but we know now that these labels are unhelpful at best and may be harmful at worst. Click [here](#), [here](#) and [here](#) to learn more about why these labels problematic and how they may not mean much in terms of actual [‘outcomes’](#)



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