

From Sensory Room to Living Room

By Chantal Spencer

An exploration in everyday therapeutic
sensory designs for adults

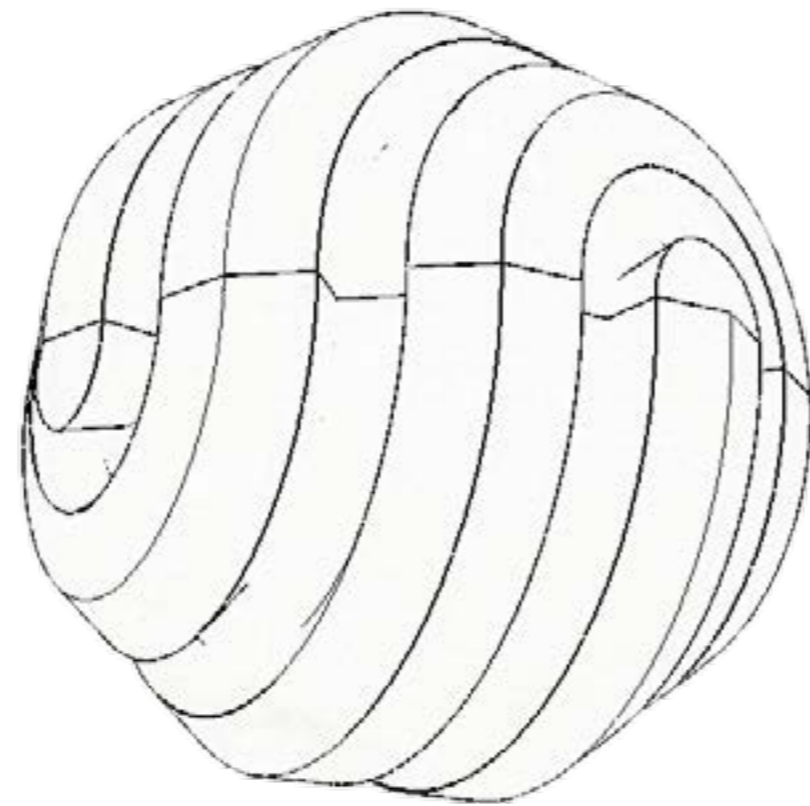
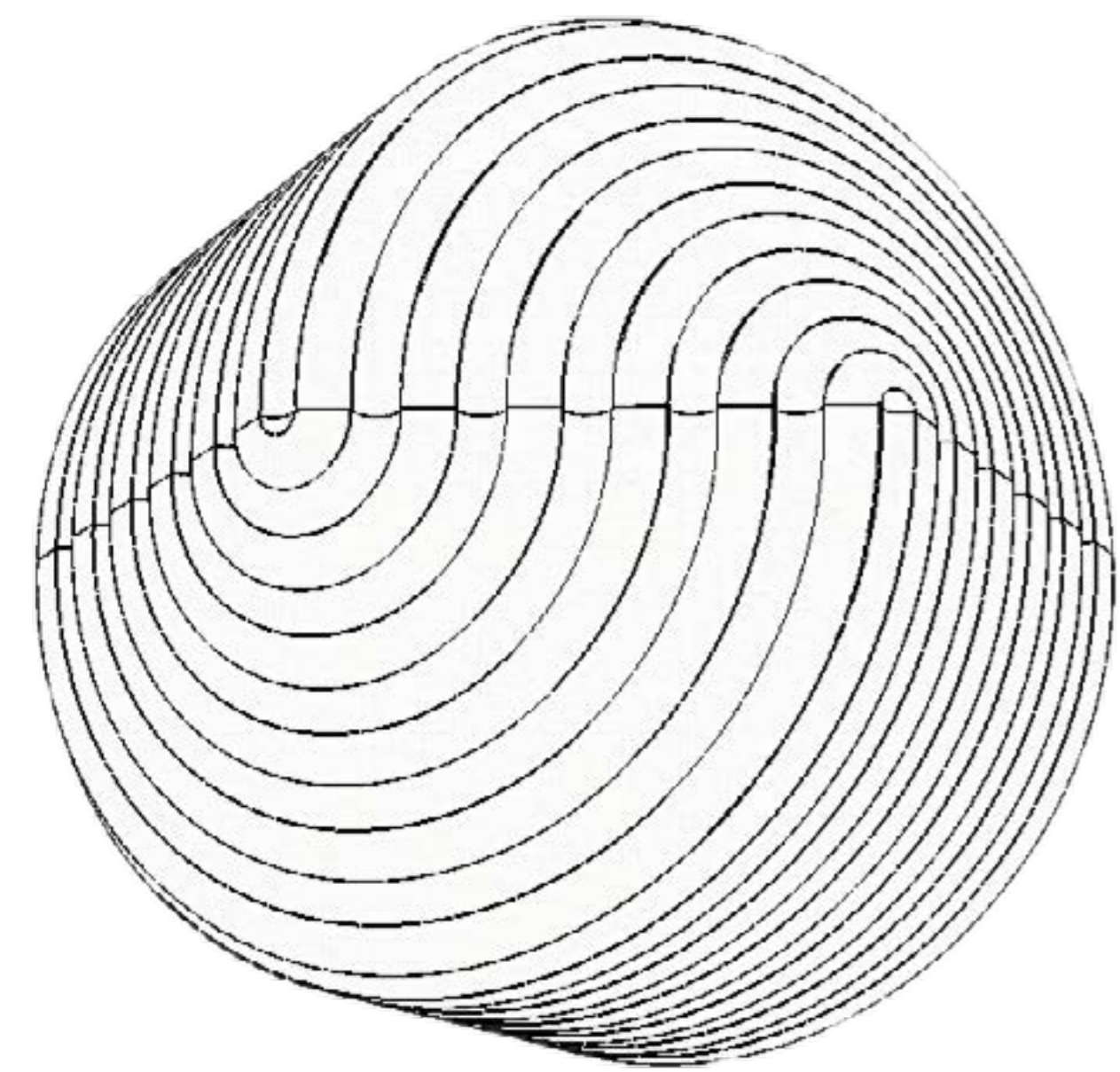


Table of Contents:

Introduction.....		p5
Self Regulation		p7
The Science Part.....		p18
Market Research.....		p28
Disability In The Real World		p32
Digital Product Design.....		p48
Material Experimentation.....		p60
Conclusion		p78
Bibliography.....		p86



From sensory room to living room: What does that mean?

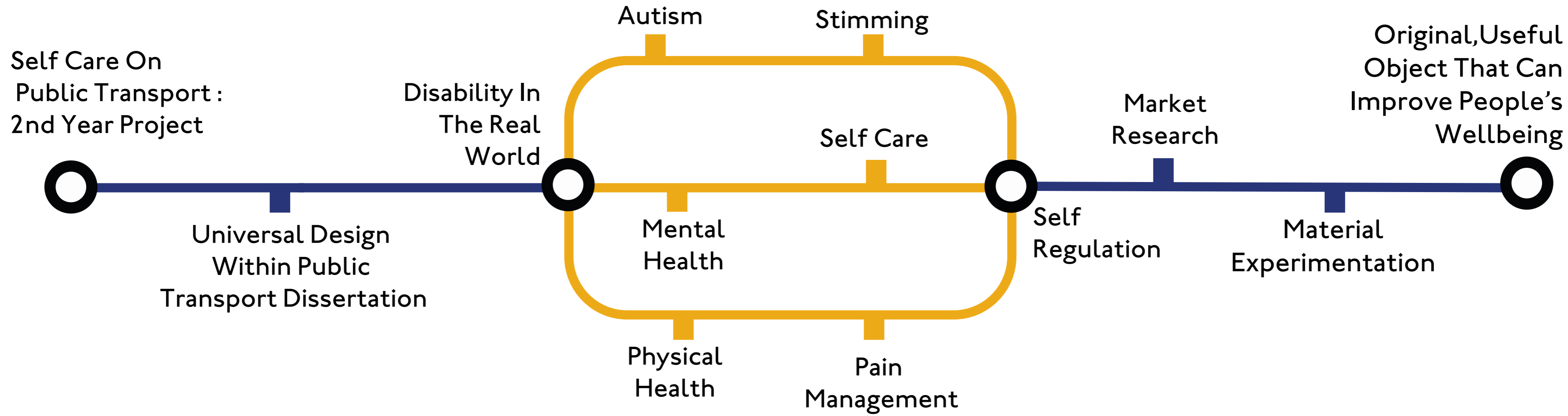
This project is an exploration into how objects, and our interaction with them, can improve our lives. I'm interested in what connects the psychological and biological, and how such interactions with physical objects can influence our own sensory health.

18 months ago I set up an organisation that mentors and supports artists with invisible disabilities. This work has given me an insight into the day to day lives and additional needs that being a disabled person brings. As a disabled person myself I have a very personal view of what it is like to be disabled. But no disabled person is the same, even those who share a condition may have very different issues.

For me it was important to find a thread that links not only disabled people together but those who may consider themselves non-disabled. As an advocate and activist for disabled people's rights, one of my significant objectives is integration. It was important for me that this project produced objects that would be useful and appealing to a wide range of people both abled and disabled.

Having recently been diagnosed with a condition that is thought to have been brought on by trauma, I discovered that our psychological state can and does manifest as physical symptoms. Many pain management strategies used by the NHS focus on good mental health and its capability in reducing symptoms such as chronic pain, skin and bowel conditions etc...I like to think of myself as an open minded person, but I have to admit this really did take some time to convince me.

What you see in this publication is that journey, from how to take these ideas and questions and turn them into something useful, whilst raising awareness and bringing people together.

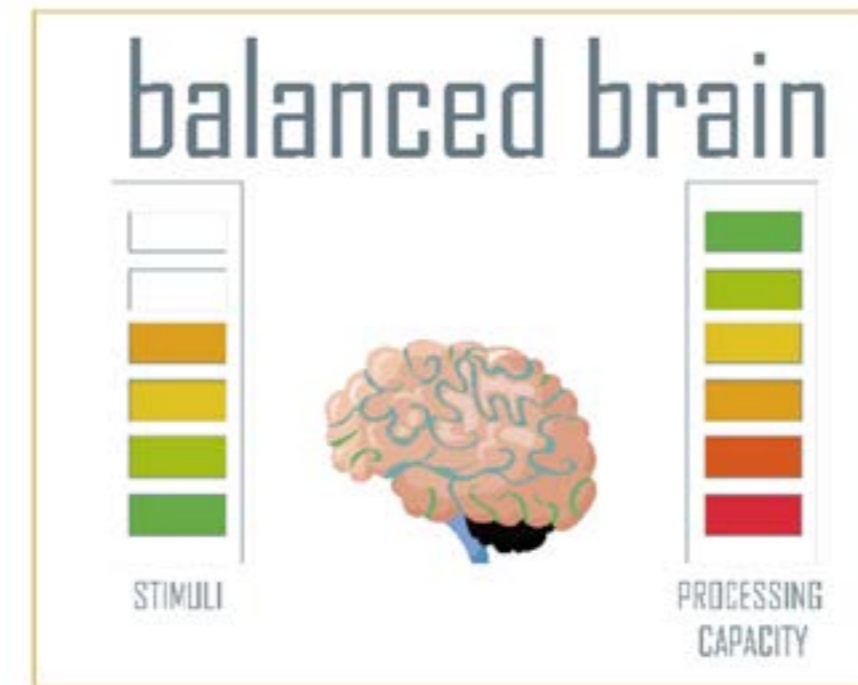




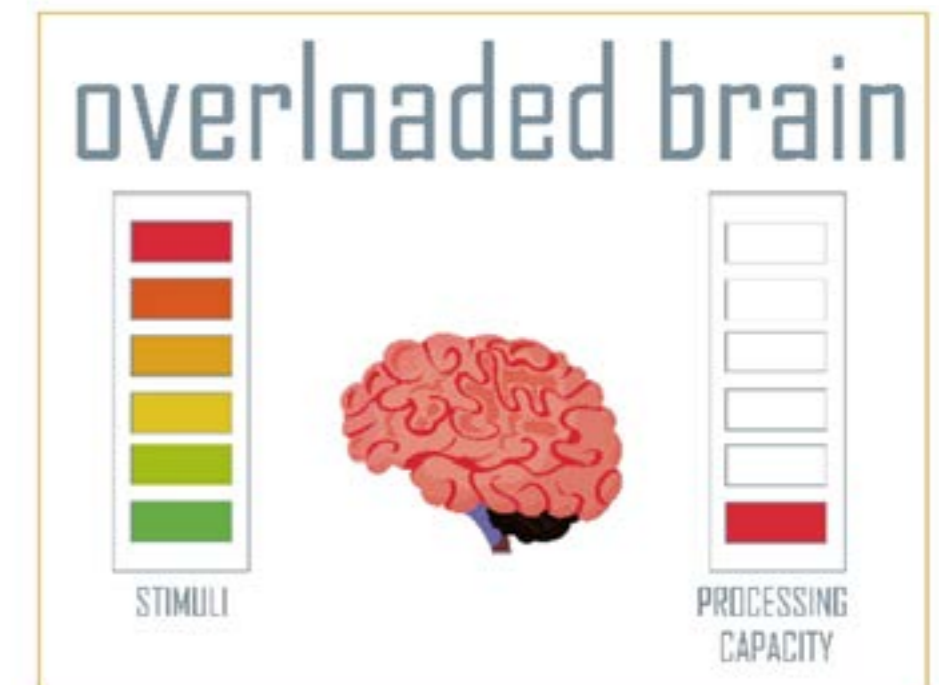
Self-Regulation: Capacity vs Stimuli

From Sensory Room
to Living Room

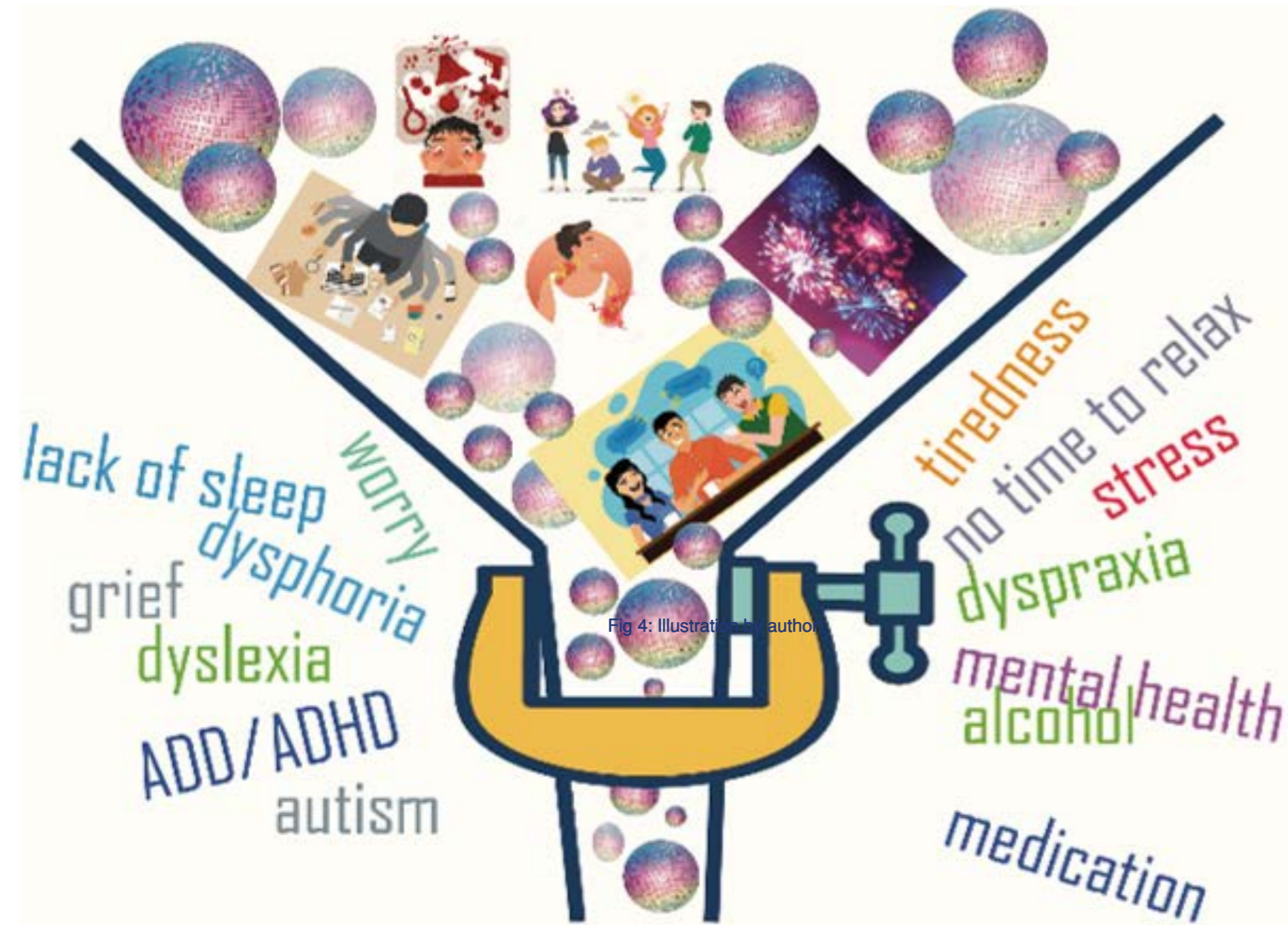
One of the most important factors in how our psychology affects our body is understanding what stress is.



Stress in it's simplest format is our brain having to cope with more stimuli than it can process at that moment in time. The illustration on the left shows you a balance brain, processing capacity is high, and stimuli is less than the capacity of the brain.



On the right you can see a brain that is experiencing stress. It's capacity to process the stimuli is very low and the amount of stimuli is much higher, this creates a state of stress. And it is these periods of stress that can have a negative impact on our physical health.



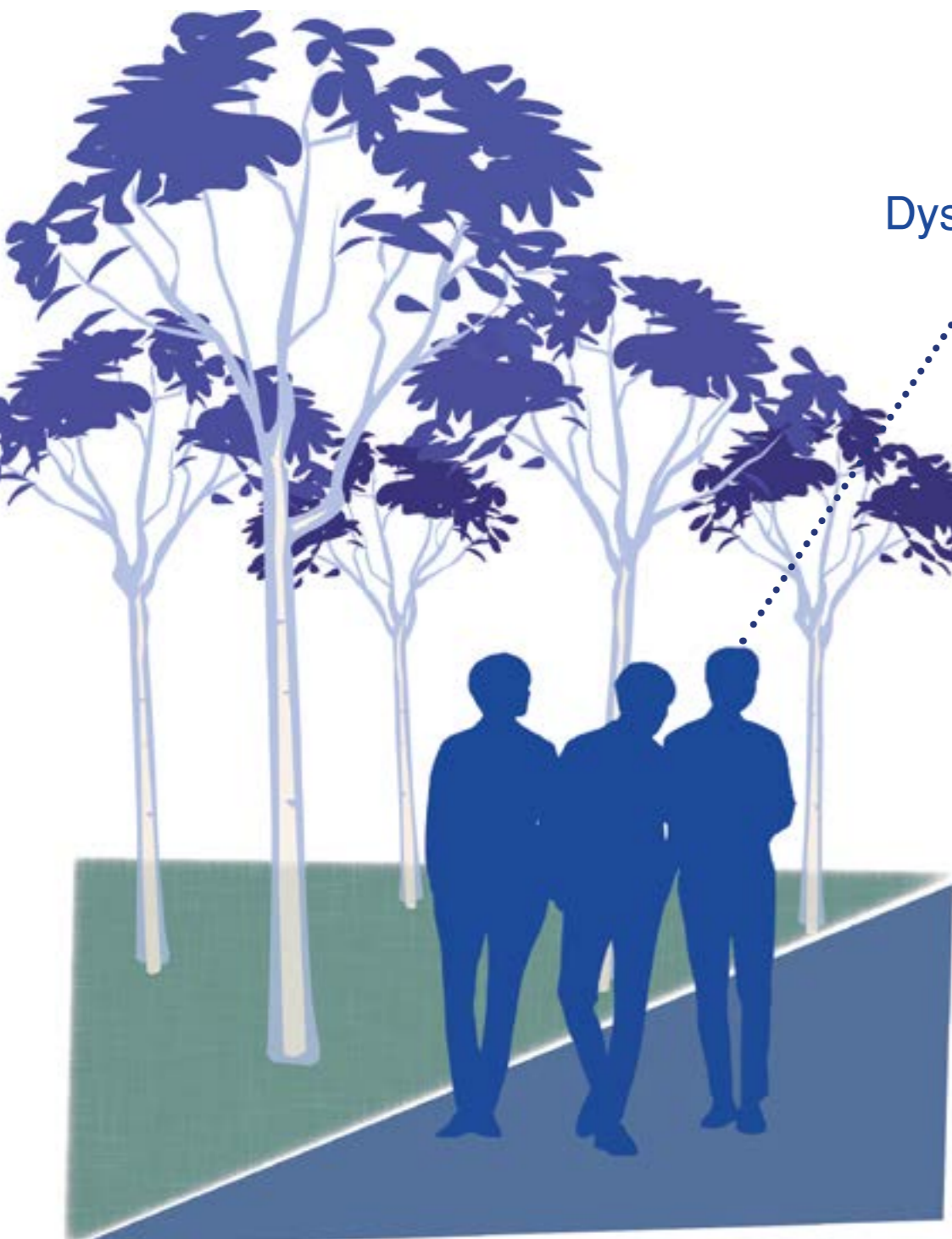
Why does my ability to cope with stress change from day to day?

To answer that question, first we need to look at how we process stimuli and how factors can impact on our capacity to process them.

Our brain absorbs everything we encounter in day to day life as information, these are referred to as stimuli. They can be anything from anxious thoughts, workload, social interactions, emotions good or bad, to physical pain, lights, sound etc. These are referred to as stimuli and they all need to be processed by the brain.

Many external factors can affect the brains ability to process stimuli; tiredness, ADHD, grief, dysphoria to name but a few.

These factors act like a vice, inhibiting the brains flow of registering to then processing stimuli, leading a person to feel burned out and stressed. .



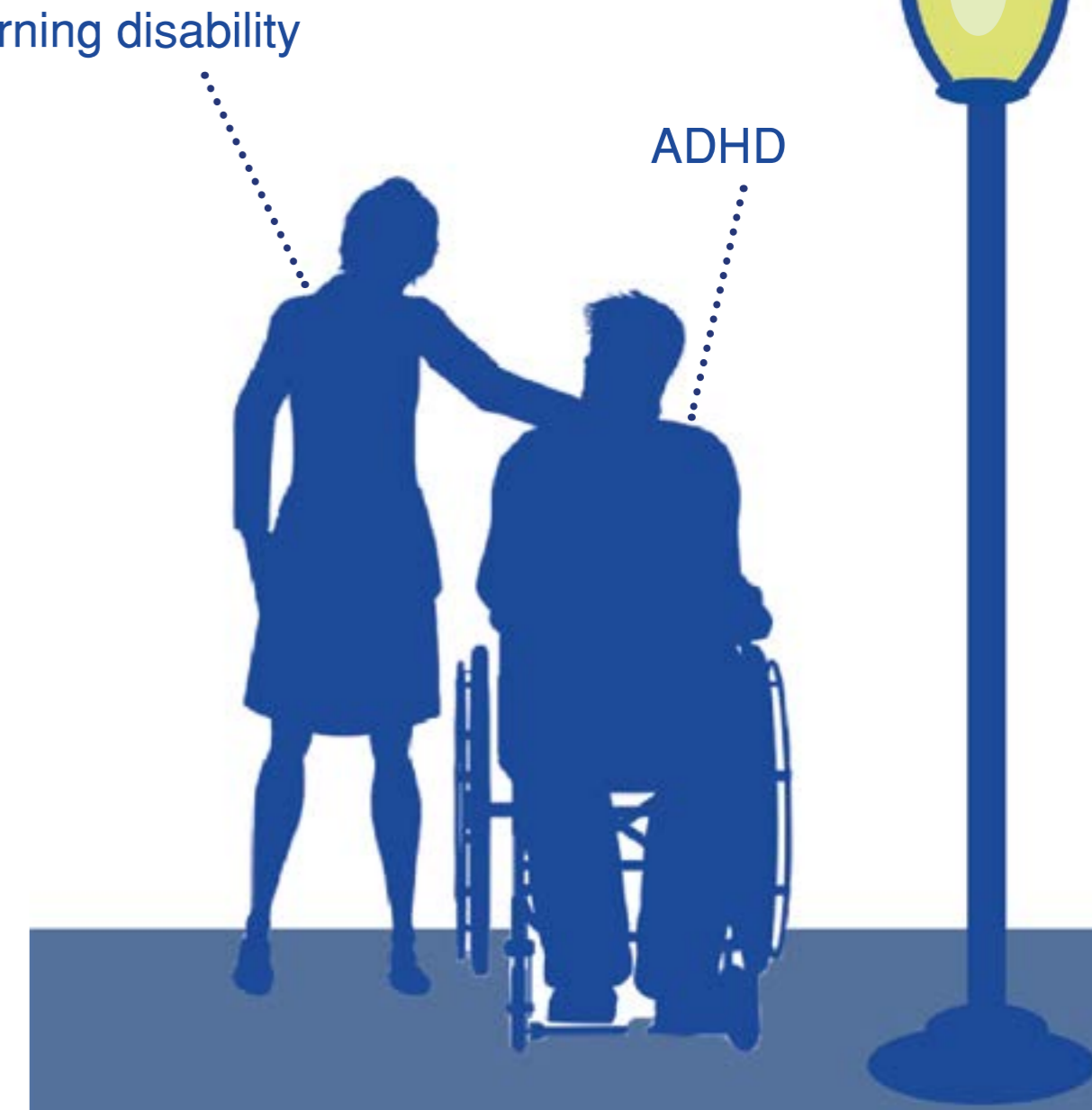
Dysphoria



Dyslexia

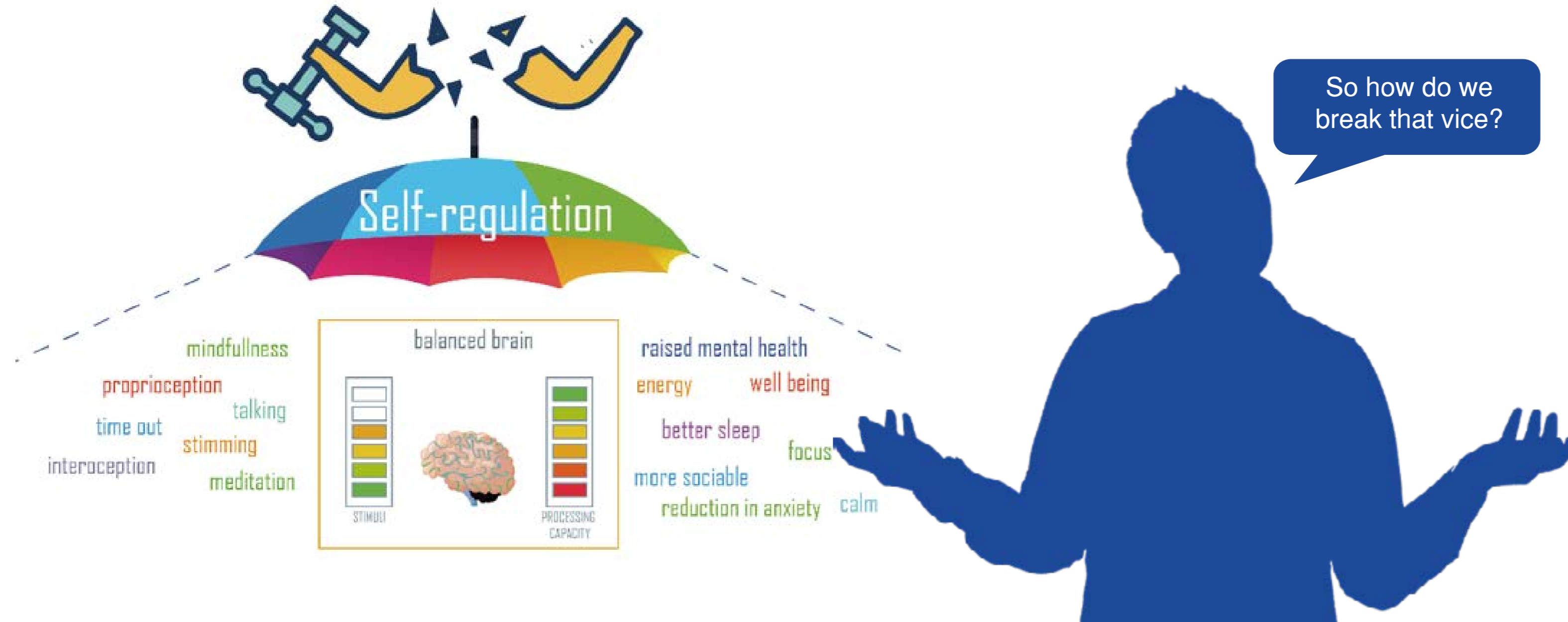


Autism



Learning disability

ADHD



The process is called self-regulation:

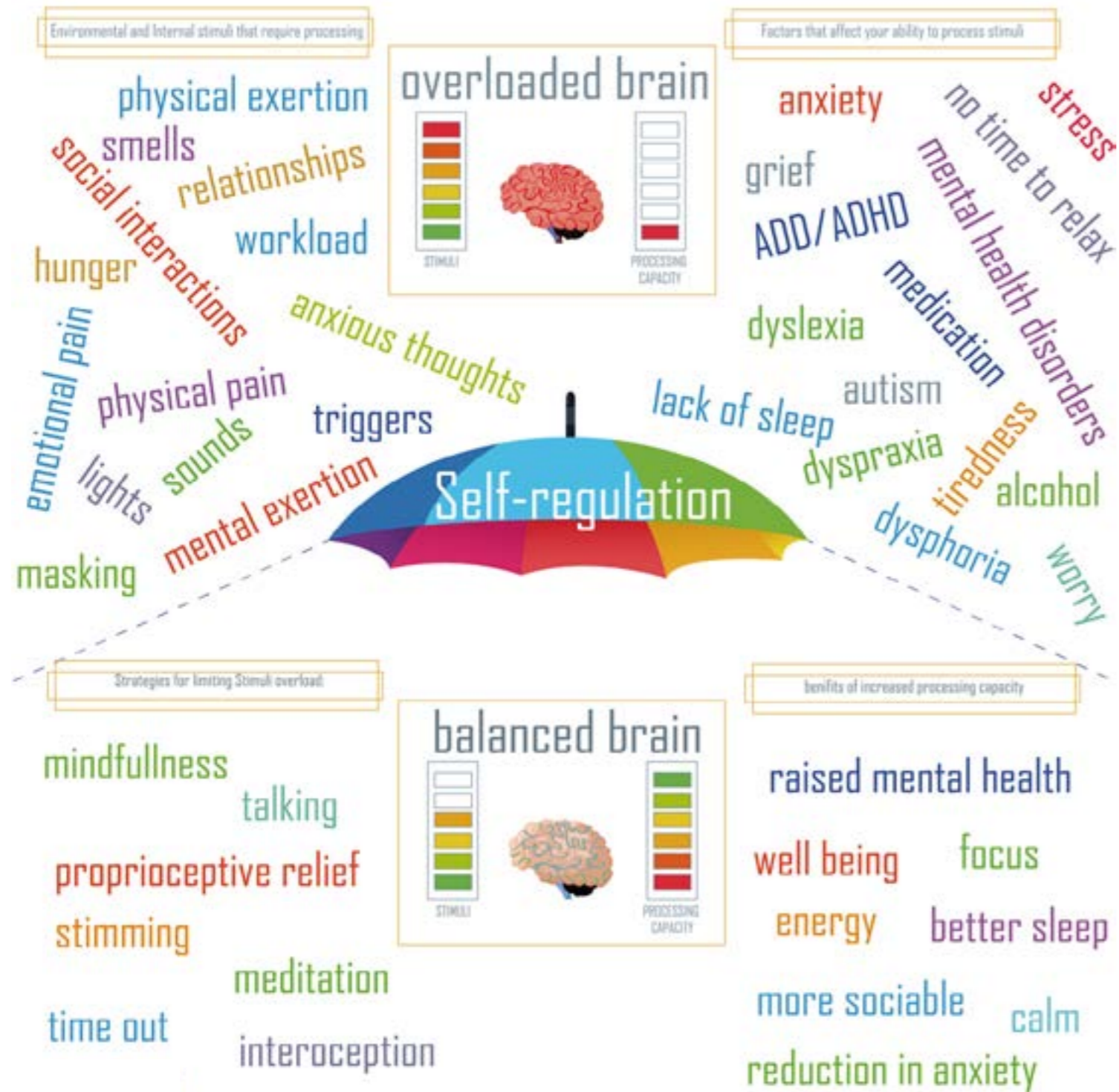
Self-regulation can present itself in many formats. Some people may choose meditation or mindfulness as an aid to increase the brain's capacity for processing, thus reducing stress.

Neuro-divergent people are known to use stimming or proprioceptive relief to help calm their minds.

These methods of stress reduction focus on improving our

own ability to process stimuli as opposed to the simple reduction of external stressors. It encourages us to self-care regularly throughout the day to keep our brains and bodies in a healthy balance.

Having explored Proprioception and Interoception last year, what I am most interested in is stimming within this project and how that can be turned into a 3D object for me to make.



Self-Regulation: Jargon Buster

From Sensory Room to Living Room

Stimming:

Is a slang term for Self-Stimulatory Behaviour. Everyone has stims that they do subconsciously, from twisting your hair to biting your nails. Some people choose to stim purposefully to help block out external stimuli. This type of stimming is generally more pronounced and obvious from hand flapping to staring into twinkly lights. Stim objects are often used to help the user enter a deeper state of relaxation. The more stimsy the object, the more external stimuli it blocks.

Triggers:

This is a term used to describe something that reminds a person of a Psychological imprint from a time in their past. These can be good or bad and can bring on a flashback state in a person that reduces their ability to process the here and now. Psychologically they are living in two times simultaneously. Triggers state can last from fractions of a second to months at a time, and can have significant impact on a persons' daily life if they have experienced trauma.

Masking:

This is a term used to describe when a person has certain behaviours that are intrinsically part of themselves but feel unable to show them in general day to day life. Neuro-divergent people often hide their behaviours and personality traits to appear more neuro-typical. Those with mental health conditions often hide their anxiety or depression. Habitual masking creates serious mental health issues, low self esteem and even post traumatic stress.

Proprioceptive relief:


This is a term used to describe deep pressure relaxation. Proprioception is your sense of where you are placed in the physical world. This sense is responsible for the good feeling you get from receiving a hug or curling up under a nice heavy duvet. Some people use weighted blankets and other deep pressure products to give them proprioceptive relief.

Interoception:

This is a term used to describe a person's ability to read their own bodily and emotional needs. Many neuro-divergent people and those living with mental health disorders are affected by reduced interoception. This can sometimes manifest as a complete inability to name emotions, this is called alexithymia. It is important for self-regulation as you can easily overload yourself if you are unable to identify your state of mind.

Dysphoria:

This is a term used to describe a feeling of sadness or disconnect with the world. People can experience dysphoria as part of mental health conditions. This can leave a person feeling disassociated and unable to focus



Is there any Science that can explain how this all works?



The Lizard

This is the most primitive part of our brain. Responsible for processing basic part of stimuli.

The Mammalian Brain

The green area is our mammalian brain. responsible for emotions and practical reasoning

The Human Brain

The yellow area is your human brain, responsible for imagination, morality, abstract thought, complex abstract reasoning.

The Triune brain theory was developed in 1960s by a Neuroscientist called Paul D MacLean. As with all theories about brain function and evolution it is impossible to know definitively if this is actually 100% accurate. But it is non the less a very interesting perspective on brain evolution and helps us understand that the brain, as an organ, has defined functions and origins.

MacLean describes the brain's evolution in three parts. Each one has its own set of identified tasks and functions.

As we evolved through time our brains became more and more complex and so new parts had to be created to move forward in evolution. The first part is described as the Lizard Brain. This is the most primitive part of our brain this is because it is an echo

from the first creatures on the earth. This part of our brain is the first thing that informs us in any given situation, particularly in stressful ones. It is your fight or flight response. This is what lots of people believe is activated through stimming. It's considered to be the root of how we can retrain ourselves to be calmer and healthier in general. For example, if we were to touch a hot pan, our lizard brain would be the first to register this stimulus, it would register it as pain and trigger your fight or flight response and left to itself would mean that you would always avoid touching pans. There is no reasoning in this part of the brain it will simply learn from its interactions as it is lacking the other two more developed brain centres. A person with a flight response may decided to never touch a pan again or a fight response might make a person destroy this and any other pan it ever sees again.

This brings us to the green area is our Mammalian brain. Next up in the evolutionary process if still very primitive. It oversees emotional thinking and prac-

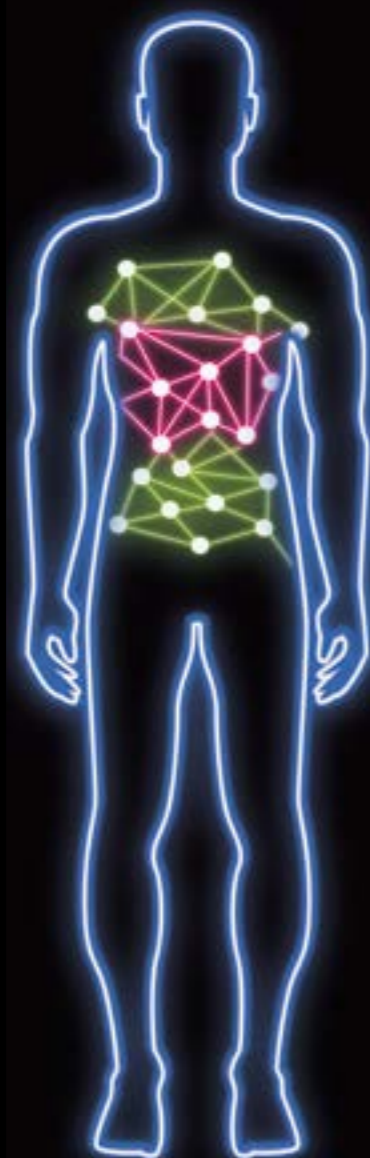
tical reasoning. This is where your habits live and are in charge, so to get through to the lizard brain, first it is important to create new habits. If we look at the hot pan example again, the Mammalian brain will be the part of your brain that registers that you should not touch a hot pan again, it understands that there is more to this situation than just the heat. It is where you learn that you should be careful of pans as it is where we process basic emotions such as fear. Habits then form from these interactions feeding into the instinctual responses of the Lizard brain.

The yellow area is your human brain, your Neocortex. It's in charge of all your human thinking like imagination, morality, abstract thought, complex abstract reasoning. So, if you touched the hot pan your human brain would invent a tool to help you not get burned. This is the part of the brain that can think of new habits and routines to feed to the mammalian brain, that will help the lizard brain be reprogrammed to be calmer and less responsive to stress.



The Id

This is what Freud described as the instinctual part of our personality.



The Ego

This is what Freud described as our emotional self.



The Super Ego

This is what Freud described as the part of our self that is in charge of our morality, and reasoning.

These terms are descriptions of different aspects of our personality that were initially introduced by Sigmund Freud.

Although some aspects of Freud's reasonings around this topic have been rebuffed by modern psychology practices, the idea that our psychological self is can be separated this way is still thought to be accurate and so important in explaining how our behaviours are managed by our minds.

The first part to look at is the Id. This is the part of your personality that is driven by instinct and impulse. Its only goal is to gain satisfaction for everything it desires. The Id is the unconscious part of the brain that is responsible for feelings like pleasure or pain. The Id is why car manufacturers spend vast amounts of time engineering the sound

of how the car door closes. The satisfaction you get from the click of a well-made button or the crunch of a freshly opened packet of crisps, that is the Id. It seeks out this sensory interaction, but they can be substituted, so the satisfaction of a crunchy salty crisp can be substituted with something of equal sensory feedback. The Id isn't fussy, but it is insatiable, that's how we don't just lose interest in life all together, it keeps us wanting and so we carry on existing and living.

The next part of our psychological self is the Ego. The term is commonly misused as meaning arrogant and self-important or selfish. That would be better description of the Id. The Ego is basically a slave to the Id. It's the Ego's job to filter through the Id's impulses so that they can be carried out in a way that is socially acceptable or be done in a timely way. For example, if the Id decided that it wants to go to sleep, but the person is at work, the Ego would then delay that response until it was a more appropriate time and place to sleep. Possibly by substituting the initial urge

with other sensory feedback, sugar drinks, food or coffee. The Ego is the part of our brain that works out the best possible way to satisfy the Id without having negative repercussions that would then negatively impact the Id.

Last on the list is the Super Ego. This is the part of our psychological self that is in charge of our morality and reasoning. The Super Ego is developed through life and is directly affected by external stimuli. Humans are not born with a Super Ego, but they begin developing one from the first interaction they have. This is why different people have different views and morals, because the Super Ego learns through interaction. Its main purpose is to manage the impulses of the body in a way that is morally acceptable or socially responsible. So for example the id may see something it wants, the Ego will work out the best way to get it in a way to avoid a negative impact on the Id, and the Super Ego will stop the person from stealing the object and consider the morality of the object.



'Brain neuroplasticity refers to the ways in which the brain is able to adapt and to change as a result of experience. Neuro refers to the communication cells of the brain, neurons. Plasticity actually means malleability or the ability to adapt. It's actually amazing the ways in which our minds completely change based on the experiences they encounter.'

("How Our Brain Neurons Can Change Over Time From Life's Experience")

The brain can be reprogrammed, it has different physical areas and also psychological areas. But how do those relate to each other? It seemed clear to me that these two sides of our brain must be linked as there are similarities between the brain areas in the biological sense and those in the psychological sense. I went on to discover this is what is known as biopsychology.

Knowing that the link exists on such a deep-rooted level, you begin to understand how neuroplasticity would work. The value of creating good habits that feed our primitive needs to help with our overall wellbeing becomes

very clear. The knowledge that you can physically change the make up of your own brain through behaviour is a big pill to swallow. But our brains are constantly changing and creating new neurons in response to how we live our lives. If we unpick this to its most basic component, what we are trying to do is feed our insatiable Id and retrain our instinctual lizard brain, they are one and the same. Know that the Id's basic need for pleasure is not measured by what is giving it pleasure but simply the sense of pleasure itself, means that the Ego and Super Ego are able to replace those initial urges with other healthier sensory ways.

For example: if a person is feeling anxious, our primitive self will be perceiving that as pain or the opposite of pleasure, this may result in negative behaviours as the Ego will attempt to quell the Id with high value sensory things like delicious food, alcohol or drugs, to name but a few. We know that those can be replaced with other sensory pleasure items of

lesser value but they will need to equal the same value in the end to eliminate the 'pain' that the Id is feeling from the anxiety. This is where our more developed/evolved sections of the brain take over, they can work out what is going to be healthy way to substitute the high value sensory pleasure items. Each person is different, and this is evident in how some people choose to relax - some people sky dive whilst others grow plants. But how can those be integrated into day to day life? You can't just go sky diving during a difficult day at work. And that is the part I am most interested in,

could stimulating regularly throughout the day help keep the Id at bay, therefore reducing stress levels?

I doubt I'll get a definitive answer on that one in this project, but I would like to use that question as the basis of what I



Stimming: What is stimming?

From Sensory Room to Living Room



TAPPING



CHEWING PEN LIDS



HAIR TWISTING



NAIL BITING

What is stimming?

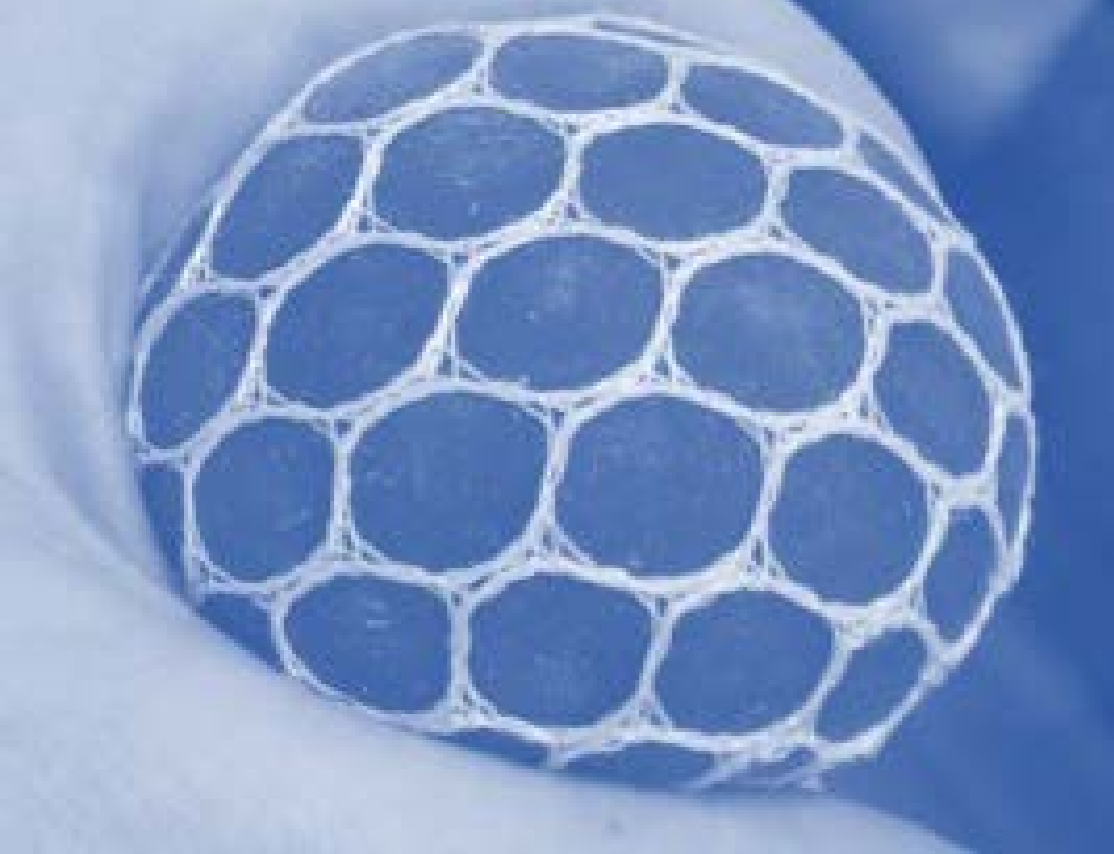
Stimming is an abbreviation of the term self-stimulatory behaviour. Most people associate stimming with autism but in fact everyone does it.

Stimming is a repetitive physical movement that people do to reduce stress.

causing it. Leaving the person feeling more relaxed as the Id is making less demands.

If we look at it in conjunction with the biopsychological principles that we looked at earlier, it is feeding the primitive part of our brains with mostly low levels of sensory pleasure. The repetition is what raises the level of satisfaction and this way helps the Id reduce the 'pain' that the anxiety is

These are often falsely viewed as nervous habits, when in fact they are a perfectly natural tool to help increase the brains capacity to process stimuli.



Stimming: What is on the market today?

From Sensory Room to Living Room

Here are some examples of stimmy objects, some you may know and some you may not.



FIDGET SPINNERS



LAVA LAMP

With a view to producing a physical object from all my research, I looked into what was on the market already.

The classic lava lamp, has a lot of stimmy aspects to it. It glows, it is colourful and has movement that is both predictable but also not in some ways. You know that the wax inside will float and move but not exactly how or when. This type of thing is very soothing as it allows the brain to focus more intensely than if it was still or entirely predictable.

They were banned from classrooms all over the UK because teacher's felt they were too distracting. The idea of a good stimmy object is to be able to do it at the same time as interacting with the world.



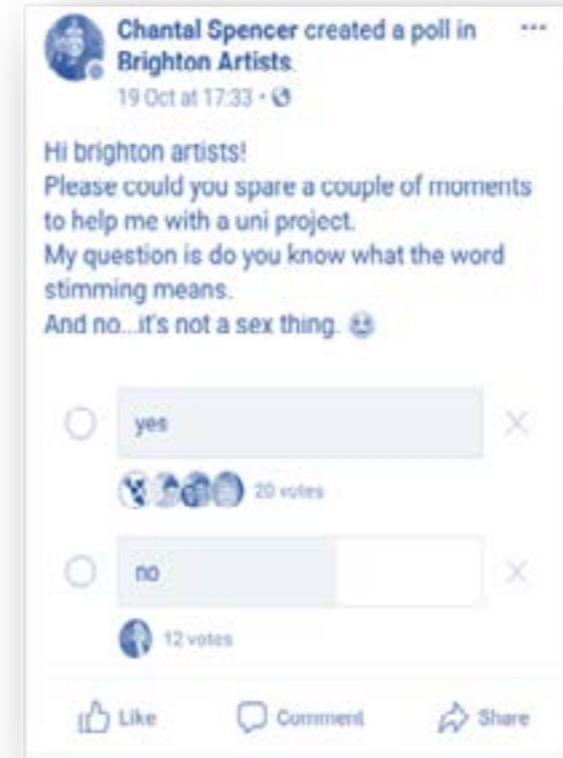
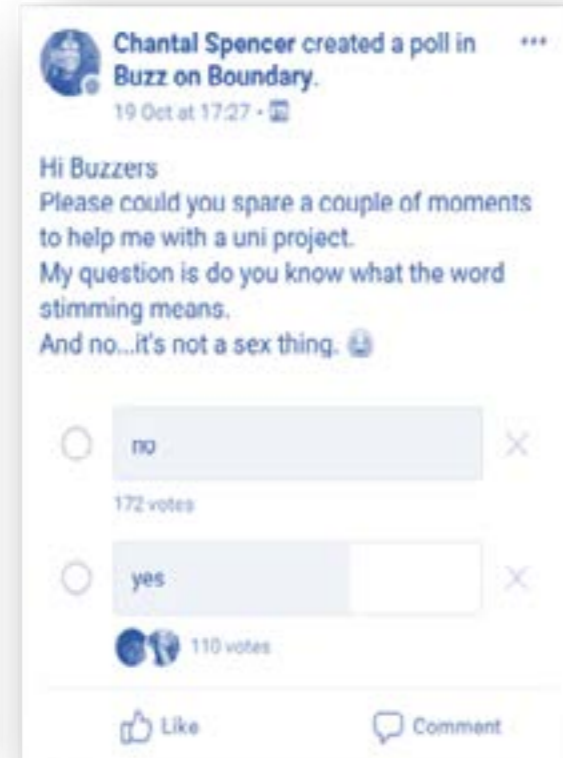
FIDGET CUBES



CHEWELERY

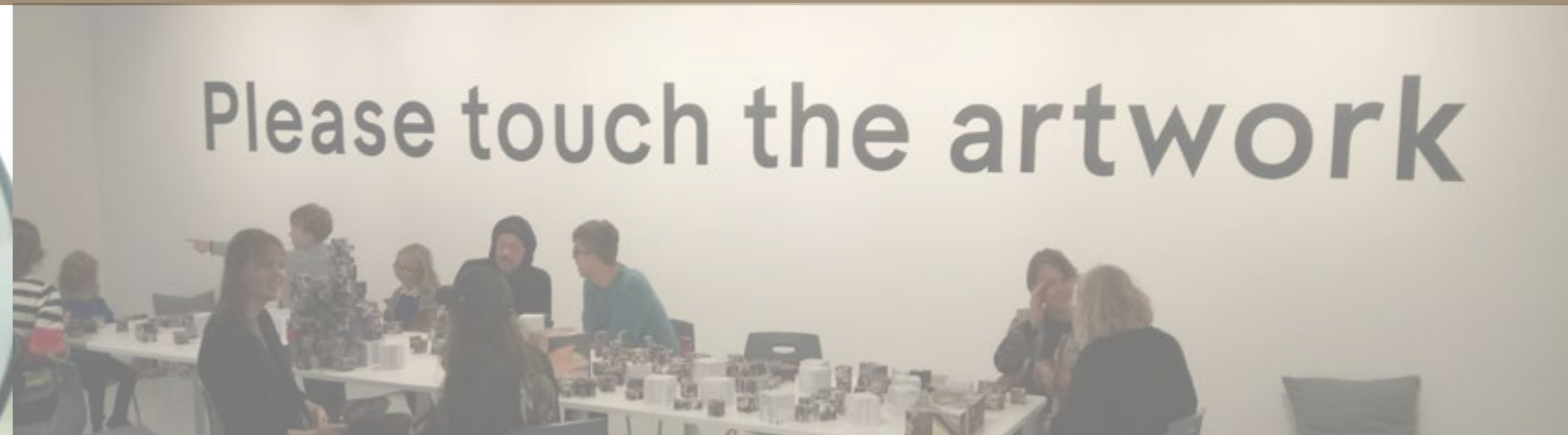
You also have fidget spinners and fidget cubes. Neither of which I think are entirely healthy as a way to stim, the sound and click can quickly turn into stimuli as the intensity of these objects is high.

Chewlery is a fairly new invention aimed at adults as well as children. These are made from food safe silicon and are designed to be chewed on as a form of stimming. as a replacement for chewing pen lids, pencils or other objects. This is a great stim toy as it does not interfere with your concentration and can be used whilst interacting with the world. They have also given some consideration to the design and not made it look like a medical object but a piece of jewellery to be proud of.



39% of people said they did know what stimming meant.
739 people participated in the polls

“I find Facebook polls a really effective way of getting a lot of people to give me an answer. As part of my design process has to involve communicating my ideas, I decided it was important to know just how commonly understood the words I was using were.”



Anna Farley's exhibition of fidget cubes

Although it was great to see artworks made by disabled artists, I was slightly disheartened by the quality of the work. The fidget cubes were scruffy and the photography on them was not particularly well done. On one

hand it is obviously a good thing to give a space to disabled artists, but I feel the artwork was lower standard than most art exhibitions would show. This is problematic for me as I'm trying to show case really good artwork in my shows that I feel help fight against stigmas that disabled people face.

The artworks were sweet, and the photos showed important life moments that were important

to tell. But I feel they would have been better told with more care and consideration given to the actual execution. The fidget cubes looked like they would not last the weeklong exhibition time as they were already falling apart, and the show had only been open a few hours.

What I did find impressive though, was the sensory items at the door, free for anyone to take

and use at the exhibition. I wish I'd have been brave enough to use them! The big space made me feel quite anxious for some reason. Also, the comfy bean bag chairs were a good addition. But more importantly, throughout the two the week exhibition, there were lots of talks on disability and the benefits system, providing some really good outreaching support.



What do objects for disabled people normally look like?... pretty ugly.

Historically, disabled people have been overlooked when it comes to fashion. There is a new movement in terms of representation in fashion for disabled people. But on the whole

when looking at what is available as therapeutic objects for disabled people there are very few designers considering the sociopsychological impact of their designs. Function over form.

When looking into alternatives for weighted blankets last year I came up with a lot of these rather ugly bland weighted jackets (see figure 3). This is not something many people would want to wear, disability doesn't negate the need to feel that our clothes make us feel good. The standard colostomy bag is an object that is for

some an intrinsic part of everyday life. Part of their identity. Rather than celebrating the diversity that we have in this world these kinds of designs create a shroud of shame and neglect the user's emotional needs.

Fig 1 shows a set of underwear that has been specifically designed for women with colostomy bags, the bag itself has a feminine design on it too. These things are more than just functional in the medical term, they function as a social voice to say that person is allowed to feel sexy and

womanly. I'm not just interested in making pretty things for pretty sake. Representation has a massive impact on everything that we are and feel about ourselves and as a designer I should be striving to tick all the boxes, not just the obvious functional ones. Clearly that bag is not going to be something that a person could afford to use every day but just like you wouldn't wear expensive lingerie everyday it is not made for that purpose.

The representation of disabled people in public spaces. The Infantilisation of disabled people.

This is still very much a problem today. For example, the sunflower lanyard fig 4 is a lanyard designed to be worn by people with invisible disabilities. It is being marketed as a product to help the disabled person but

really it so that shops can easily identify disabled people, it gives no useful information other than that. Invisible disabilities range vastly, and the needs of the people affected by them too. On top of that the issue with the sunflower design makes the whole things seem very childlike. I would not wear it. Designers need to stop using meek and childish symbols to describe disabled people.

Another example of this is at Gatwick airport, they have

recently unveiled their brand-new high tech sensory room, for autistic children. So, what does that say about autism? that it only affects children? Autism is for life, there are many more autistic adults using Gatwick airport than there are children. What they needed to create was a low sensory environment for people to calm down in. It makes me wonder why they didn't, when you need to focus on getting on a flight and all the anxieties of flying etc... the last thing an autistic adult needs is to wig out

for an hour in a sensory room. Maybe it's because it would be too well used and difficult to manage? Maybe because it's not just autistic people who need low sensory spaces? As adults we are expected to mask anything that might make other people uncomfortable at the expense of our own mental and physical health.



Award winning actress from American horror story of all the series to be a lead role in, that is certainly not for children! She's an outstanding actress and she also made history by being the first model with down syndrome to walk the catwalk at new York fashion week.



This is an image of a man protesting in 1995 against a law that made it legal to discriminate against people simply because they have a disability....



During the research for my dissertation on Universal Design in public transport, I went to visit the Brighton and Hove bus depot.

They very kindly allowed me to take Photographs of their Routemaster 1963 bus. What I was looking for were issues around accessibility. I wanted to see the bus in person as my memory of these buses was full of nostalgic emotions and I felt that they were not reliable memories to take a critical view of. The bus designs stayed almost exactly the same from the 1940's all the way to the 90's. These buses were around when WW2 had just finished and there were over 300 000 disabled veterans in the UK on top of all the other disabled people. Putting myself in their shoes helped me see

how deeply accessibility can affect not just a person but a culture. All these men and women who had fought for their country were now not even able to take the bus.

The steps turn into barriers and the lack of accessibility suddenly shouts very loudly of social class inequality and discrimination against disabled people.

These buses are a symbol of our heritage, the british red bus is iconic to all. But behind that iconography lies injustice and segregation.





The second part of my trip to the Brighton and Hove Bus depot was to take a closer look at the most modern version of the Routmaster bus.

Having some time in the bus with nobody in it meant that I could really examine every inch of it. Even from the outside of the bus there are disabled symbols and drop-down ramp for access. Within the bus there are design elements everywhere that attempt to tackle the issues that disabled bus users face. The floor has a light blue path to help those living with Dementia as dark floors can sometimes be disorientating as they could feel like holes in the ground. The hand holds are all large and white to make them easier to see and hold onto for those with phys-

ical impairments such as arthritis. The area for wheelchair users is clearly marked out and really tells a story that disabled people are not just allowed to be there but welcome and this is their area.

The fact that one of the most accessible public places in Brighton are the buses is almost counterintuitive. These are the smallest spaces; they are in a moving vehicle and they need to be cost effective as the buses need to keep their ticket prices low. This is why I felt drawn to write my dissertation on them.

From a design perspective this is a treasure trove of issues resolved and re-engineered over time.



STOP

Brighton 919

priority seat
please offer
seats to
elderly
disabled
pregnant
women
with
children

caution these seats fold up
automatically when vacated

caution these seats fold up
automatically when vacated

caution these seats fold up
automatically when vacated

used tickets

Social Media Research: Proposition Exhibition

From Sensory Room
to Living Room



My Proposition display was a way to showcase some of my social media research.

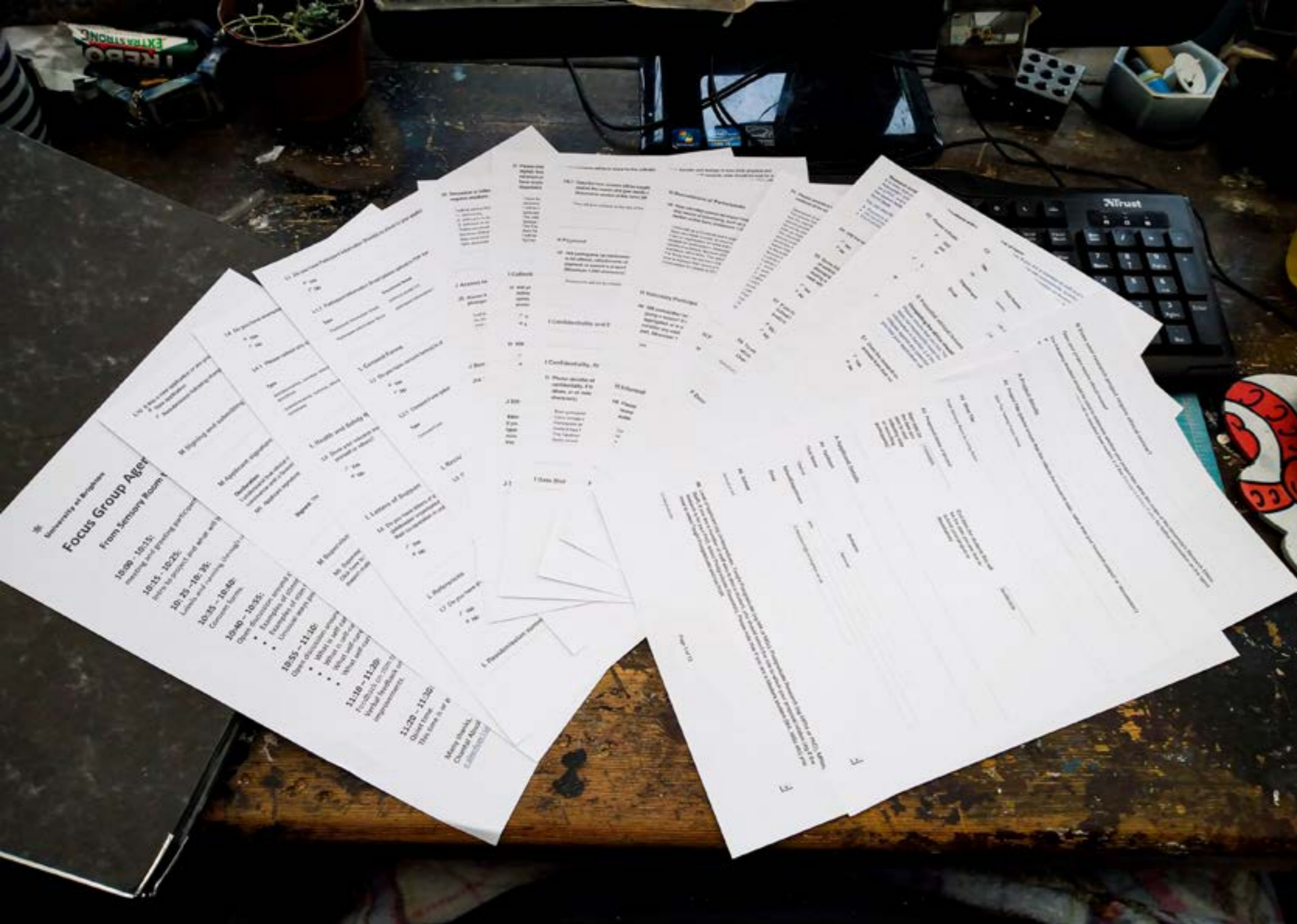
Social media, when used correctly, can be a fantastic resource for research. Over the summer months I began joining Facebook groups and liking pages of other disability advocates. For 10 months my Facebook feed taught me a huge amount about how disability affects people in their day

to day lives. This newspaper was the culmination of all of the social media posts that were relevant to my project and reproduced as a tabloid style newspaper. The aim of this was to highlight how disabled people are not represented in the media. How stories that affect disabled people are mostly hidden away in social media groups and forums specifically for disabled people.

As a designer immersing myself in the life of the people that I am designing for was a powerful tool in my arsenal. Understanding the subtle differences and challenges that connect people together and truly

understanding that every person's experience of disability is different. Even those with exactly the same condition can vary wildly in what they struggle with.

It made me want to unpick and unravel all these storylines to find the connecting thread, the pieces of the story that are the same for everyone.



Primary Research: User testing in focus group

From Sensory Room
to Living Room

The next stage in my product development was to get some user feedback.

I had arranged for a group of 10 individuals with varying needs and experience of stimming to come and participate in a focus group. Where we would primarily discuss the issue of self-care in public.

The plan was to have four questions that we would discuss as a group for 15 mins each. At the end of the 90 mins session I would ask each attendee to fill in an anonymous online questionnaire. Even though the focus group did not go ahead in the end, due to the Covid-19 National Lockdown, It was a really interesting exercise in reflection and bringing my thoughts back to the original question.

After months of working on materials, finish and electronics, I felt that it was a crucial point to evaluate where the project had gone

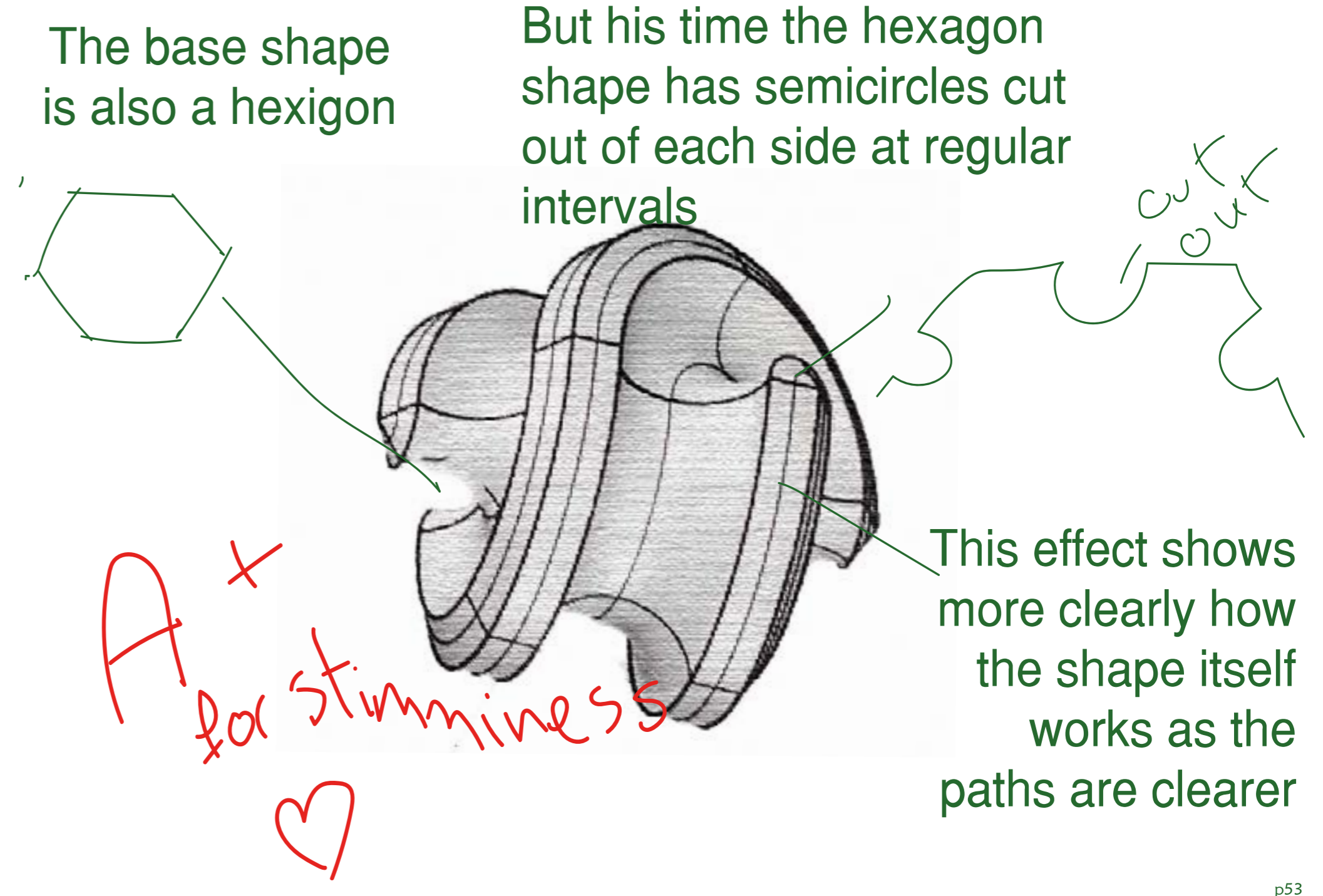
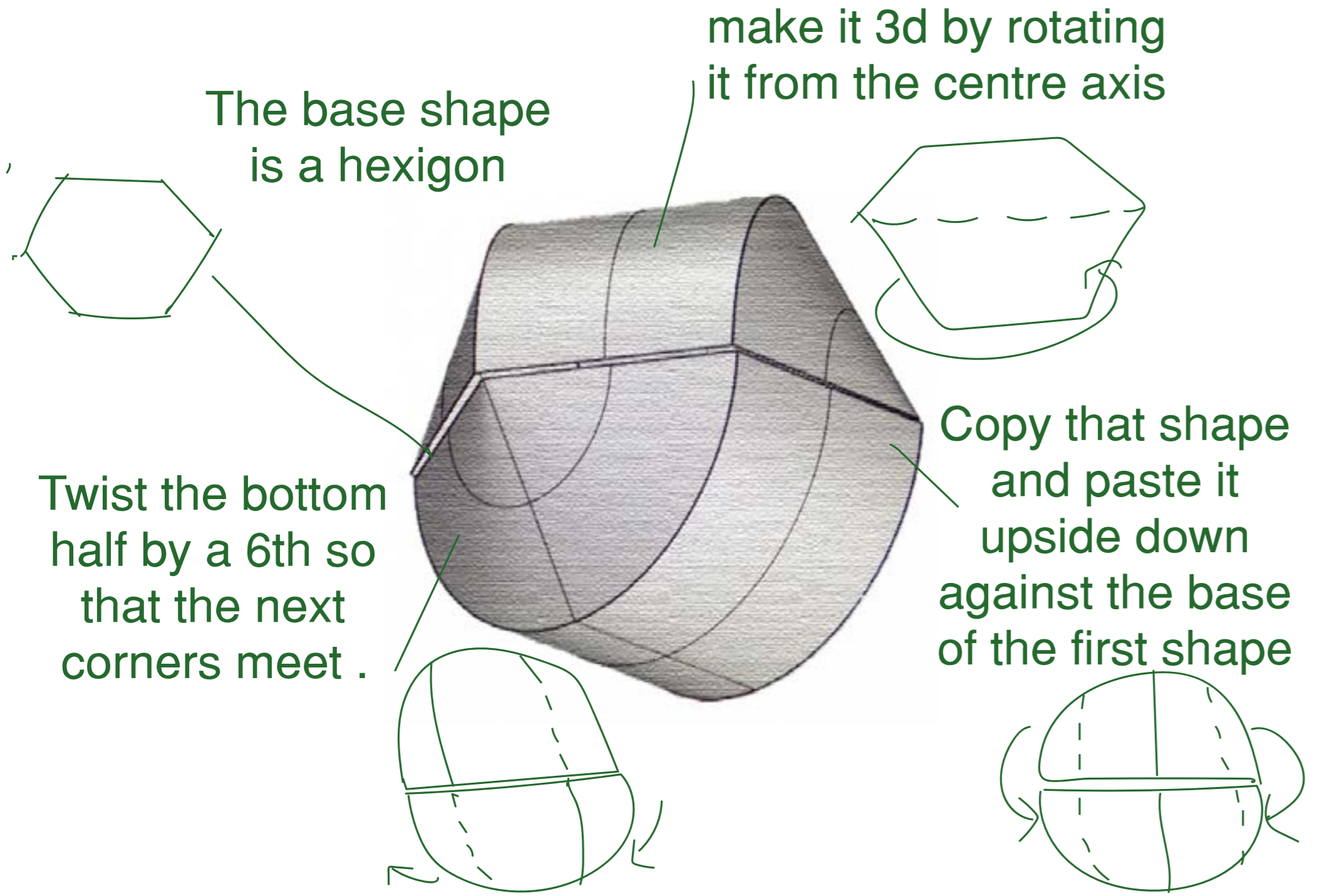
and to see if there were new goals or if things needed to be adjusted.

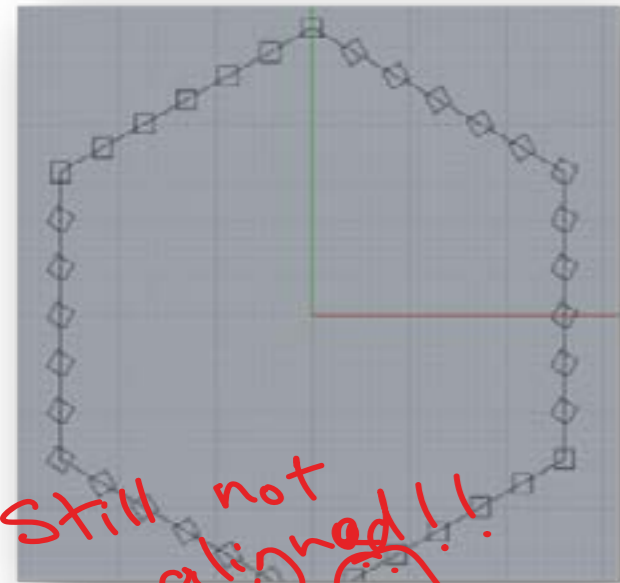
3d Modelling :Shapes and forms that are intriguing and move in an irregular way



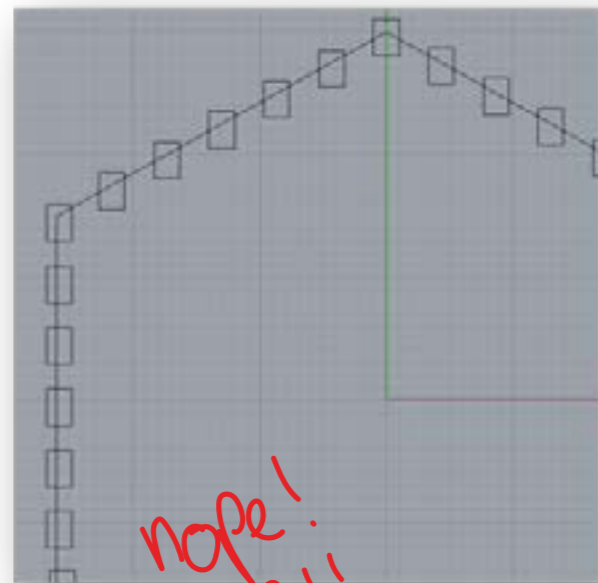
3d Modelling: OLOIDS







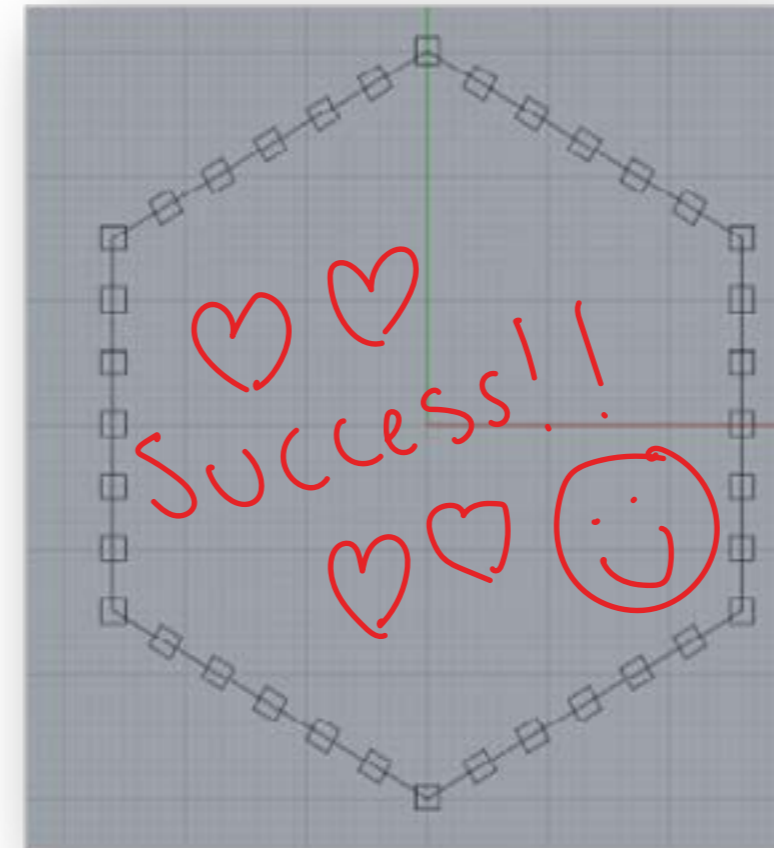
The issue with these sphericons, is that they need to be absolutely perfectly aligned.



I learned a lot about how to use different 3d modelling tools like array and mirror. If anything is even slightly off the entire shape does not work.

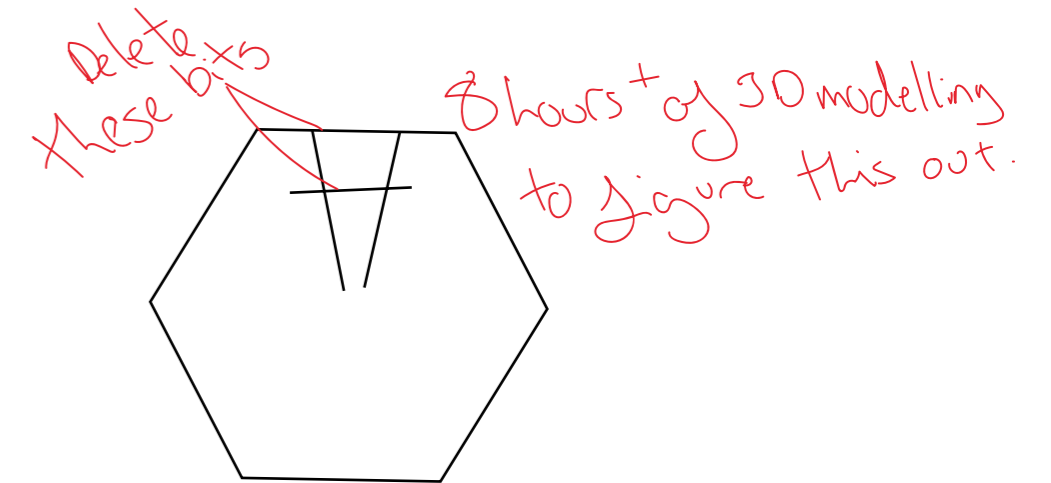


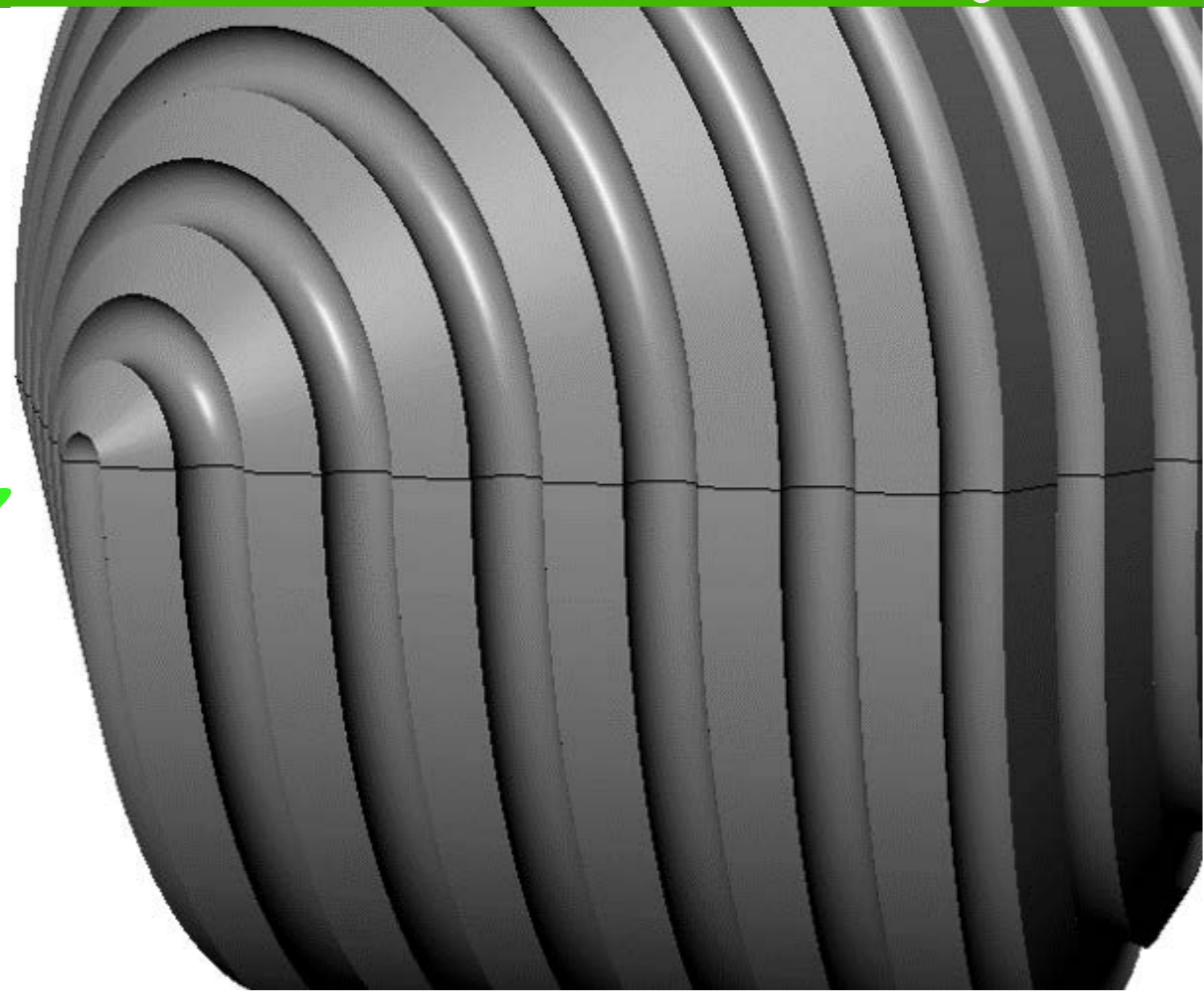
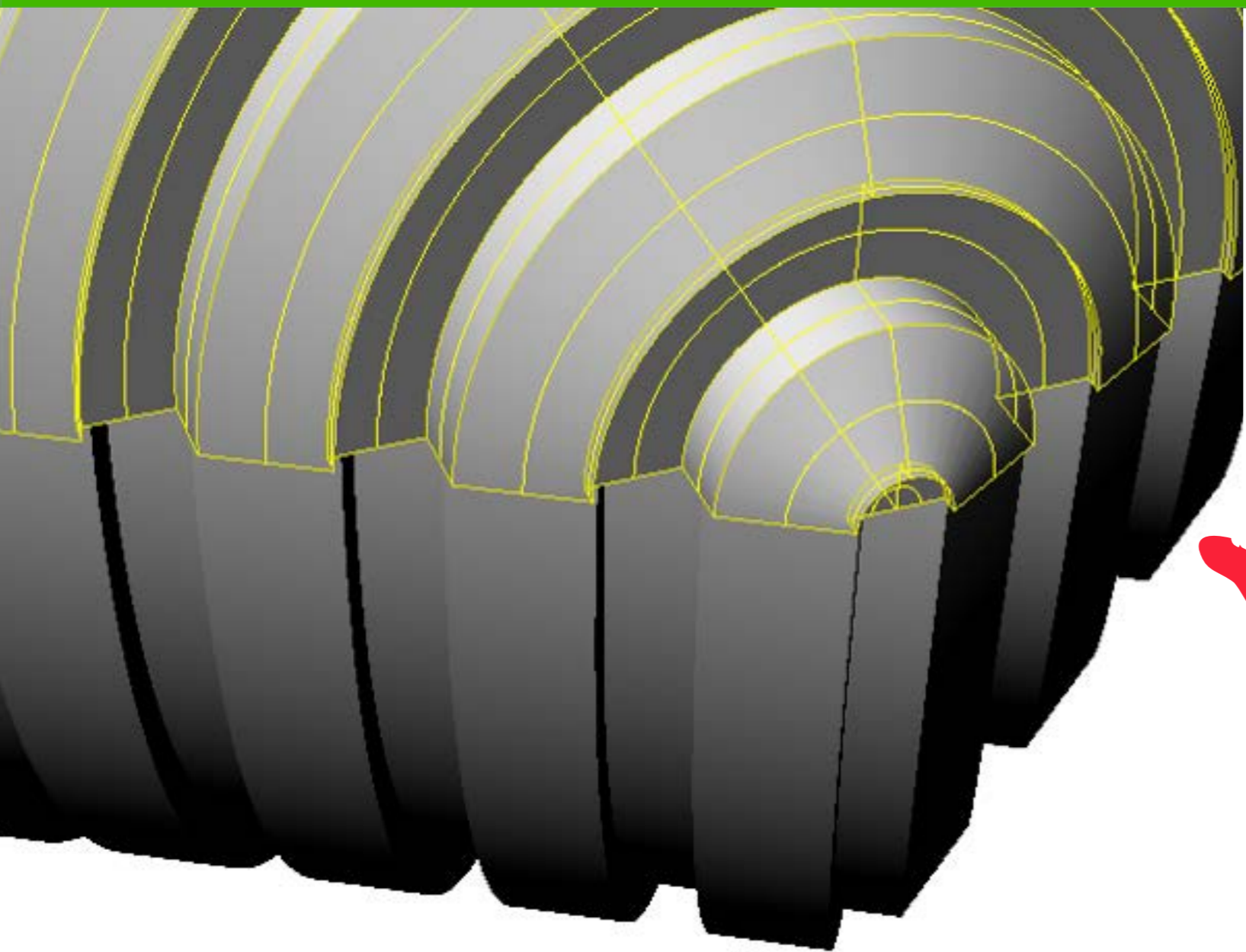
All sides and indents need to be exactly the same all the way around or when the shape is turned they will not line up.



One might ask if it is strictly necessary for the indents to have square side when the circle method works so easily.

But the challenge presented itself and I couldn't resist the urge to work out what was going wrong. It was an opportunity for me to stretch my learning and 3d modelling knowledge.









Experimenting with Materials

From Sensory Room
to Living Room



Thermoractive Colour changing pigment experiments.

Using my market research about stim toys, I wanted to find a material that was interactive in a similar way to the lava lamp. Something that changed in a slightly unpredictable way but not overly so. I felt that colour changing pigment was a great happy

medium in that it ticked that box and also added an element of control from the user. I wanted to see how well it worked in silicone as that would add another level of sensory feedback, like the squishy toy from the scope Christmas party (see page ??). Although the material was very stimmy, I felt it would work very well as a basis for a stim toy,

I didn't go ahead with using it as it didn't work with toys I designed in the end.



Experimenting with Materials

From Sensory Room
to Living Room

Olafur Eliasson uses Dichroic Film in his work.

During my search for materials to make stimmy objects I found Olafur Eliasson's work. It struck me immediately as highly sensory work and I was intrigued at how he got the rainbow reflection in his glass work.

I discovered this effect is called dichroic, and you can buy a film that can be used in casting or to stick on smooth surfaces. It is also a type of glass that can be fired and it has the same qualities of reflecting a translucent rainbow type colour.





Experimenting with Materials

From Sensory Room
to Living Room

Olafur Eliasson plays with refraction using globes.

I was also taken by the way that Olafur played with the refraction of the clear glass globes. This made me want to see how one might be able to down-size that effect into something hand sized. I used it in combination with the dichroic film, folded and

shaped differently in each globe to see how that affect the light that passed over it. I absolutely loved this effect, in fact through the whole project i often found myself holding these in my hands and just taking some time out of the world.





Experimenting with Materials: using resin as a casting material

From Sensory Room
to Living Room

Not all resins are made equal....

The decision to make the items out of resin came from two places. One the shapes themselves that I had developed would be very difficult to build by hand as it required absolute precision. The type of precision that can only be achieved by a mould. I could have just 3D printed the objects but the lightness of the 3d prints was off putting and it soon became clear that the elements would be embedded in the main body of the objects so 3d printing was off the cards and resin was in.

Number 2 I have always had a fascination with resin and wanted to expand on the idea of using the ocular effects that rounded clear resin would create.

I spent a significant amount of time working through problem after problem. Halfway through the project I changed resin and that brought me back to square one. Attempt after attempt to fix issues around shrinking and bubbles. When I finally found the right method though, the resin really worked. The finish was superb, the weight of the object was nice and satisfying.

I believe my love affair with resin has come to an end...

The guilt of using such a toxic substance was constantly nagging at me, hindering my ability to just experiment without worry. Every time a test failed, I felt it was another blight on the planet that won't ever disappear. The resin gave me headaches and made my chest hurt too. I made a firm decision with myself that I had learned all that I really wanted to about this material, and I would think very carefully about using it again.



Experimenting with Materials: alcohol ink in resin

From Sensory Room to Living Room

How do I make a handheld Lava Lamp?

The idea wasn't ever to make a hand help lava lamp in the literal sense. What I was aiming to achieve was something that had the same visual qualities and language as one. That could be kept in a pocket or on a desk and used discretely for a bit of stimming. This led me to discover Alcohol Inks in resin.

There is a particular method of applying alcohol ink to uncured resin that will result in an amazing

droplet texture (see figure to the right).

To achieve this effect, you drop the ink colour into the resin once it has been catalysed and poured into the mould. Then you apply the opaque white ink drops over the top of the coloured ink droplets and the weight of it makes the coloured ink opaque and pulls it down slowly through the curing resin.

The effect is magical and looks great. But it is extremely temperamental.

A slight change in ambient temperature and the resin will be either firmer or thinner and the ink will either not penetrate at all or sink all the way through and out of the bottom. Leaving a sticky mess. I did several timed tests to see if there was a particular amount of time it could be left to cure before dropping the ink, but there were so many variables that it was impractical to use as a method of construction. Especially for objects that relied on their absolute precision. This was a really fun process though and when it went right it was really captivating.



Experimenting with Materials: Strength test for neodymium magnets

From Sensory Room
to Living Room



Neodymium magnets... So cool, they're dangerous.

There was a lot of opportunities for learning involved with these little monsters. First was discovering that they are not only dangerous to swallow due to the fact that they could try to connect in your bowel and perforate it, but also that if swallowed they will burn your insides and potentially cause death. This news brought about the first re-structor of the design of my toys, the mag-

nets that were to be used as a way to attach to two sides together in a way that could be seperated and brought back together easily without and external fittings.

This meant they had to be embedded into the actual resin itself to keep them from coming unstuck and injuring someone. This in itself birthed even more learning opportunities. After 6 attempts to get the little monsters into the holes, I discovered that because they were too close to each other, they were flipping inside their holes and then were the incorrect polarity. They needed to be all in the same direction.

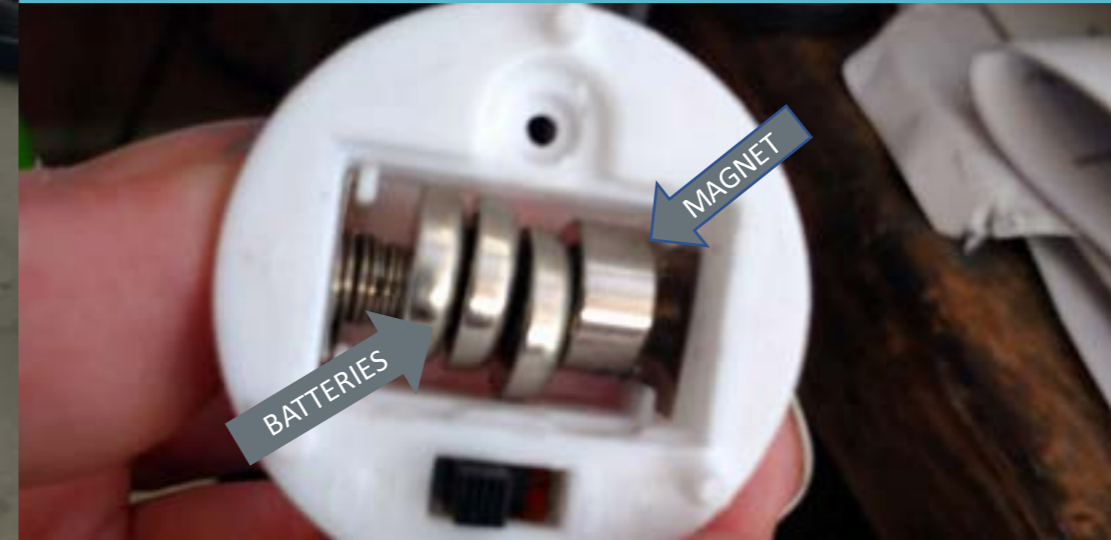
All in all, they were worth all the effort, they worked really well and gave a satisfying clunk to the connection of the two halves.

fig 1,2 and 3 are tests to see the strength of the magnets with adifferent thicknesses of material between them.



Experimenting with Materials: are neodymium magnets conductive?

From Sensory Room
to Living Room

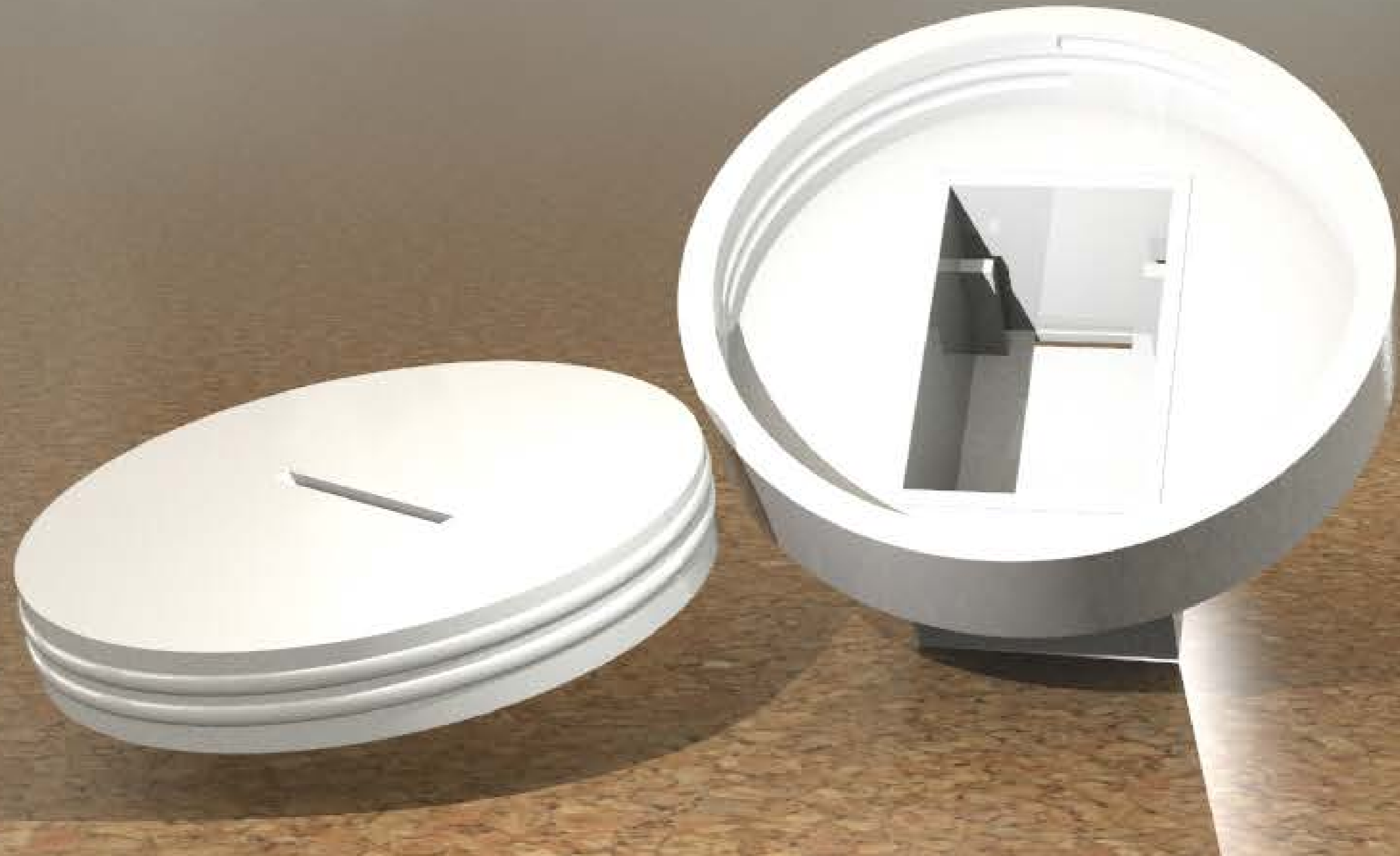


The inevitable moment came where I decided to make things even more complicated for myself and introduce electronics.

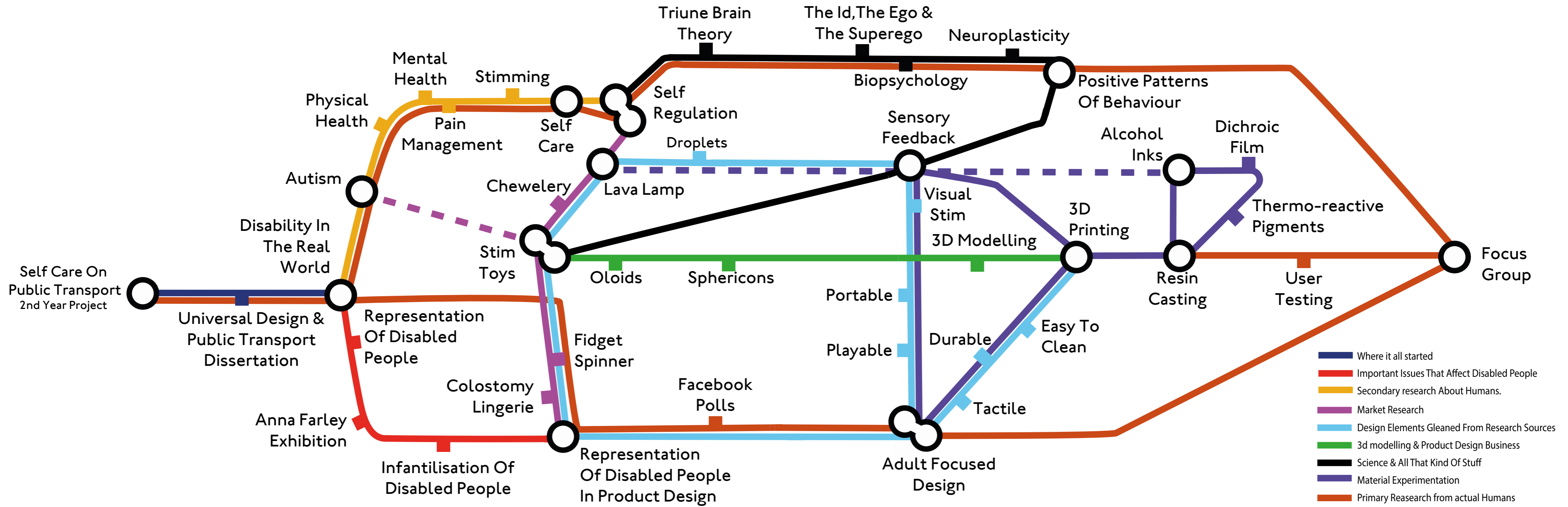
This experiment was to check the conductivity of the magnets that would be used to hold the two pieces together.

This test showed me that it would be possible to create a light up Spherion, which could be turned on and off by simply turning, since only half of the magnets would be connected to the circuit.

And it worked! Now on to Designing the battery pack!







- Where it all started
- Important Issues That Affect Disabled People
- Secondary research About Humans.
- Market Research
- Design Elements Gleaned From Research Sources
- 3d modelling & Product Design Business
- Science & All That Kind Of Stuff
- Material Experimentation
- Primary Research from actual Humans

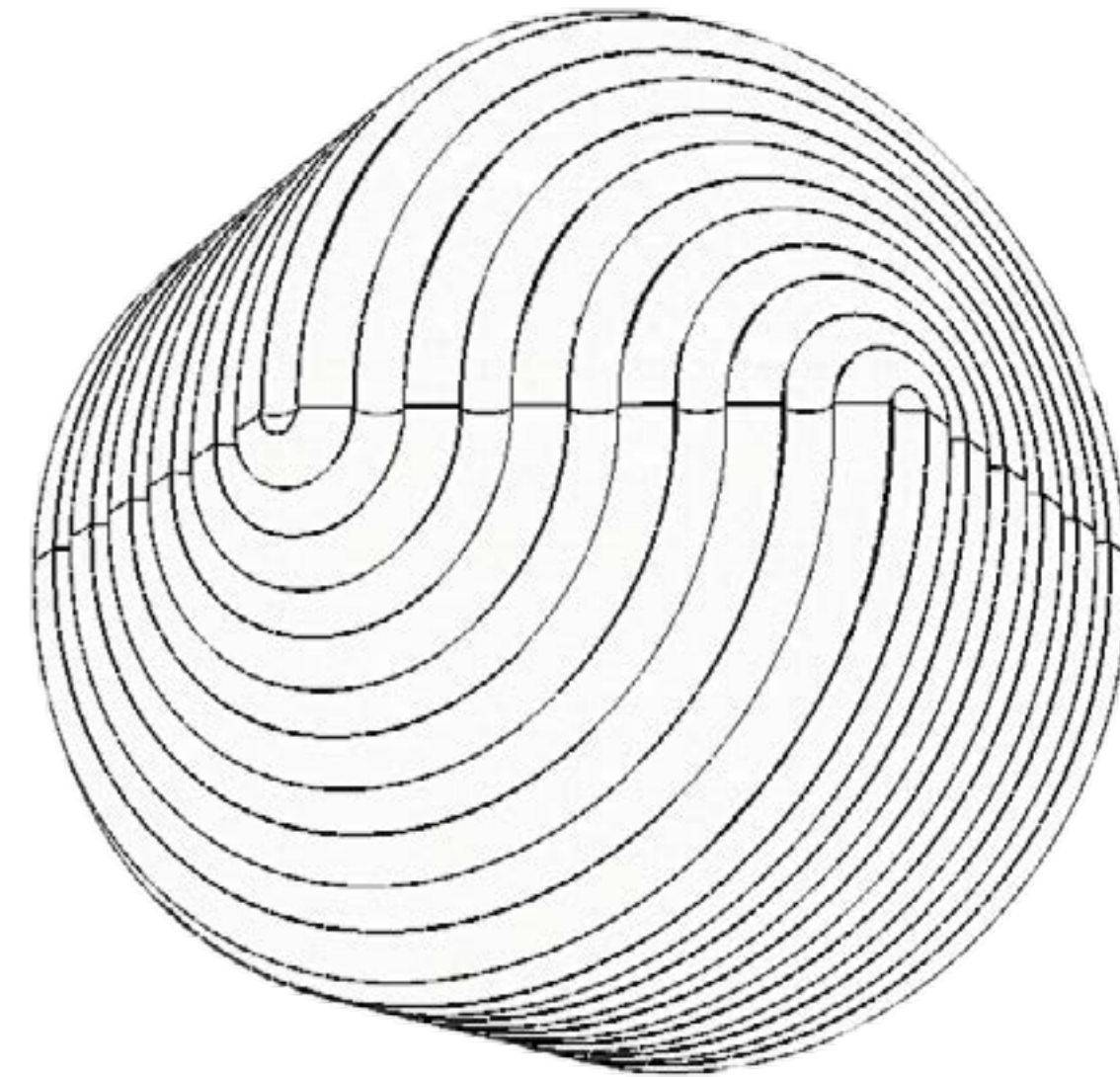
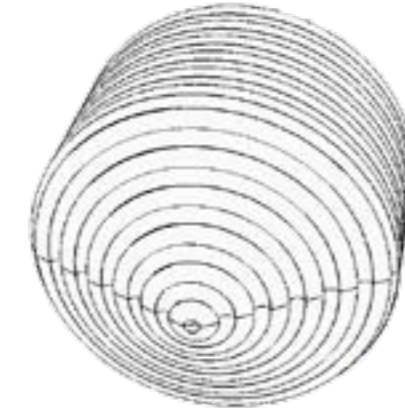
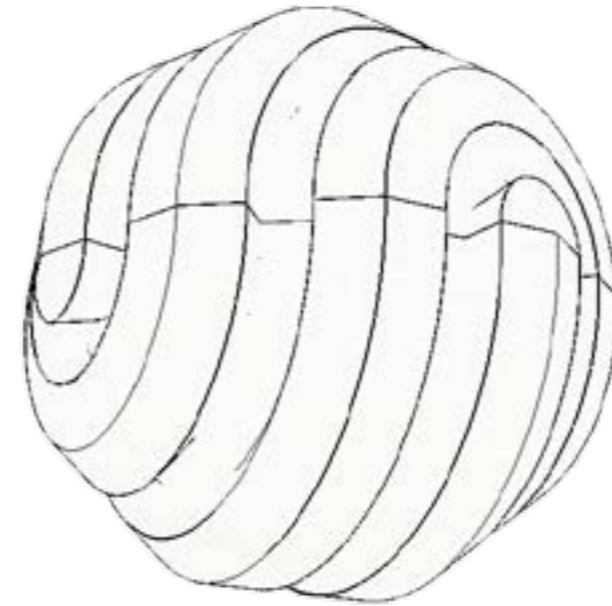


So that was my journey... I turned over every rock and peaked in every crack.

I think the most important thing I learned from this project is how many different ways you can access information. My theoretical research helped to

underpin my work and give it some well documented scientific evidence. Whilst my social media and primary research allowed me to move past the textbooks and see what it actually means to be disabled for an individual. That brought me to delving deeper into the Psychosocial aspects of design, not only for stim toys but for a broad range of objects and spaces, from buses to lingerie.

I found the thread that I was looking for, the thread that links us all together. Self-regulation is something every human on the planet has to do, regardless of age gender or disability. Therefore, I feel that I reached the goal I had set for myself. To create a useful object to be enjoyed by all as well as help maintain and manage people's sensory health. Now that I have a really good understanding of Neuroplasticity and the way in which our minds can be reprogrammed to create healthier day to day coping mechanism, I look forward to continuing designing with those principals in mind.





List of illustrations and image sources

From Sensory Room to Living Room

- p4..... Blue 6-sided Sphericon designed by Author. University of Brighton. Personal Photograph by Author 18 Mar 2020.
- p6..... Initial research plan laid out in the style of a London tube map. Illustration by Author 01 May 2020.
- p8..... Blue 6-sided Sphericon designed by Author. University of Brighton. Personal Photograph by Author 18 Mar 2020.
- p9..... Balanced brain vs overloaded brain. Illustration by Author 12 Dec 2019.
- p10..... How the brains processing capacity can be impacted. Illustration by Author 12 Dec 2019.
- p12..... People affected by invisible conditions. Illustration by Author 12 Dec 2019.
- p14..... Self-regulation diagram #1. Illustration by Author 12 Dec 2019.
- p16..... Self- regulation diagram #2. Illustration by Author 12 Dec 2019.
- p19..... 2nd year project on Sound reactive speech therapy light designed by Author. University of Brighton. Personal Photograph by Author 18 Mar 2019.
- p20..... The triune brain theory. Illustration by Author 01 Apr 2020.
- p22..... The Id, the Ego and the Super Ego. Illustration by Author 01 Apr 2020.
- p24..... Neuroplasticity. Illustration by author 01 Apr 2020.
- p26..... 8 sided red Sphericon design and made by Author.
- p28 Fig 1-4 : Stock Photos, Royalty-Free Images, Graphics, Vectors & Videos. Adobe Stock. N.p., 2020. Web. 11 Oct. 2019.
- p30 Commercial Stim toy at Scope Christmas party. Possability House Brighton and Hove. Personal Photograph by Author 18 Dec 2019.
- p31 Photographs of stim toys from online retailers:
1. Branded Promotional Fidget Spinner - Totally Branded. Totally Branded. N.p., 2020. Web. 11 Oct. 2019.
 2. Lava Lite 1953 11-1/2-Inch 12-Ounce Accent Lava Lamp With Silver Base, White Wax/Blue Liquid | Best Buy Canada. Bestbuy.ca. N.p.,2020. Web. 11 Oct. 2019.
 3. Fidget Cube Toy White And Black. SkillToyz. N.p., 2020. Web. 11 Oct. 2019.
 4. <https://www.amazon.com/Chewelry-Boys-Girls-Necklace-Chewlery/dp/B0799QPHV9>
- p34..... Anna Farley Exhibition. The Phoenix art gallery, Brighton. Personal Photograph by Author 22 Oct 2019.
- p35..... Anna Farley Exhibition. The Phoenix art gallery, Brighton. Personal Photograph by Author 22 Oct 2019.
- P36..... Photographs from online retailers:
1. Tucker, Emma. Stephanie Monty Designs Colostomy Bag For Intimate Moments. Dezeen. N.p., 2020. Web. 11 Oct. 2019.
 2. <https://www.amazon.com/8531-Colostomy-Drainable-Ultraclear-Hollister/dp/B00F4JMLCC>
 3. Vests, Weighted. Weighted Vests | Enabling Devices. Enabling Devices. N.p., 2020. Web. 11 Oct. 2019.
- P37 Photographs from online source:
1. Sunflower Lanyard, ID Card and Clear Wallet. Hiddendisabilitiesstore.com. N.p., 2020. Web. 11 Oct. 2019.
 2. Gatwick, The First UK Airport To Open Passenger Sensory Room. Gatwick Airport. N.p., 2020. Web. 11 Oct. 2019.
- P38..... Brian Arch/Stringer/Getty Images. Jamie Brewer actress and first ever model with Downs Syndrome walking the catwalk at New York Fashion Week.2015. Photograph. www.independent.co.uk.
- P39..... Unknown Artist. Disability Rights Activist protesting about representation of disabled people in London.1995.BBC news archives.
- p40..... View of upper deck of a 1965 Routemaster bus, Brighton and Hove Bus depot. Personal photograph by Author.01 Nov 2019.
- p41..... View twisting steps to upper deck of a 1965 Routemaster bus, Brighton and Hove Bus depot. Personal photograph by Author.01 Nov 2019.
- p42..... View of wheelchair area on a 2017 Routemaster bus, Brighton and Hove Bus depot. Personal photograph by Author.01 Nov 2019.
- p44..... View of main walkway with light flooring and high-backed chairs on a 2017 Routemaster bus, Brighton and Hove Bus depot. Personal photograph by Author.01 Nov 2019.
- p46..... Display of authors work: propositions, University of Brighton. Personal photograph by Author 15 Oct 2019.
- p48..... Ethics proposal papers written by Author, on a desk, Brighton. Personal photograph by Author 05 May 2019.
- p50..... Green 3d printed Sphericons designed by Author. University of Brighton. Personal photograph by Author 01 Jan 2020.
- p52..... Green 3d printed Oloids designed by Author. University of Brighton. Personal photograph by Author 01 Jan 2020.
- p58..... Close up rendering of digital work created by Author. University of Brighton. Personal photograph by Author 15 Dec 2019.
- p60..... 8 sided red Sphericon designed by author, in two different positions. University of Brighton. Personal photograph by Author 18 Mar 2020.
- p62..... Thermoactivated sheet of silicone stretched over an embroidery hoop by Author. University of Brighton. Personal photograph by Author 05 Jan 2020.
- p63..... Sequence of Photographs of thermoactivated pigment in silicone shapes by Author. University of Brighton. Personal Photographs by Author 10 Jan 2020.
- p64..... Dichroic film in resin handheld objects my by Author. University of Brighton. Personal photograph by author. 20 Jan 2020.
- p65..... Ólafur Eliason. Flatland Light, 2018, Colour-effect filter glass (red, green), stainless steel, fluorescent light, ballast, paint (black), cable.
- P66..... Semi globes of resin with dichroic film inserts created by Author. University of Brighton. Personal Photographs by Author 10 Jan 2020.
- P67..... Ólafur Eliason. Renaissance echoes, 2018, Glass spheres, silver, paint (black, white), stainless steel.
- P68..... Several disks of resin with alcohol ink pigment colours made by Author. University of Brighton. Personal photograph by Author 18 Mar 2020.
- P70..... Disk of resin with alcohol ink pigment colours made by Author. University of Brighton. Personal photograph by Author 18 Feb 2020.
- P72..... Neodymium magnets being inserted into blue resin Sphericon by Author. University of Brighton. Personal Photograph by Author 20 Jan 2020.
- P73..... Neodymium magnet strength tests by Author. University of Brighton. Personal Photographs by Author 10 Jan 2020.
- P74..... Neodymium magnets arranged on a metal ruler by Author. University of Brighton. Personal Photograph by Author 10 Jan 2020.
- P76..... Digital 3D render of battery pack designed by Author. University of Brighton. Personal Photograph by Author 10 Feb 2020.
- P78..... Sequence of images of red resign Sphericon designed by Author, being used by a person. University of Brighton. Personal Photograph by Author 19 Mar 2020.
- P80..... Research framework Plan in the style of a London underground. Illustration by Author 01 May 2020.
- P82..... Line drawings of Sphericons designed by Author. Illustrations by Author 09 May 2020.
- P84..... Image of final day before the Coronavirus lockdown occurred, all 3d work made so far. University of Brighton. Personal Photograph by Author 18 March 2020.

Bibliography

From Sensory Room to Living Room

Abernethy, Laura. "You Don't Look Sick: 'I Thought Only Old People Got Arthritis, until I Was Diagnosed at 28'." 2019. Web. 05/05/2019 2019.

Activist, True. "Mindfulness and Meditation Will Now Be Part of the Curriculum in 370 Schools in England." 2019. Web. 06/06/2019 2019.

Castaneda, Carlos. The Teachings of Don Juan: A Yaqui Way of Knowledge. New York: Pocket Books, 1974.

Freud, Sigmund, and James Strachey. The Ego and the Id. New York: Norton, 1962. Print.

Healthline. 2020. What Is Stimming and How Can It Be Managed? [online] Available at: <<https://www.healthline.com/health/autism/stimming>> [Accessed 9 October 2019]

How Our Brain Neurons Can Change Over Time From Life's Experience. Verywell Mind. N.p., 2020. Web. 11 May 2020.

ITV. "Bristol Woman Campaigns to Raise Awareness of Link between Anorexia and Autism." ITV NEWS (2019). Web.

MacLean, Paul D. The Triune Brain in Evolution: Role in Paleocerebral Functions. New York: Plenum Press, 1990. Print.

Mumma, Autistic Pride. "Autism and Spoon Theory. Am I the Only One Who Wonders This?" AUTISM AND SPOON THEORY. Am I the only one who wonders this?? 2019. Print.

Neurodiversity, Supporting and Celebrating. "Understanding Different Categories for Expression of Difference - Co Occurring Conditions." Web. 24/12/2018 2019.

Ph.D., Seth J Gillham."21 common reactions to trauma" Think.Act.Be. 2016. Web. 22/06/2019. web.

Phillipa, Aldrich. "Future Perfect, N Design Labels for an Ageing Society." Housing and learning improvement network (2013). Web.

Planetmclulu. "Living with Dp/Dr." I've been suffering from dpdr for over 3 years now and i want people to know what it's like (10 comics) (2019). Web. 06/06/2019.

Porges, Stephen W. The Polyvagal Theory: Neurophysiological Foundations of Emotions, Attachment, Communication, and Self-Regulation. New York: W.W. Norton, 2011. Print.

Porges, Stephen W, and Deb Dana. Clinical Applications of the Polyvagal Theory: The Emergence of Polyvagal-Informed Therapies., 2018. Print.

Pullin, Graham. Design Meets Disability. Cambridge, Mass: MIT Press, 2009 Print

Purser, Ronald. "The Mindfulness Conspiracy." Life and Style. The Guardian 2019. Web. 23/06/2019 2019.

Quincy. "Autism, Education, Myths and Misconceptions." An Autistic speaks about living with autism 2019. Web.

Rahim, Zamira. "Woman with Mental Age of a Child Must Have an Abortion against Her Will, Court Rules." Home news. 2019. Web. 22/06/2019 2019.

Sittabey, Shola. "No Body's Perfect with Rankin and Alison Lapper." No Body's Perfect with Rankin and Alison Lapper, BBC4, 10 Nov. 2016.

UK Crohn's and Colitis. "M&S shows its guts with new accessible toilet signs." 2019. web. 11/02/2019

Wanshal, Elyse." pink Says She gets link between anxiety and suicide and offers solid advice" Entertainment-Huffington Post. 2019.Web. 26/04/2019 2019