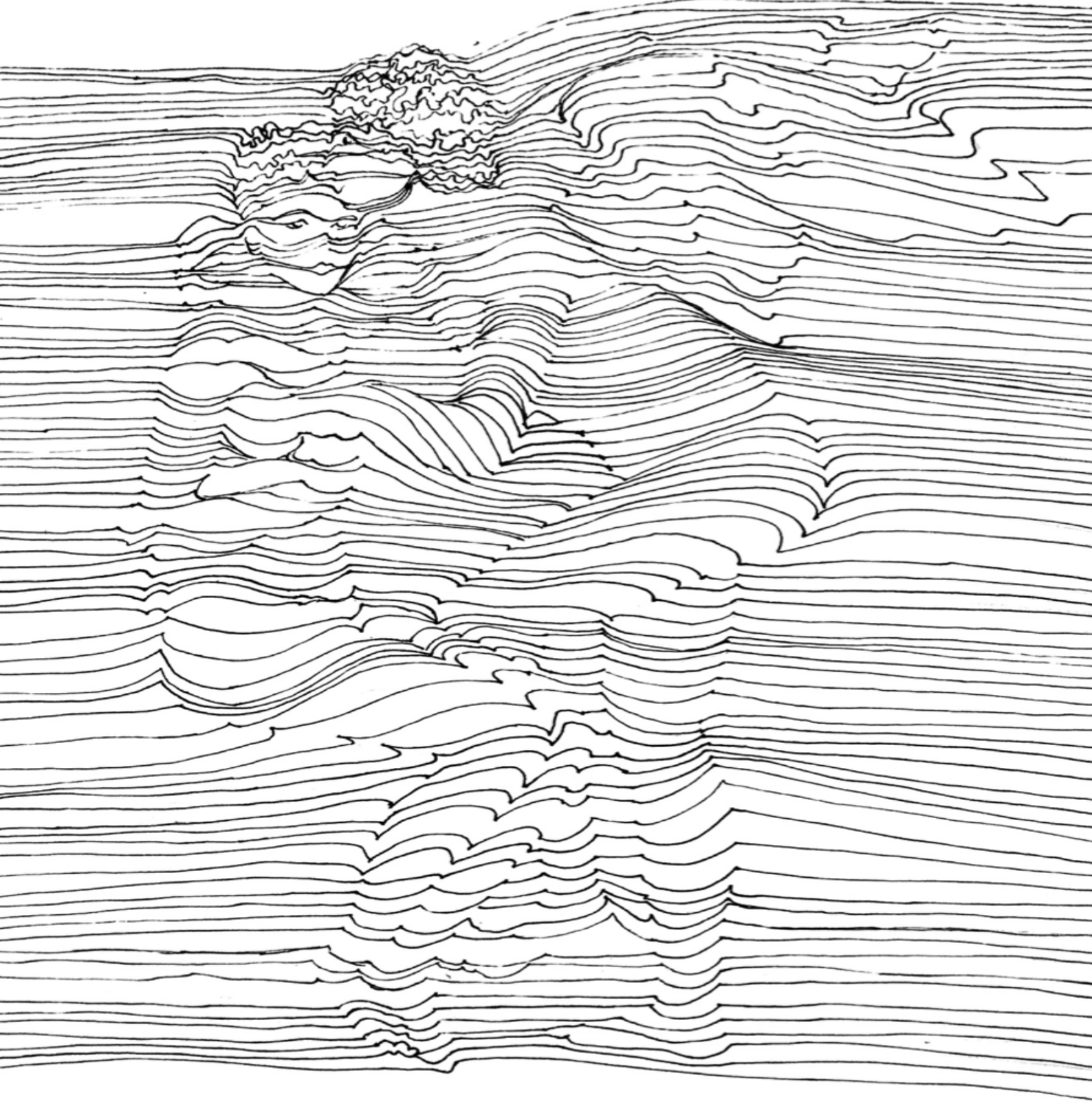

MAZE

ISSUE 10

MAZE

MAZE is a student-run Psychology and Neuroscience magazine of the University of St Andrews. It is published twice a year and editions are available online and in print.

Each issue of MAZE centers around a specific theme within Psychology and/or Neuroscience and features submissions that range from opinion pieces to interviews.

MAZE offers students a chance to further their interests in Psychology and Neuroscience, get involved in writing and engage with the other individuals in the field.

TEAM

President
Madeleine Thursfield

Neuroscience Editor
Emma Ritson

Events
Laura Edy

Editors
Ella Kicks
Natalia Zdorovtsova
Eliska Klimentova
Niki Davies

Treasurer
Petra Palinko

Designer
Madeleine Thursfield

Cover Art
Andrea Yunez-Cunningham

Contact us and find out more at:
Website: https://mazewp.st-andrews.ac.uk/
Facebook page: @MAZEnewsletter
Email: mazemag@st-andrews.ac.uk

ISSUE 10

The theme of this issue is on the Psychology and Neuroscience of Art. I am very excited about this issue because of the interpretative nature of theme. As is reflected in this issue, this theme covers a number of topics from how we can study art from a psychological perspective, the way art can be used as a way to express experiences with mental illnesses to questioning the boundaries between art and science. In whatever form art takes, art is integral to the human experience and building this issue around this concept has been a joy.

Along with articles on the Psychology and Neuroscience of art, there are fantastic pieces including an interview with a professor in parapsychology to insights into what is happening within Neuroscience in St Andrews.

A huge thank you goes to Keith Sillar and the School of Psychology and Neuroscience for supporting MAZE through the years, those who have submitted pieces for the magazine and the MAZE team who, with their commitment and hard work, have put this issue together.

Madeleine Thursfield

“A work of art is above all an adventure of the mind” Eugene Lonesco

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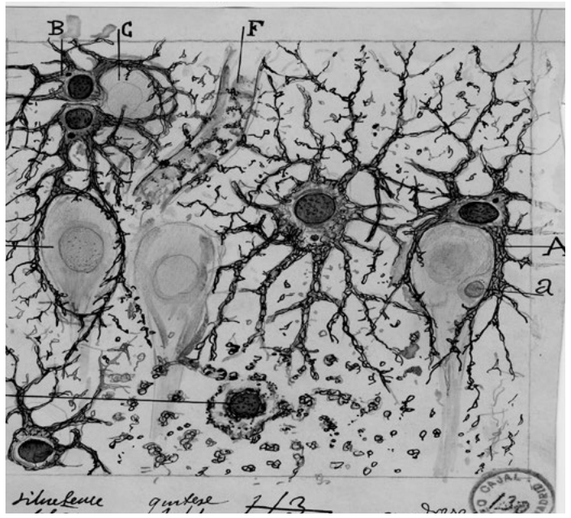
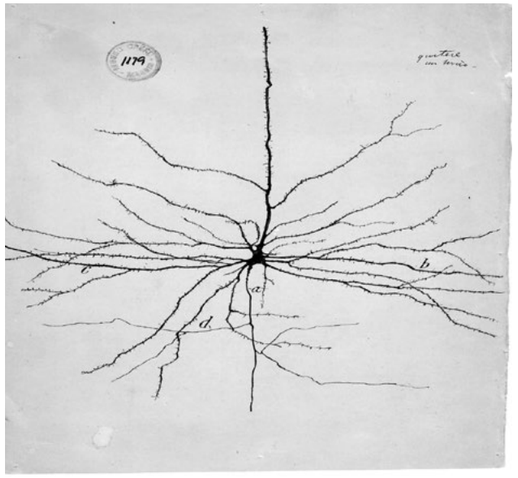
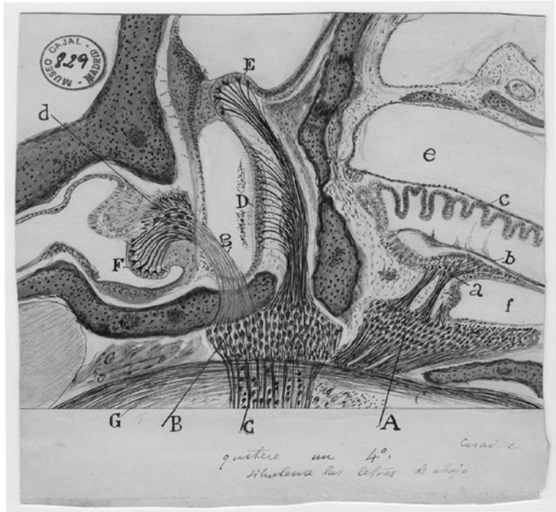


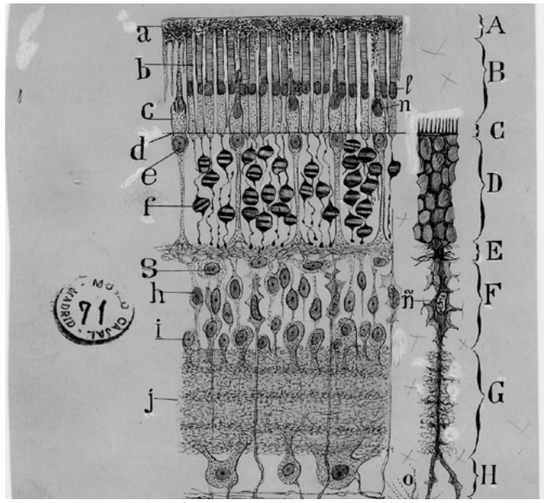
Astrocytes in the hippocampus of the human brain



The pyramidal neuron of the cerebal cortex



The labyrinth of the inner ear. Neurons that transmit information to the brain are indicated at A and Bw



Cells in the retina of the eye

Illustrations by the 19th century Neuroscientist Santiago Ramon y Cajal. Ramon y Cajal was one of the first neuroscientists to investigate the microscopic nature of the brain.

Images taken from: Instituto Cajal del Consjo Superior de Investigaciones Cientificas, Madrid/CSIC

THE SCIENCE OF ART AND AESTHETICS

DHANRAJ VISHWANATH

Traditionally, academic interest in the connection between Art, Aesthetics and the Mind has been reserved for philosophers. Art has always been seen as too messy a topic for proper scientific investigation and, over the centuries, only philosophers have had the courage to try to dig systematically into this abstruse aspect of mental function. For a long time, in the fields of empirical psychology and neuroscience, one only dabbled in the connection between art and the brain after one had achieved a notably successful scientific career elsewhere. Neuroaestheticists like Semir Zeki, VS Ramachandran or Margaret Livingstone come to mind.
But the last decade or so has seen a surge of interest in the psychology and neuroscience of art and aesthetics, including the first international scientific journal and conference specifically dedicated to visual art and psychology (VSAC; Art and Perception). Research on art, aesthetics and the brain has steadily been making its way into mainstream--even high impact--psychology and neuroscience journals.

But what exactly are we are trying to understand by developing a scientific explication of the link between the mind, art and aesthetic experience?

Most of us already have a bunch of personal opinions on the matter through our own folk-psychological understanding. While not as universal as music, almost everyone has some interest in some kind of visual art or artwork. Everyone has come across at least one art work, a painting, a photograph or a sculpture, that they think is pretty neat. Everyone also knows that an art work that they like might not necessarily be liked by even their best friends or partner. Art and aesthetic preferences seem to us to be quite individualistic. And the differences seem to get bigger between those with substantial experience with art creation or viewing (experts) and those without (novices).

But at the same time, we often have the sense that certain works of art appear to be liked by a lot of different sorts of people. Indeed, some might claim that for an artwork to be truly great it must work for the novice and expert alike. So while we would all probably sign up to the notion that there are huge individual differences in art and aesthetic preferences, we all have a vague notion that there must be some universal principles at work.

When we think about art, many of us think of beauty. But then again, most of us also know that a lot of what passes for "Art" these days is far from being beautiful! Most of us also know that beauty in art that is not the same as beauty in a human face, or beauty in nature. Symmetric faces are usually seen to be beautiful, but most art works are studies in asymmetry. A beautiful art work does not make us want to kiss it or go on a date with it, though there probably are art aficionados that have smothered a painting with kisses.

Some might say that being artistically or aesthetically attracted has something to do with the creation of a positive feeling (affect). But we all know that some of the greatest

artworks engender a sense of melancholy or sadness (negative affect). What we can all agree on is that art can, subtly or forcefully, evoke emotions.

Sometimes we might think that aesthetic experience involves a sort of mental reward (different from the kind that comes from food, material gain or mating). But equally, one can feel a sense of emptiness or loss after experiencing a painting that one really likes.

We often think that an artwork engages aesthetically because we go through a process of understanding and cognitive engagement, perhaps leading to explanation of an underlying narrative or meaning. Perhaps the stronger, more engaging, or successful that process, the better the appreciation. But then we've often had those instances when an art work's attraction just pops out instantaneously or where one finds beauty in a simple arrangement of coloured shapes or brush strokes that resists any talk of "explanation". Sometimes, no explanation is forthcoming however hard we try.
To add to all this confusion and perplexity about what art does to us, there is the question of what Art is. We have all at some point found ourselves (whether by choice or coercion) in a modern art museum, muttering "Gimme a break. Is that supposed to be Art?". Perhaps it's all just context. Stick anything in an art museum and it becomes art. Or perhaps it's all simply socio-cultural convention. A hundred years ago, dripped house paints on a canvas would be mistaken for a painter's soiled dropcloth. But today we (willingly or unwillingly) accept it as art.

But there is another side to this. As we spend time perusing those same weird-and-wacky art works, we sometimes slowly come around to intuitively understanding why what seemed to be a confounded object could perhaps be considered 'Art'. The sheer courage of the painter's or sculptor's intention seems to

open up a space where such otherwise untenable considerations spontaneously emerge. In other words, as much as we often try to write off what passes in the name of art, we equally often have the vague feeling that there is indeed something ineffable that makes something Art.

FROM FOLK PSYCHOLOGY TO SCIENCE

Going by the folk psychological musings on art and aesthetics I have just described--and which we have all at some point been engaged in--we might rightly come to the conclusion that developing a Science of the psychological or neural underpinnings of art and aesthetics is a fool's errand.

But then folk psychology (in all its messiness) has been the foundation and driving force for all of science. Even in the field that now considers itself above these sorts of vulgarities: physics. For example, the co-discovery and explication of the physics of electricity and neural conduction began with questions emanating from the folk psychology of how the mind is able to make contact with the external world, leading to notions of "animal spirits" and "vital spirits". A direct lineage can be drawn from Swammerdam's experiments on animal spirits, Galvani's observation of twitching frog legs, Volta's pile, to Maxwell's field equations. Folk psychological constructs have always been instrumental in forming the basis for empirical and theoretical work, but eventually cast aside, as the scientific understanding became more sophisticated.

The same applies in psychology and neuroscience. Psychological constructs such as memory and attention, which we now read in scientific journals confidently defined and described in terms of saliency maps, grid-to-place-cell connectivity, cortical or hippocampal alpha/theta band synchronization, all had beginnings in rather diffuse folk-psychological notions of "paying attention" and "remembering things"; exemplified in William James' "Everyone knows what attention is." Our understanding of the psychology and neuroscience of human vision starts from Alhazen's painstaking debunking of the millennia-long Greek folk-psychological ideas of visual perception as due to a "fire

in the eyes" emanating out onto objects, or ghostly eideoli passing from objects into the eye. Alhazen's analysis of human vision actually led to the foundations of the modern concept of light and optics in physics.

A SCIENCE OF THE PSYCHOLOGY OF ART AND AESTHETICS

The urge for the creation and appreciation of art (and aesthetic artefacts in general) is a profound and vital mental activity that has engaged humans since prehistory. It is therefore a psychological activity that demands scientific enquiry. And there is no doubt that trying to understand art and aesthetics in terms of perception and cognition will, in the end, serve to provide a richer understanding of perceptual and cognitive processes themselves, and perhaps the natural world.

It is no surprise, that in these early days of a science of aesthetics, it is those very same folk-psychological constructs (referred to in the passages above) that have come into play as the initial variables and factors for theoretical and empirical exploration: Beauty, preference, individual differences, universality, experts and novices, attraction, reward, emotion, cognitive engagement, explanation and meaning, context, socio-cultural convention. And like all beginnings in science, there is not always an integrative plan, a coherence, or consistency, to either the theoretical musings or the empirical investigations. But the exciting thing is that it seems to have begun in earnest!

My own bias is to think the tantalising clues and ultimate answers lurk within the more basic question alluded to above: What is Art? Stay tuned!

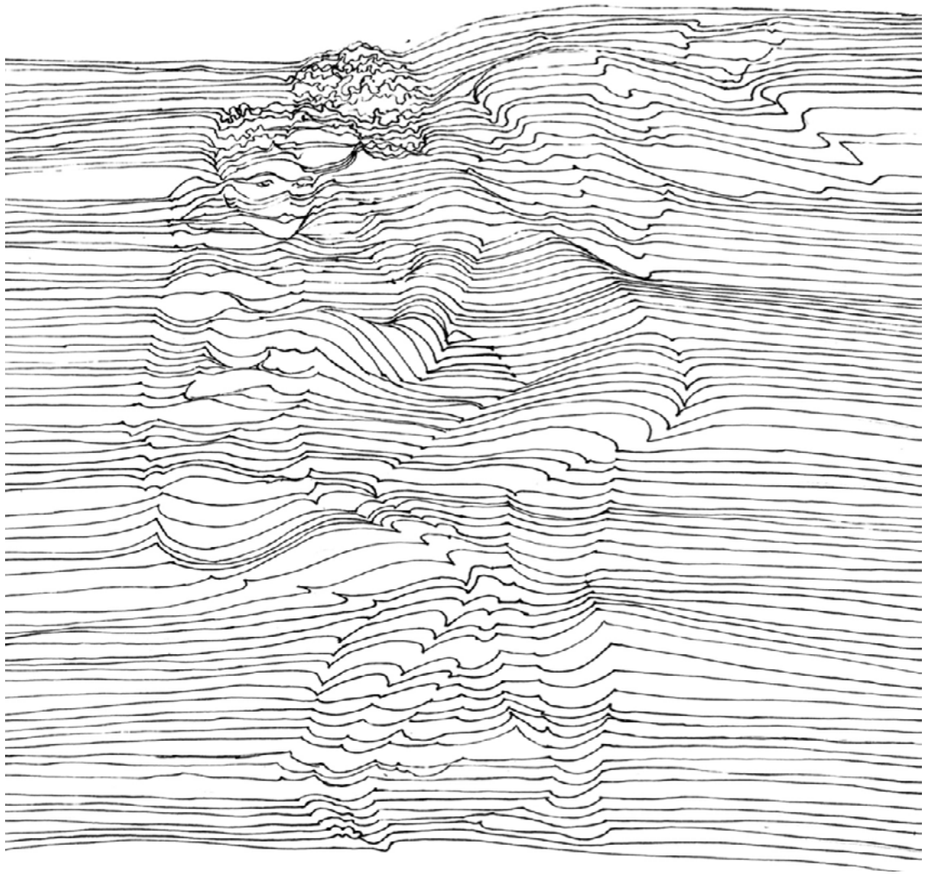
BEHIND THE COVER ART

ANDREA YUNEZ-CUNNINGHAM

Since the start of consciousness, humans have studied themselves, each other, their unique existences and their shared experiences; endlessly endeavoring to understand and express themselves. This first manifested itself as cave paintings and later in works such as Michelangelo's David and Da Vinci's Vitruvian Man; both incredible feats of human mastery and proof of our continued obsession with realizing human perfection.

The study of humanity also preoccupied early philosophers, the early version of psychotherapy literally translating to "soul healing", Psyche meaning soul in Ancient Greek. Psyche was also a classical figure in Roman and Greek Mythology. Her story, told in full by Apuleius in the Metamorphoses, introduces her as a beautiful Princess who earns the ire of Venus. Venus commands the god Cupid to enchant Psyche to fall in love with the foulest of men but Cupid, representative of all love, falls in love with Psyche himself. The story therefore becomes a metaphysical allegory for the union of the human soul with a notion greater than humanity - divine love; a matrimony allowing humans to transcend their very selves, overcoming their flaws to become something more than that which is understandable.
This concept has been intensely popular since its earliest iterations, evidenced by the era-spanning archive of art portraying its sentiment.

The drawing, inspired by Francois Gurard's 'Cupid and Psyche' (1798), depicts Cupid's first kiss to Psyche, capturing the loss of her innocence, an awakening integral to a human life. The viewer is forced to consider the human experience while their physical experience is intensified through their eye contact with Psyche, the window to her soul. The simple lines of the drawing are reminiscent of neuron traces and leave a parting impression of just how little is needed for humans to recognise and relate to a mere suggestion of humanity.



PSYCHOLOGY, ART, AND THE AGE OF SOCIAL MEDIA

INTERVIEWS BY ELLA KICKS

In the age of social media, there is a wealth of easily accessible art themed around psychology. These interviews explore the views of those doing the creating.

INTERVEW ONE: **THE MAITCH GROUP**

An account sharing art depicting the struggles of people with mental illness. Find at **themaitchgroup**

Q1 WHAT ARE COMMON THEMES IN THE ARTWORK SUBMITTED?
Usually share advice they wish they had gotten sooner. Generally, the themes are around getting help and that mental illness is a real problem, and that it's okay to take some time to work through it.

Q2 HOW DOES ART INCREASE UNDERSTANDING OR AWARENESS OF MENTAL HEALTH OR PSYCHOLOGY?
I think it shows the whole process of sharing a story. With writing, the medium is taken away but the artists choice of pencil vs paint, digital vs paper etc. says a lot about the artist and gives them a little more freedom. I think it gives a real insight into the way they think about things, and the thought processes behind the message they try to convey.

For example, one piece had the words "Get Help" emblazoned over a very tired face with no eyes and his brain bursting out of his head (see picture to the right). This contrasted the lighter hearted works I usually see that say to get help, because it suggested he was still struggling himself, and in the process of recovery.

Q4 WHAT ARE THE POSITIVES IN USING SOCIAL MEDIA FOR ART THEMED AROUND MENTAL HEALTH?
I think the biggest positive is that they're easy to share online, which stimulates the conversation behind mental health. The more everyone is talking about it, the more comfortable people may start to feel with admitting they are suffering.

Another positive is that for some people, words can't describe how they're feeling, but they can relate to pictures. I think this may be especially true of psychosis, as it's very difficult to put hallucinations, delusions and pseudo-hallucinations into words.

AND THE NEGATIVES?
It's very difficult to police. As art is left to the interpreter, some images may be quite triggering. Contrastingly, sometimes the more real feelings of suffering aren't shared, while anecdotes of recovery are, which can strengthen the stigma that people suffering can just "get better".

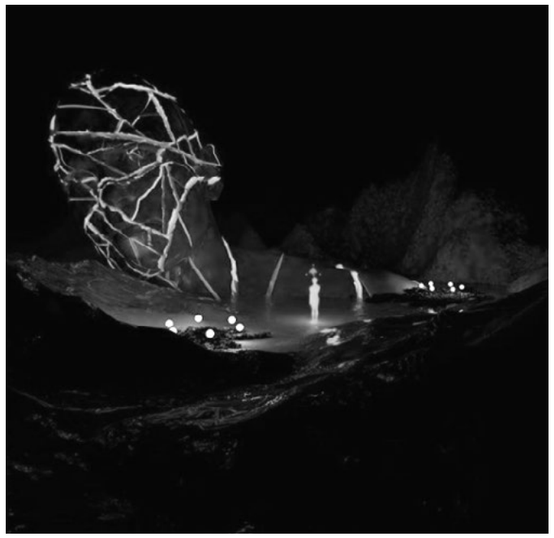
Q5 IS ART USEFUL TO EXPLORE MENTAL HEALTH?
ABSOLUTELY! For some people, it's the only way they can express themselves. It's also a much more intimate method of sharing a story, without the artist having to name and recall everything they suffer with.

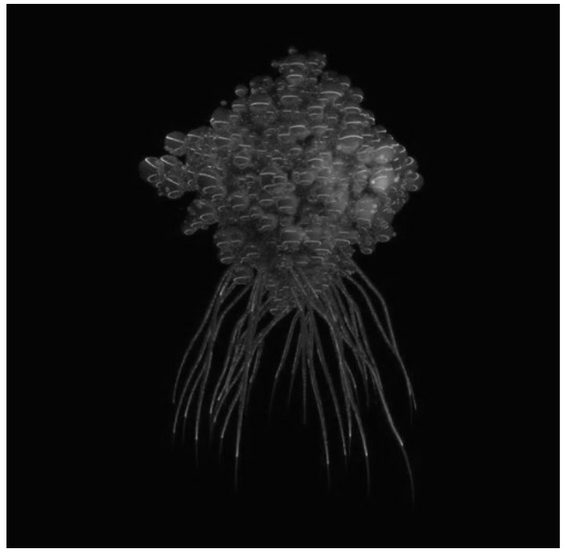
Many people who suffer with mental health problems feel that documenting them in drawings helps them cope a little better, others like to create pieces just to share and help end the stigma. Overall I think they offer amazing insights into people's feelings.

INTERVEW TWO: **SAMUEL CARILLO**

A 24 year old artist and musician from Mexico, with synaesthesia, Aspergers and Schizophrenia. Find at **samuelc_mindesign.**

Q1 CAN YOU TALK ABOUT YOUR FRACTURED MIND SERIES?
Music and art helps me like a therapy. I wanted to express what I imagine and sometimes hallucinate, things that most people think are impossible but for me, or at least for some of the voices/minds inside me believe that are possible. I want to show the world what happens in my mind, to show that there are awesome things inside the mind of a sick person and that maybe I'm not really sick.





Q2 HOW DOES ART INCREASE YOUR OWN UNDERSTANDING OR AWARENESS OF MENTAL HEALTH OR PSYCHOLOGY?
Is like I stated before, you can show that a "sick" mind is actually a beautiful mind, thanks to the different renders of this series I was able to see that I'm capable of creating grotesque pieces (some drawings I make) and beautiful/sci-fi renders like the ones in this series. I feel now more than ever what I started to believe some years ago, that the mind is limitless.

Q3 HOW DO YOU FIND SOCIAL MEDIA IS USEFUL TO PROMOTE KNOWLEDGE OF PSYCHOLOGY OR MENTAL HEALTH ISSUES THROUGH ART?
I think it's easier to find people in social media that can relate to a mental illness than in school or work, and easier to find acceptance of your art style in social media.

Q4 IS ART CAN BE A USEFUL MEDIUM TO EXPLORE MENTAL HEALTH?
Yes, because everything is permitted, there are no limits inside your mind and if you understand it completely, then there aren't limits physically either. People can appreciate a piece made by someone with a mental illness and it may motivate them to learn more about it, help people and understand them.

INTERVEW THREE: **HOW AM I FEELING?**

An instagram account and website using art and storytelling to express experiences with mental health. Find at @howamifeelingg.

Q 1 PLEASE TELL US THE MOTIVATION/INSPIRATION BEHIND HOW AM I FEELING?
The main one motivation was my lack of ability to talk about my mental health. I knew for a long time that something felt a little "off" but I was also high functioning enough that it was easy to shrug off or people labeled me as being over dramatic/over-emotional, which I then believed. This lead to me burying my emotions so I'd become "easier to deal with". Since I never talked about my mental health or feelings, I had the idea to build a platform for other people to begin talking about their issues. I just didn't want to be/feel like the only one who was going to bring up such sensitive material. It worked out well though! After a little over two years, the community has grown and things have improved for me as well. The best part is seeing people relate to one another or with a story I've shared.

Q2 WHAT THEMES ARE MOST COMMON IN THE ARTISTS YOU RECEIVE SUBMISSIONS FROM?
Dark looming figures, different faces of sadness, the inability to speak, falling sensations, all different versions of the same feelings. I think being able to physically see those renditions really drives home the point of 'you're never alone'.

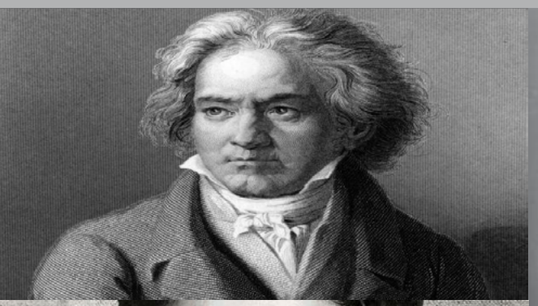
Q3 WHAT DO YOU THINK IS THE MERIT IN SOCIAL MEDIA FOR ART AND PSYCHOLOGY/MENTAL HEALTH?
Social media connects people but then it can also be a very dark and mean place. I enjoy seeing people comment back and forth saying they can relate to another persons' interpretation of an emotion. I've witnessed shared dialogue on posts asking for advice, ending with people saying they'd seek treatment and thanked the original poster for their help. It makes me really happy to see the platform and community doing what I had hoped it would do, which was to create this type of support system for others.

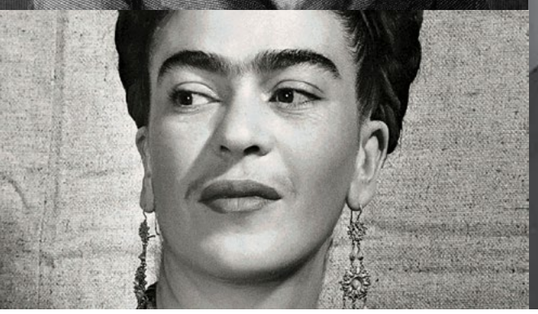
AND THE DOWNSIDE?
The hostility. Not everyone is empathetic or understands what other people are going through so they'll either lash out, or troll them, make threats, etc. I'd say it's bad when people who don't understand mental illness continue to perpetuate the stigma, but it's even worse when people who are active members within the mental health community at large continue to do the same thing, which I've unfortunately witnessed happening.

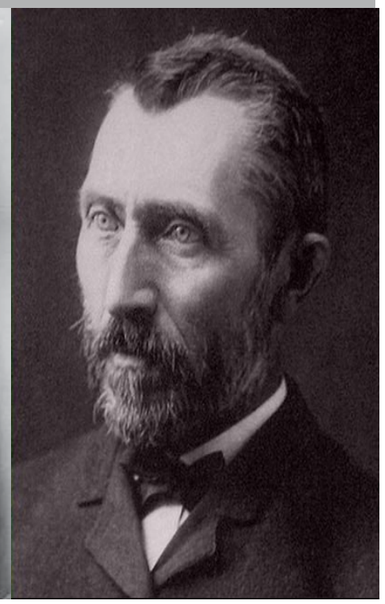
Q5 HOW DO YOU THINK ART CAN BE USED FOR PUBLIC UNDERSTANDING OF PSYCHOLOGY AND NEUROSCIENCE AS AN ACADEMIC FIELD?
Art can help explain peoples' behavior. It's not always easy to communicate what we're feeling into words and I believe art can help. Through my own experiences, I've learned that I can do as many mental loops as I want with covering up how I feel, but my art always gets straight to the point and then it's like a wake up call to slow down and take care of myself. In regards to public understanding, I think it gives them and inside look into how people with mental health issues function and how the disorders affect their sense of self and reality, etc. And even though someone who doesn't suffer from the same issue may not completely get it, they at least have a physical understanding of it now instead of just a textbook or Google definition of a condition. It's much easier to understand someone's monster if it has a face.

THE INGENIOUS BRAIN: IS THERE A LINK BETWEEN AN ABNORMAL BRAIN AND AN EXCEPTIONAL ART TALENT?

ELISKA KLIMENTOVA







Ludwig van Beethoven, Vincent van Gogh, Kurt Cobain or Sylvia Plath undoubtedly excelled in their respective fields yet from the perspective of psychological research, it is more important that each one of them had a long history of a mental illness. Beethoven's mood oscillations, van Gogh's self-mutilation or Plath's and Cobain's depression impended both their professional and personal lives, and in case of later two, the condition led to the untimely death. Over the course of past centuries, the existence of the link between the art genius and mental health problems has been noticed yet it was only in past few decades when the question has been addressed from the perspective of psychology and neuroscience. In this article, we seek to discover the connection between the artistic genius and brain abnormalities.

There have been several documented cases of art genius and brain abnormalities. Pablo Picasso suffered by strabismus, i.e. he lacked the depth perception due to the abnormal alignment of his eyes. John Constable, an artist infamous for his landscape paintings, reportedly suffered from deuteranopia. An abstract expressionist Willem de Kooning created some of his greatest art works while in the advanced stage of Alzheimer, unable to perform even basic daily activities. One of the first internationally recognised female painters, Frida Kahlo, was born with spina bifida and had life-long problems with neurologic-related maladies.

"the link between a divine source of inspiration and altered mental states can be traced as far as to 4th century B.C.E."

To create an exceptional piece of art, as all of the above mentioned did, it is probably necessary to envision the world in an exceptional way. As Adrienne Sussman remarked in her article "Mental Illness and Creativity: a Neurological View of the "Tortured Artist"", the notions about the link between a divine source of inspiration and altered mental states can be traced as far as to 4th century B.C.E.. Madness, correctly channelled, was considered a divine gift. Sussman continued to explain that the concept later developed to the idea of the tormented artist, widely popular across Romantics. To be regarded as a valid member of Romantic circles, and thus to attain the recognition for their work, you had to be touched, to have a state of mind which made it impossible for you to engage and relate to ordinary people.

Such public mindset, of course, led some artists to fake their condition, others, however, were at some point institutionalised or even committed suicide. One of the most prominent examples of artwork which dealt with mental health problems was Mrs Dalloway, written by Virginia Woolf. Not only one of the main characters, Septimus Warren Smith, suffered by unprecedented and inexplicable changes of mood and mental breakdowns that carried a a great deal of similarity with author's own symptoms but Woolfe also used her bipolar disorder to create a unique way of narration. A significant part of Mrs Dalloway is, to reader's frustration, written as a long stream of thoughts loosely linked to each other. The other common occurrence in the book are indirect internal monologues. The long stream of thoughts is most probably aimed to represent Woolfe's own state during the manic phase of her bipolar disorder when she was able to work continuously for long hours, even days, while indirect dialogues can be regarded as Woolfe's reflection on hallucination which accompanied these states. Another example of turning the mental health condition to an asset in their work is the actor Stephen Fry, another bipolar disorder patient. Fry was only formally diagnosed at the age of 37 and by that time, the condition had almost ruined his life, driving him on the verge of suicide. Yet, at the end of the documentary, Fry insists that if he could, he would not get rid of the condition, as it also a key driving factor behind his creative energy.

Even though there is a little evidence that a particular brain abnormality is linked to an artistic genius, it can be assumed that the abnormal perception and way of thinking which accompany some neurological abnormalities allows authors to see their surroundings in a unique way. The same effect can be, of course, achieve by use of psychedelic substances or other kind of perception-altering substances, yet the overall experience of someone living with a neurological disorder, including dealing with the fear, regardless whether it is justified or not, of public rejection due to the condition, the awareness of a person being somehow different from a general population and other aspects of the condition, is probably impossible to replicate by a healthy individual.

Therefore, there has been little evidence about a specific brain condition resulting in an extraordinary artistic talent of any sort yet it is possible to assume the altered perspective and unconventional way of thinking are two keys which give rise to outstanding artistic works. Patients with mental health problems are also at greater risk of being rejected by the society they live in. However cruel the rejection is, it also means that their creative process is not constricted by ordinary social rules. In other words, even though the brain condition most likely does not come with the gift for fine art, the attitude of the society towards mental conditions, somehow ironically, put artists to optimum position to create the arts which challenges the very fundaments of the said society.

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THE NEED FOR DANCE NEUROSCIENCE: ON THE REHABILITATIVE POWER OF RHYTHMIC MOVEMENT

ANAIS DURAN

The act, and art, of dancing is a visceral activity facilitated by the interweaving of neural circuits of emotion, perception and movement. It is a demanding sensorimotor process characterised by the organisation of body movements into spatial patterns and the synchronisation of those movements with temporal markers. The dancer, guided by the rhythm of music, carves up a moving narrative through time and space while summoning a tremendous amount of resources to sustain the flow of movement. As a recreational dancer who has engaged in various styles ranging from ballet and modern jazz to partner dances like salsa and swing, I am frequently astonished at the sheer breadth of technical vocabularies that can be mapped out by the body in movement. However, as a student of psychology, I also take an active interest in the cross-dimensional nature of motion execution, and I am deeply intrigued by the neural mechanisms that underpin the translation of movement into aesthetic experience.

Motion coordination requires one to evaluate multimodal segments of information from spatial, visual, auditory and physical cues in order to determine the amplitude, timing and nature of the next movement. Measurement of brain activity during actual dance performance is currently impracticable; as a result, researchers in the field of neuroscience have designed innovative methodologies to detect patterns of cortical and subcortical activation during the execution of pre-learned motor schemas. On one occasion, amateur tango dancers were placed in a positron emission tomography scan and asked to perform various steps from their repertoire onto an inclined surface whilst listening to tango music. The research revealed activity in various regions responsible for spatial orientation and for the sequential regulation, timing and execution of movements, namely the superior parietal lobule, the right putamen and the anterior cerebellar vermis [1]. These results confirm the interactional connectivity of brain networks during the execution of spatially and rhythmically patterned movements, and lay the groundwork for further research in the nascent field of dance neuroscience.

“Dancing has an incredible restorative potential and looking at its benefits from a neuroscientific perspective can inform interventions”

Dancing in a class setting typically requires participants to engage their memory in the learning of complex movement patterns known as choreographies. This repetitive learning process results in the prolonged recruitment of neural resources which could have a significant impact on anatomical remodelling. A longitudinal study amongst senior participants has suggested that involvement in a long-term dance programme could induce neuroplasticity by inducing transient increases in cortical volume and grey matter in the primary and supplementary motor areas. In addition to promoting cardiovascular fitness, preventing the decline of motor coordination skills and improving cognition, attention and verbal memory systems, dancing could potentially play a role in reducing the risk of neurodegenerative diseases in the elderly [2].

Dancing can generate transformative effects in a multiplicity of dimensions: it can enhance mood, reduce stress levels, encourage social bonding, promote physical health, improve feelings of self-efficacy and have a positive impact on overall quality of life [3]. To the late Marian Chace, one of the pioneers of dance/movement therapy (DMT) during the 1960s and the founder of the American Dance Therapy Association, the therapeutic potential of movement is so critical that it must be incorporated alongside traditional clinical treatments as an alternative to verbalisation [4]. By tapping into the productive power of rhythmic movement, DMT seeks to offer a non-evaluative and exploratory platform for the expression of verbally inaccessible trauma. As a supplementary clinical intervention, DMT can be beneficial in the treatment of psychiatric outpatients as it engages the body in the process of emotional exploration [5]. Depressed patients who participated in a ten-week group DMT programme displayed a significant post-treatment reduction in scores on the Beck Depression Inventory and self-reported favourable changes in mood, vitality, coping-skills and body image [5]. Furthermore, research on the effect of dance on anxiety has highlighted the curative potential of dance as participants self-reported a significant reduction in scores on the State-Trait Anxiety Inventory in comparison to sport and music therapy control groups [6].

Taking part in improvisational partner dancing, such as salsa and swing, has certainly been therapeutic to me as I spent the last decade navigating the choppy waters of multiple anxiety disorders. While dancing, I find that my attention is embedded in the present moment as my partner and I both engage in playful and spontaneous exploration of collaborative flow. The constant feeling of hypervigilance that usually hijacks my attentional channels is temporarily soothed as I stand fully receptive and attuned to the pulse of the rhythm and the squeeze of my partner’s hand which guides me though a never-ending sequence of leaps and spins. Indeed, the rapid, impromptu execution of a dance sequence is in itself an exercise in kinetic mindfulness as awareness is centred on the situational requirements of the present, embodied moment. Dancing has an incredible restorative potential and looking at its benefits from a neuroscientific perspective can inform interventions in the supplementary treatment of mood disorders and in the prevention of neurocognitive decline in the elderly. These encouraging preliminary discoveries should encourage non-dancers to stretch out their limbs and join the dance.

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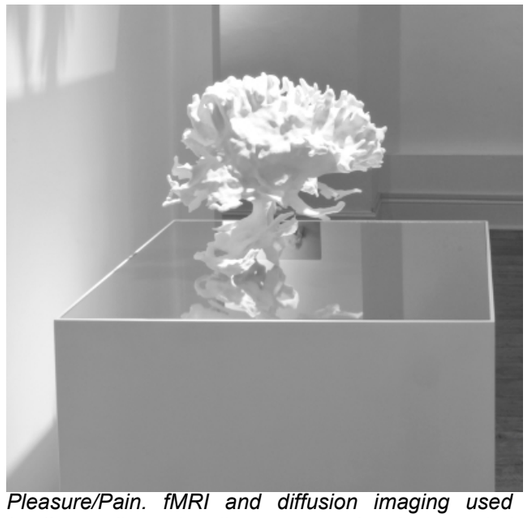
From Within, Faraday Museum, The Royal Institution of Great Britain

SENSE, sequence of sculptures showing patterns of brain activity in response to the five senses. fMRI scans were converted into 3D physical structures of amber resin. Medicine Now, Wellcome Collection.



Pleasure/Pain. fMRI and diffusion imaging used to three dimensionally map overlapping cerebal pathways involved with pleasure and pain.

These sculptures are by Scottish artist Annie Catrell. Her interests lie in where science, art and poetry meet. Collaborating with neuroscientists and using state of the art technology, she manages to beautifully bridge the gap between science and art.

Images taken from https://www.rca.ac.uk/more/staff/annie-cattrell/

AN INTERVIEW WITH PROFESSOR CAROLINE WATT – The Koestler Chair of Parapsychology

INTERVIEW BY LAURA EDY

The University of St. Andrews was very fortunate to be joined by Professor Caroline Watt from the University of Edinburgh, for a whistle-stop tour of the high and lows of three decades of research into paranormal claims. From the Indian Rope Trick, to precognitive dreams, to controlled laboratory research, the Koestler Chair of Parapsychology, Professor Watt, gave an inspiring and informative talk into Investigating the Impossible, on Tuesday 19th September in the Byre Theatre. A sold-out event, attended by students and academics across the University. MAZE team, Laura Edy and Tabitha Fleming, where lucky enough to get 10 minutes of Professor Watt's time before her talk to find out about her time as a student at St. Andrews and how she got into Parapsychology.

Could you possibly tell us about your time as a student in St. Andrews? The highlights, the lowlights..

I absolutely loved my time in St. Andrews. I was in St. Andrews until 1984 and loved it so much that I worked as a waitress during my summers, so hardly ever left. My parents had to come to visit me if they wanted to see me, I never went home. I was in the Atholl (John Burnett Hall) for four years. I was somewhat torn between Geography and Psychology and was swithering between the two for quite some time, but eventually decided against a joint degree as I thought it would be too much with all the field work from Geography and the project from Psychology as well. I absolutely loved psychology as a subject, but got taught nothing about parapsychology, which is normal as it is not a core BPS recognised topic. But what is really funny, is the year that I graduated was the year that the parapsychology chair was being discussed in the media because it was starting at Edinburgh, so there was a lot of press and discussion surrounding it. In my final exam, there was a paper called the Contemporary Issues paper, which covered what's happening in Psychology at the present moment/ what's the relevance to psychology to the wider world etc. There was a question in the Contemporary Issues final exam about the Koesler chair of parapsychology and I answered that question. It was something like, 'you're applying to be the new professor of parapsychology at Edinburgh University, outline your research proposal and the methods you would use'. Truly amazing and weird that I am now that professor that I wrote about so many years ago.

Was that your first encounter with parapsychology?

Yes, that was my first real link to parapsychology. I had read popular books like Lyall Watson books but it wasn't part of the undergraduate curriculum at all, so someone must have just thrown that question in to the paper because it was something relevant at that time. After I graduated, obviously, I knew about the chair starting up and I wrote to the professor. There had been no jobs advertised or anything, I just wrote speculatively and said that I had just graduated the University of St. Andrews with a Psychology degree and whilst I don't have any particular experience or knowledge of this field, I am very curious about it and to let me know I can help you in any way. After about a year of to-and-fro he was looking for a research assistant in 1986 and I was invited to apply for it. It just shows that you should take a punt, don't sit around and wait for someone to advertise jobs, establish a relationship before. In the time between graduating and working as a research assistant, I did some nannying and a secretarial course (touch typing and short-hand). A lot of students may, especially in Psychology, graduate not quite knowing what you want to do – but Psychology does qualify you for lots of different careers and leaves you with lots of transferable skills.

Who was your project supervisor?

Margaret Wetherell, she is still active as a social psychologist. I did my dissertation on a social psychology topic, about sex stereotyping and androgyny under Maggie's supervision. It was using the Bem Sex Role Inventory, developed by Sandra Bem. I can't remember what I did my literature review on however, no doubt it will be somewhere in a filing cabinet somewhere.

Had you had a personal experience / prior exposure to parapsychology?

I hadn't had any personal experience, which perhaps was a plus, because it meant my attraction to the field was out of curiosity. As a psychologist, I knew that people had experiences and beliefs; if you do a survey the evidence is

about 50% of the population believe in paranormal, that's including traditional religious. About half of these believe they have had "some kind of paranormal experience", so that's about 1 in 4, quite a high proportion of the population. So to me as a psychologist that was obviously and interesting question "what lies behind these experiences?".

Would you personally describe yourself as a sceptic or a believer?

I think I probably would be a sceptic, but in the true sense of the word which is questioning, not in the knee jerk reaction saying this doesn't exist, rather saying well you claim you can do this thing, how do we know that/ what is the evidence for that. I think the argument about what do I think about the evidence, when you look at the controlled lab studies testing 'do people have the ability to read each other's minds'; I think that the evidence is not there yet. There are positive results but I don't think that the quality of the research is good enough. Don't get me wrong, its good quality research, in some respects better than psychology research because you're testing a controversial idea but I don't think its persuasive, convincing yet. I teach a course to forth year Edinburgh University students and it is a good subject for teaching methodology because you must think carefully about how you could conduct your research, what pitfalls to avoid etc. The studies that test the idea "can people do telephathy" are experimental studies, but studies looking at the belief in the paranormal are often questionnaire based. So, you might take a questionnaire measure of someone's belief and then look at their beliefs in other areas to see what are the correlates, so it's more looking at social factors, personality variables etc. It is a very popular course at Edinburgh, which is always fully subscribed. Students also have the option to do their dissertations in parapsychology.

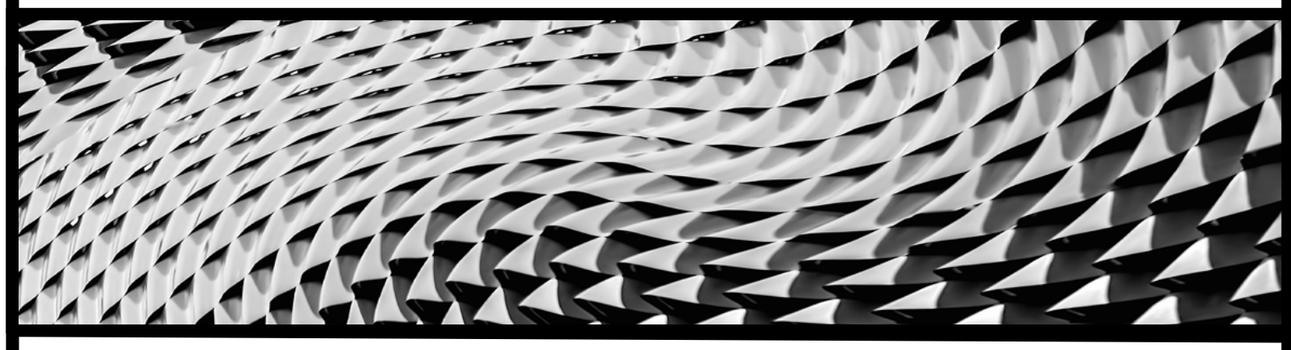
If you could give one piece of advice for someone interested in parapsychology, what would you suggest?

First-of-all, get expertise in a mainstream subject. Parapsychology is quite an interdisciplinary area, some of it might be to do with Philosophy, some might be to do with Physics, obviously, a psychology connection, social anthropology, various different disciplines. So I think first it is important to develop mainstream expertise first and then once you have got a secure position, then start to explore the parapsychological side of your subject.

To find out more about Professor Watt's work and Parapsychology, check out her recent book Parapsychology: A beginners guide (2016).

Neuroscience at the University of St Andrews has a new course....

NEUROSCIENCE MASTER OF RESEARCH (MRES).



This one-year postgraduate programme is centred around practical research skills and each student conducts a comprehensive, year-long project in one of the universities' Neuroscience labs. But what topics are covered by MRes students in their research projects and what does their work in the lab consist of? To answer these questions each of the students enrolled on the MRes course this year has kindly written a summary of their research project, and these summaries are listed below.

ABBY SCURFIELD

I am from Sacramento, CA, and I completed my bachelor's in Neuroscience at the University of Puget Sound in Tacoma, WA. I am doing my master's project in Dr Miles' lab where I am researching Amyotrophic Lateral Sclerosis (ALS) - or Motor Neuron Disease - using induced-pluripotent stem cells. In ALS patients, motor neurons are selectively targeted and have abnormal electrical properties before their death. Recent research indicates that glial cells, such as astrocytes, might be central to the specific targeting of motor neurons.

I am working with Dr Veronica Brivio and PhD student Amit Chouhan to identify differences in astrocyte protein expression between patient- and control- derived cell lines that may correlate with the electrical changes present in ALS patient motor neurons. These electrical abnormalities in motor neurons represent a very early stage pathology that holds great promise as an intervention target to prevent disease progression. My primary interest in Neuroscience is neurodegenerative disorders, so I am very excited to be spending the year conducting research on such a high impact and poorly understood disease.

VICTORIA ROSEN

For my master's research project, I am working with Dr Balslev and my work aims to address theoretical models of visuospatial attention. Previous work in Dr Balslev's lab has looked at the role of eye rotation signals and their involvement in the location of the attention window. My experiments are based on this work but will instead focus on how these eye rotation signals relate to the size of an individuals' attention window. To observe this, we will apply single pulse transcranial magnetic stimulation (TMS) that will introduce noise to eye rotation signals, and then use an eye tracker to ensure eye fixation. We have hypothesized that the addition of TMS-induced noise will increase the span of the attention window.

If you would like to know more information about the Neuroscience MRes programme have a look at its webpage using the following link https://www.st-andrews.ac.uk/subjects/neuroscience/neuroscience-mres/

BEN THOMPSON

I'm working on my master's thesis in the Ainge lab, studying the importance of our environment in spatial navigation. By training rats in a simple navigation task and then removing all light, and thus all visual input, we hope to observe changes in the ability of the rats to perform the navigation task. Implanting electrodes into the medial entorhinal cortex of the brain will then allow us to record the changes that a loss of visual input has on the rat's cognitive representation of its environment. Any changes observed in the cells responsible for spatial navigation, such as place, grid, and border cells, may indicate a relationship between visual input and path integration. Alternatively, no change could suggest the involvement of entirely different systems in the maintenance of the cognitive map. I'm really excited to be working on this project and in the midst of a field in Neuroscience that's constantly growing and changing.

CATHERINE DUNLAVEY

I'm now in my fifth year at St Andrews and I am a Neuroscience MRes student from Connecticut. I'm working with Karen Spencer and the Mechanisms of Behavior research group. I'm investigating the link between the gut microbiota, chronic stress, and the brain by analyzing behavior, corticosterone (stress hormone) levels, and glial cell distribution and development in the brain. Though obvious links between these components exist it is not clear to what extent these links exist or how far reaching they are in peripheral systems. We do know that microglia develop altered morphology because of chronic early life stress and that there is a link between gut health and brain health which can be affected by stress.

Ultimately, I am looking to see if prebiotics (food for gut bacteria) serve a neuroprotective role for glial cells in the face of chronic early life stress in quail. This will be achieved by investigating physiological systems such as the hypothalamic-pituitary-adrenal axis (stress response), glial distribution, and characterization of the bacteria in the gut.

JAMES FEBERY

My master's research project is an extension of my undergraduate research project that I completed here in St Andrews in Dr Pulver's lab. My research is focussed on the sodium-potassium pump that is ubiquitous to all cells and essential for basic cellular function. However, research has indicated that it can also act as a memory mechanism for locomotor neural networks to prevent their exhaustion and in my project, I intend to reveal more details about this exciting function. My interest is directed at Drosophila melanogaster larvae ventral nerve cord (essentially their spine) locomotor networks. Using live imaging and genetically encoded calcium indicators I can observe real-time locomotor neural network activity.

Last year, I found that pharmacological manipulation with a sodium-potassium pump inhibitor did increase neural network activity but with only subtle effects. Following on from that finding, I am investigating the role of the pump through multiple approaches. I will be genetically and pharmacologically altering the activity of the pump before observing how these manipulations affect the locomotor network activity. Overall, I hope that this year's research will be a beneficial addition to the growing literature on the many interesting functions of the sodium-potassium pump.

NEURO SOC

"We want Neuro Soc to be a community; open to everyone who is interested in what we do."

The University of St Andrews Neuroscience Society-affectionately dubbed 'NeuroSoc'-was founded by neuroscience undergraduates; however, it is not solely for neuroscientists. Students of all degrees, either affiliated with or simply interested in neuroscience are welcome. Originally drafted in 2016/17, the official committee were proud to present their brand-new society for the 2017/2018 academic school year. The new committee is composed of a broad range of positions intended to increase function and accessibility. The committee is headed by president, Gray Seiler and vice president Julia Marache who have stated, "We want Neuro Soc to be a community; open to everyone who is interested in what we do."

NeuroSoc's main goal is to provide a platform where neuroscience enthusiasts can connect with each other and, more broadly, with the world. Events and outreach officers help to expand student networks both on and off campus. Many of the events organized focus on building a strong sense of comradery between members. For their inaugural event, NeuroSoc welcomed their new members with a bonfire on East Sands complete with cider and marshmallows. Despite the brisk weather everyone gathered together to share anecdotes about where they were from and what they hoped to accomplish in their time at St Andrews. Older students shared internship stories and advice on lecturers. The event ended with a group photo in front of the bonfire. The committee hoped that this event would help familiarize members with the society and encourage relationships between students who love neuroscience.

In helping students connect outside of the St Andrews bubble, the Neuroscience committee has also organized networking events for entrepreneurial students. Neuro-Networking, a recent event held in late November, focused on connecting students to St Andrews Neuroscience Alumni all over the world. Professor Julia Harris, the director of Research in the School of Psychology and Neuroscience, and the Careers Centre were on scene to provide professional advice to students looking for research opportunities in-term or over summer. Stephan Pulver from the neuroscience department also made an appearance to share his insight on what to put forth when applying for internships and post-graduate positions. The committee wanted to provide a welcoming, casual atmosphere to encourage students to broaden their social spheres and become comfortable interacting with researchers.

Events officers have expressed that they wish to increase off campus activity as well. Currently, the committee is looking at neuroscience conferences in Scotland and hope to arrange a trip to the 2018 Edinburgh conference in second semester. The committee is also arranging for visiting professors to come give talks for students who wish to broaden their off campus social spheres but cannot find the time. The committee is also looking into organizing grant application talks for students who wish to pursue independent research.

Interspersed with large networking events are other opportunities for more relaxed meetings. The NeuroSoc Journal Club is a monthly get-together where students from across all four years may meet up to discuss recent articles and scholarly publications in neuroscience research. This offers a chance for students across all years to become acquainted and discuss the latest discoveries in neuroscience with likeminded peers. The aim of this club is to help students develop lifelong academic skills such as experimental design and results interpretation. The first meeting looked at the role of leptin in neurodegenerative disorders such as Alzheimer's Disease-a focus of current neuroscience research. Students were invited to interpret the article using lecture material and real-world experience. St Andrews' own Alison Holiday was invited to lead the discussion and share her experience working in research as a neuroscience postgraduate. Based off the positive feedback for the event NeuroSoc hopes to make Journal Club a lasting tradition.

Beyond career and skill preparation, the committee also helps their members to unwind through more calming events. During revision week NeuroSoc hosted a Mindfulness Yoga session, led by Barbara Dritschel from the Psychology and Neuroscience Department. This session was hosted with the Mindefulness Movement to raise funds for SAMH. The focus of the event was on relaxation amidst the stress of exams. As with all events, non-members were invited to come along and meet the society in a relaxed setting.

Neuroscience Society will continue to host events both on and off campus for the remainder of the 2017/2018 school year. As always, anyone interested in neuroscience is welcome to participate in all events held by the society throughout each semester. NeuroSoc hopes to continue providing an open, inviting community in the years to come.

Those interested in contacting the society can either email them at neurosoc@st-andrews.ac.uk or find them on Facebook at https://www.facebook.com/groups/214238739057724/