Evolutionary Psychiatry Special Interest Group (EPSIG)

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Notes from the Editor

I am delighted to publish the winning Charles Darwin essay prize entries for 2022 in this Newsletter, having listened to the excellent presentations that the prize winners Dr Sirous Golchinheydari (CT) and Dr Vaishnavi Sornarajah (ST) gave at the 5th International EPSIG conference on 10th March 2023. I think you will agree that their ideas are interesting and well worth reading.

This Newsletter also includes a link to the next free WPA seminar by the evolutionary anthropologist Nikhil Chaudhary (Assistant Professor at the University of Cambridge with the title: "Hunter-gatherers, mismatch and mental disorder".

He recently published an Editorial in the Journal of Child Psychology and Psychiatry (JCPP) https://acamh.onlinelibrary.wiley.com/doi/10.1111/jcpp.13773 with the title: "What can we learn from hunter-gatherers about children's mental health" which is freely available and worth reading if you work with children or their mothers.

FREE WPA EP Section web pages with links to all future webinars

https://www.wpanet.org/evolutionary-psychiatry

Thursday 25 May 2023, 4pm BST: Nikhil Chaudhary (Cambridge, UK) **'Hunter-Gatherers, Mismatch and Mental Disorder'**

Thursday 29 June 2023, 4pm BST: Prof Martin Brune (Germany) **'Human brain evolution - vulnerability to neuropsychiatric disease by design?'** (This webinar has been moved to this new date from it's original date in March)

College members and fellows get a 30% discount on CUP/Royal College of Psychiatrists Academic publications including the edited volume 'Evolutionary Psychiatry' by entering the discount code: 'RCPSYCH'
https://www.cambridge.org/gb/academic/subjects/medicine/mental-health-psychiatry-and-clinical-psychology/evolutionary-psychiatry-current-perspectives-evolution-and-mental-health?format=HB

Core trainee Charles Darwin Essay prize winner 2023

Sirous Golchinheydari is a core psychiatry trainee in London. He has a keen interest in academia with numerous publications in several different fields. He took this essay as an opportunity to explore the origins of mental illness from an evolutionary perspective and integrate these concepts into his own practice.

The gap between evolutionary explanations and clinical applications

"**Nothing in biology makes sense except in the light of evolution**."

The better half of the 19th century threw the world of science and medicine into a debate that would detach us from the thinking practiced for millennia. The origins of the esteemed homo sapiens built the framework that would help us understand the gears and cogs and the effect thereof on human beings. These advancements helped to explain the pathophysiology of many diseases and their desire to persist in the human genome. Looking back at the oldest recorded disorders in human history, the most frightening may have been the invisible with no physical manifestations. Despite Democritus' efforts to find the cause of madness and melancholy by cutting an animal open, an explanation for these disorders could not be found; the cause was quickly dismissed as supernatural. (1) The theory that physiological abnormalities may be the root of mental disorders originated early on and today is well-established, putting psychiatric disorders in the same group as physical disorders that have survived the test of natural selection.

Despite their invisibility, psychiatric disorders can be very debilitating. They can significantly affect one domain that nature may consider the most essential: reproduction. Despite the seemingly chaotic order of nature, firm rules have developed through time to ensure the survival of the species. For genes to be passed on to the next generation, the rules of sexual reproduction involve two genetically different organisms. The process of the most favourable gene being passed on is explained in the book "On the Origins of Species" by Charles Darwin as survival of the fittest. When survival of the fittest is factored in, the rules state that only the fittest organism should be able to reproduce and therefore is far more likely to find a mate. The question of how psychiatric diseases have broken these rules and crept into the gene pool has been asked numerous times, leading to different theories about how these disorders have survived the test of time.

Given the complexity and vast pool of invisible disorders of the brain, it would be sensible to look at each individually and assess their advantage and disadvantage in the human genome. There have

been numerous papers published attempting to outline how the genes in psychiatric disorders possibly contained an advantage allowing them to be passed on, but some psychiatric disorders have garnered more attention in this aspect than others. The genetic model has mostly fallen short of providing sound evidence for their theories but interesting ideas have been proposed and specific genes isolated. Their limitations, however, have to also be accepted and mentioned.

Another way of assessing how these disorders have maintained themselves is to consider their social advantage. There is a significant overlap between genetic and social advantage, but an umbrella term is used for simplicity. The social model has shown to be more plausible in assessing the different ideas proposed in this topic. The social model is very subjective in comparison to the genetic model. It makes assumptions of mild non-debilitating disease and may ignore significant overlap between psychiatric disorders such as psychosis in schizophrenia, severe depression and mania. Despite these shortcomings, it still provides an engaging, entertaining and comprehensive theory of how psychiatric disorders affected our ancestors.

Schizophrenia

Schizophrenia would be a rule-breaker of nature from the disorders. It exhibits strong negative fitness traits and a high heritability but is still found in around 1% of all human populations. (2) Schizophrenia has a polygenic inheritance pattern and its phenotype falls on a spectrum, resulting in various clinical presentations. (3)(4)(5)

It is difficult to prove the age of schizophrenia in human history but it seems to date back to ancient civilisations as their scriptures show characteristics of the disease (6)(7) Isolated populations have shown similar findings, such as in the Australian aboriginal population that separated from the rest of the world around 60,000 years ago. Finally, it is well-established that schizophrenia shows a similar frequency throughout all cultures. (8) The likelihood of the genes involved in schizophrenia being present early on is high.

Schizophrenia, in the perspective of evolution, has been studied extensively and multiple theories have been published focusing both on its genetic favourability and social favourability. The study has even coined the term the “schizophrenia paradox” and has commonly related the high prevalence of schizophrenia to fecundity. (9)(10) The vast collection of published theories makes it difficult to discuss all of them and some provide more evidence than others. However, in the “genetic favourability” model of schizophrenia, notable theories stand out.

Genetic favourability

A recurrent theory in literature is that schizophrenia results from human evolution, a by-product. An exciting analogy proposed is the apparent disadvantage of herniated discs brought about by the advantage of bipedal locomotion. Schizophrenia could be an inevitable by-product of favourable genes. (11)

Since the condition is polygenic, it allows for speculation regarding an unfavourable gene coupled with a favourable gene. It may have survived because of and despite natural selection. The inheritance of one favourable gene could lead to the inheritance of a non-favourable gene as they come together. Alternatively, the two genes coding for schizophrenia could be more favourable together rather than standalone entities. Finally, one gene could be both unfavourable in one aspect but favourable in another. All of these justify why the genes have remained in the pool. (12) Some studies have attempted to prove the theory of coupled genes and have yielded some examples, mostly to do with high cognitive performance like high IQ but have yet to solidify the argument by isolating these genes. Similarly, the theory of one multifunctional gene has also yielded isolated

results that, for example, provide advantages in physical health yet predispose an individual to schizophrenia but have not found this to be the case with all schizophrenia genes. (13)

Other theories take a more psychobiological approach focusing on functional links between specialised areas in the brain. The myelination of callosal and intrahemisphreic fibres on the later stages of brain maturation, which are new and random neural connections, could lead to the clinical symptoms we observe. Such changes could theoretically result in several cognitive disorders. As evolutionary-fuelled emergence of new and unique extensions of specialised function in the evolving brain continues, errors in connection and biological trial may produce individuals that possess advanced abilities but also individuals that possess a wide range of distortions. (14) Another theory labels schizophrenia as a "failure of integration between limbus and cortex." This idea builds on the evolutionary remnants of the three brains, namely the reptilian (upper brain stem), the para-leomamillary (limbic) and neomamillary (cortical), suggesting a lack of incorporation and modification meant to be taking place in succession as these entities developed and replaced each other.

Each of these interesting theories acknowledged their limitations and have focused on specific domains failing to address all the aspects of schizophrenia. (11)

Social favourability

Hypothesis in favourability in relation to social skills seem more promising in their evidence. An attempt to explain this theory yielded an argument that psychosis is a by-product of normal human interaction in a social environment. Social skills have a clear evolutionary benefit in society with a major polygenic heredity component. (15) Psychosis could be a result of the genetic variation of these skills leading to an individual's behaviour falling on the extremes of the distribution, showing distortion in their response and behaviour.

In other theories, we move away from talking genetics and focus on the characteristics of schizophrenia that would provide the individual with a social advantage, or at least not a disadvantage, in history. It is possible that the symptoms of psychosis elated the status of an individual in the sense that they would be considered a messenger of a higher power. This may have been the case in early civilisations and with the abundance of pagan ideologies around the world, it is likely there were numerous individuals capitalizing on these characteristics. A transient episode of psychosis may have been applauded as an episode of enlightenment or prayer. Another prestigious ability in the primitive days of society was being able to speak to the dead or spirits which could and is arguably still a profitable profession. Psychosis could have been very beneficial in many early populations around the world who in general, some sort of mystic beliefs. However, given the advancements in the past few centuries in society, the persistence and advantage of psychotic symptomology can be disputed. Schizophrenia can be severely debilitating. Therefore, the degree of disorder of schizophrenia must have been low in these profiting individuals. It is unclear the duration of time taken for natural selection to remove a gene from the pool and it is important to note that ideologies that were favourable for psychosis were abandoned only a few centuries ago, an insignificant time on the grand scale of human evolution, when the genes of schizophrenia may have already left a deep footprint. Secondly, it is well-established that schizophrenia presents with varying degrees and some individuals remaining very high-functioning. Furthermore, as a deeper understanding of medicine is acquired, individuals with schizophrenia can lead normal lives under treatment ensuring its existence. (16)

The persistence of schizophrenia in high functioning individuals may not have been a disadvantage as, as explained before, the dynamics of society allowed spiritual thinking and possibly deemed it on

the spectrum of normal. Schizophrenia of low severity would have remained undetected by natural selection. It is possible that natural selection's role here has in fact lead to a "watered down" schizophrenia and the disorder present today is a milder form.

Going back to society in its early days of primitive territorial behaviour, it is plausible that schizophrenia provided some individuals with an advantage in terms of irritability, lack of trust of the neighbour due to paranoia and a greater drive for aggression via psychotic rage. These individuals may have been able to deter an attack on their territory and possessions due to their behaviour and lack of empathy when unwell. Such behaviour could only be advantageous in the first modern humans or even in the early hominid predecessors but would not be able to sustain itself in more developed societies that would be interlinked in collective living. (17)

Around 3400 BC was when writing was invented. (18) This is considered very recent compared to the evolution of humans from their common ancestor. It is these scriptures that we rely on to formulate an impression of the early humans and their societies. The questions regarding the functionality of early societies are endless and our understanding of them are limited. This is due to the need for more sources in the first place as writing was not common practice and we only have access to scripture that has managed to survive. The role of schizophrenia and psychosis in the early days can only be speculated. The answer to how schizophrenia has survived may be straightforward and obvious if the thinking of the early upright man could be assessed.

Depression

Depression is becoming the most common disease in the next few years. The term melancholy was coined by the ancient Greeks combining the words "black and bile." (19)(20)
The term was used for a wide variety of symptoms and did not necessarily refer to depression. Other symptoms of severe depression, such as psychosis, were also recorded as part of depression. Depression is associated with a lack of movement, desire and enjoyment. The DSM-5 criteria ensure that depressed mood and loss of interest are present in the diagnosis of depression. Our modern society stereotypically depicts depression as a low mood. (21)

Similar to schizophrenia, depression has also shown uniformity of prevalence among different world populations. (22) Thus, supporting the theory that the condition has developed in the early days of evolution and has been able to maintain itself in the gene pool. However, unlike schizophrenia, depression has also been found in other species. The most notable examples are in pets such as dogs who have shown symptoms similar to depression in response to changes to routine, social group or as a result to chronic stress. The depression expressed in species other than humans is different in that many characteristics such as self-consciousness, reflection or suicidality are not present but is an interesting inter-specie similarity nonetheless. (23)(24)

Genetic favourability

There may have been some genetic favourability in genes causing depression, although this does not seem as convincing or as abundant as in the case of schizophrenia. The theories in this field rely on depression as a method of conservation of energy or sharing the identical alleles used in the immune system, for example.

A theory relates depression to a heightened innate immune response as a mechanism to protect against infection. The alleles responsible for depression also play a role in an immune response and can be evident from infancy. There have been genes that have been isolated that show a relation between depression and immunity; a hypothesis called Pathogen Host Defence hypothesis. There are limitations in this theory, namely that an innate immune response should trigger depression or

visa versa, thus predisposing an individual to something akin to septic shock every time there is a stressor inducing depression. (25)

On a molecular level, depression involves serotonin receptors, which have been found in other species, such as rodents. However, the degree to which this receptor is expressed or even present fluctuates. Rodents lacking this receptor show fewer symptoms in line with depression. Serotonin receptors have found their way into the human gene pool as a consequence of development in emotional maturity and consciousness. The stimulation of such receptors can cause depression, an unintended result of the dynamics of the anatomy of the brain. (26)

Social favourability

Again, the social aspect of depression may provide more plausible answers. The social model revolves mainly around stress, reflection and finding purpose. What stands out in depression in a social model is that the cause and effect can go both ways. Does high-performance cause depression or does depression cause high-performance?

Stress is induced by anxiety, a response that is not difficult to be imagined as an advantage. Anxiety regarding our environment is a response without which we would not be here. There needs to be a certain degree of anxiety to help avoid danger and recognise futile attempts at retaliation. This concept has been extensively studied and boiled down to the simple “flight or fight response.” Depression could be a by-product of excessive anxiety. Whether excessive anxiety is warranted due to an environment that is constantly producing dangerous situations or this high level of anxiety is an abnormality is debatable. A heightened response to anxiety causing depression may have been inevitable and a sacrifice to keeping the important advantages of anxiety. (28)

A similar idea could be that creative and successful individuals lead high-pressure lives and maintain high expectations of themselves, leading to a constant state of anxiety and stress, ultimately ending in depression. A term for this is “overachiever syndrome.” Unfortunately, individuals in this category are also less likely to seek help and are sometimes, although not an official diagnosis, are labelled with the diagnosis of “imposter syndrome” masking the depression despite its existence. (29)(30)

Another model targets the origins of stress using the advantages of reflection and analysis. Depressed individuals are very analytical and spend a considerable amount of time thinking. Behaviours such as these can be used in problem-solving and formulating action plans. Nihilism, a philosophy that everything is futile with no purpose, can be thought of as depression, yet the same philosophy has brought about other theories such as existentialism that use nihilism as a springboard to justify living and assign meaning to life even if there is not one. Nietzsche, a well-known philosopher, encourages meaning and purpose despite acknowledging the lack of meaning in life. His life has been described as very upsetting and dim, having been rejected several times by a member of the opposite sex but he has produced works that have changed our perception of reality. The role of reflection and analysis driven by depression most likely brought about these works. (31)
A similar idea is that creativity in individuals and a high IQ go hand in hand with depression driven by the ability to accept the dim reality of existence and cruelty of the world, which may operate like Pandora’s box. The terms “tortured artist” and “mad artist” are used to describe this phenomenon. Vincent Van Gogh cut off his ear due to depression and ultimately took his life. A simple search of depression in some of the most influential people in history would yield a long list of names, some of whom would be surprising. There are obvious limitations to this theory. Like schizophrenia, one would think to make the logical assumption that the depression experienced in creative individuals is mild and not severe depression or persistent depression. Ironically, the opposite seems to be true in depression. Persistent depressive disorder, previously known as dysthymia, is associated with less

creativity than major depressive disorder. A low mood for a prolonged time does not aid creativity adding to the complexity of this theory. (32)

Overall, it is already ingrained and accepted in society that creativity can lead to depression, as this has been portrayed in media where some of the most prominent individuals in history were suffering from low mood. The social model for why depression has flourished seems vast and robust.

Bipolar Disorder

The final psychiatric conditions discussed are likely the easiest to justify. Here the social model stands firm again. Bipolar disorder has been split into bipolar 1 and bipolar 2, the latter being a milder form of mania. Among psychiatric conditions, bipolar disorder, by definition, overlaps with depression and low mood. (33) The disorder dates back to the Greeks and is expressed again as melancholy. The disorder gets a specific mention in the first century in the works of Soranus of Ephesus. Bipolar disorder is present in around 1% of the world population but its distribution may not be as even as with the other psychiatric conditions. (34)

Genetic favourability

There have been genes isolated that predispose to bipolar disorder but their role in evolution seems limited.

There is a very interesting theory regarding the origins of the disorder during the Pleistocene. Bipolar disorder evolved in the northern zone due to the selective pressures of severe climate conditions and is seemingly an adaption by their Neanderthal precursors. The mood changes were dependent on the climate alternating with light and season. The circadian rhythm of humans in those climates has been modified to fit the temperament of their environment, a theory that has some genetic evidence as the “circadian gene network” in the pathophysiology of bipolar disorder has been validated. Moreover, seasonal affective disorder, a disorder similar to bipolar disorder, has shown genetic characteristics that are found in hibernating animals. Finally, populations from the southern areas who lack Neanderthal genes show a lower incidence of bipolar disorder, thus supporting this theory. (35)

Social favourability

The social advantages of bipolar disorder are clear. They become evident reasonably quickly in an average psychiatric ward. In an inpatient psychiatric ward, there are a wide range of presentations. One way of categorising these are those exhibiting positive symptoms who usually walk about the ward floor and those exhibiting negative symptoms who usually prefer to be isolated in their rooms. The energy of an individual with bipolar disorder is challenging to miss and is one of the criteria for diagnosing the disease in the DSM-5. Persistently elevated mood and persistent goal-directed activity or energy are used in its diagnosis. These individuals are creative and active during their hypomanic or even manic phases. A large number of bipolar patients are generally very successful when stable and some take advantage of their hypomanic phase, as evidenced by articles published advising on how to achieve this. Similar to depression, a search for bipolar disorder in notable individuals in history yields a long list of names.

Conclusion

Psychiatric conditions are a complex problem in the theory of natural selection. In severe forms, their hindrance can be significant to functionality. In milder forms, their possibilities are endless and favourable. Unfortunately, the anatomy of melancholy remains invisible but is slowly changing as medicine and technology progress. The concept that psychiatric conditions have outsmarted natural

selection is unlikely. It is likely that we, in the grand scheme, have a long way to go and do not fully understand these conditions.

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Specialty Trainee Charles Darwin Essay Prize Winner 2023

Vaishnavi Sornarajah is a Speciality Trainee in Dual General Adult and Old Age Psychiatry, working in Central Northwest London NHS Trust. She is keen to get engaged with the Evolutionary Psychiatry Special Interest Group especially after reading Good Reasons for Bad Feelings by Nesse.

From Ancient Rituals to Social Media; The Emergence of Self-harm Cultures

Introduction

A night shift in a Child and Adolescent Mental Health (CAMH) Unit, a peruse through social media and the tragic case of Molly Russell. These are some of the self-harming behaviours I witnessed when working with children and young people. The speed at which these behaviours can emerge and spread has been accelerated by the internet. Admissions to hospitals in England for intentional self-harm has more than trebled in 13-17-year-olds from 1,181 in 2007 to 4,075 in 2018 to (NHS Digital, 2019). The situation has caused much concern to families, health care professionals and governments leading to interventions such as the proposed Online Safety Bill. The legislative agenda aims to prevent exposure of harmful content, such as self-harm material to young people (Department for Digital, Culture Media & Sport, 2022). Much of the discourse surrounding the increased levels of suicide and self-harm lay the blame at the feet of the internet. Whilst social media companies may choose to moderate harmful content, there is a lack of discussion on why such content exists or why it proves to be so popular and spreads so quickly.

During my time as a Psychiatric Trainee, my peers and I would note that whilst most self-harming was private there were times when behaviours would spread quickly throughout a ward. Why was this the case? I hypothesise that self-harming in adolescents can occur within social groups and when it does, a subculture develops with its own prescribed socially stipulated behaviours i.e. rituals; and that this subculture develops as a coping mechanism to foster peer relations in times of stress. Greater understanding of this mechanism could give rise to alternative approaches to tackling self-harming behaviours in adolescents.

In this essay I will examine this hypothesis through the lens of Tinbergen's four questions which provide a framework for examining traits (Nesse, 2018). The questions are as follows;

1. Ontogeny: How does self-harming develop in individuals?
2. Mechanism; How does self-harming spread within a group?
3. Phylogeny; What is the history of self-harming within groups?
4. Adaptive significance; How has the trait influenced fitness?

Ontogeny: How does self-harming develop in individuals?

The causes of self-harm are multifactorial, however individuals with self-harming behaviours have often suffered from traumatic life experiences in childhood, such as exposure to violence and sexual abuse. This, coupled with poor parental attachments and a lack of knowledge on how to recognise, verbalise and manage emotions leads to intense feelings of distress and maladaptive coping strategies such as self-harming (Gunderson JG, 2018). It is thought that adverse early life experiences can impact gene expression and subsequent development of brain structures such as the amygdala which can affect emotional processing. Whilst the heritability of self- harming behaviour is high, it is hard to differentiate whether this is due to learned behaviour in the context of environmental or genetic factors. Many of the genetic markers implicated in self-harming behaviours such as *SLC6A4* (which codes for serotonin transporter) are candidate markers for other psychiatric disorders that involve emotional processing (Gunderson JG, 2018).

Possible brain structures involved are the amygdala, limbic system, insula and medial prefrontal cortex which are responsible for emotional and pain processing (Huang X, 2020). Alterations in these brain circuits could lead to increased impulsivity, high pain thresholds and emotional dysregulation that underlies self-harming. Adolescents with their underdeveloped prefrontal cortex are much more likely to engage in impulsive decision making and risky behaviours which in turn could result in the use of self-harming to regulate emotions (Casey BJ, 2008).

Self- harming behaviours can take many different forms with some of the most common being cutting, poisoning, burning, headbanging and mutilation. These actions serve the function of converting mental pain into physical pain and act as a way to communicate severe emotional pain (Nock, 2008). How do these behaviours develop in individuals given that self-harm is a brutal attack against their own body which causes pain and can negatively impact their lives?

Nock (2008) suggests that self-harming behaviours undergo both positive and negative reinforcement during early life. During childhood, individuals learn how to communicate emotions using language. However, if language fails to evoke a desired response from caregivers, such as in the context of neglect, or if the child never learnt verbal fluency, the child escalates communication from verbal to physical until the goal is achieved.

Figure 1 illustrates how this repeated process of ignored distress could escalate to self-harming behaviours (Nock, 2008). For example, if a child is crying and no comfort is elicited, they could develop scratching or cutting as a way to elicit a response.

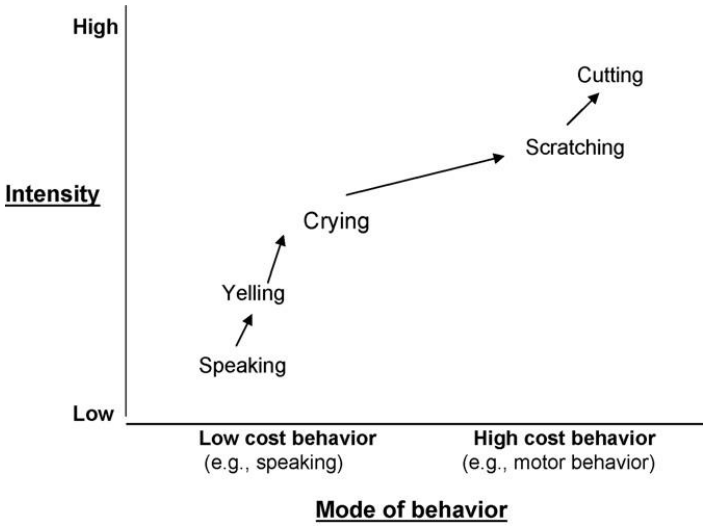

Figure 1; Illustration of hypothesis of how in the context of poor parenting styles, communication can escalate to self- harming behaviours (Nock, 2008)

These behaviours can undergo further reinforcement. Positive reinforcement would occur if the desired response is achieved. For example, if cutting elicits care when previous verbal responses did not, the individual is positively reinforced to engage in cutting when in distress. There is also a possibility that self-harm releases endogenous opioids which rewards such behaviours (Wise RA, 2014). Negative reinforce would occur in the context of the removal of an aversive stimulus, such as utilising cutting to stop unwanted emotions (Nock, 2008). Repeated reinforcement can result in a behavioural addiction forming repeated self-injury as the default method to manage emotions and communication (Blasco-Fontecilla H, 2016).

Therefore, self-harming has both inter and intra-personal functions. It serves to internally manage emotions and has a social function in the communication of distress to care givers (Nicole Heilbron, 2008). Outside of the familial unit, self-harming and its effects can be witnessed by peers leading to the spread of such behaviours.

Mechanism; How Self-harm Spreads in Social Situations

Self-harming behaviours are usually private. This means that in order for a self-harming subculture to develop, there must be a mechanism which enables it to spread from an individual to a wider base. Once it spreads and becomes public, acts of self-harm can spread through a peer group so that adolescents who had never engaged in it begin to do so. Peer influence is important for the developing teenager as peers provide support during the period of separation of child from parent (Borsari B, 2001).

Being a teenager is a daunting and isolating experience even in the context of a secure upbringing. In order to begin and maintain friendships, individuals are likely to conform to the group or imitate high status peers. Pro-social behaviours are reinforced with positive responses such as affirmation and intimacy with a consequent increase in status within in the group. Conversely, those who do not adapt to these behaviours would be ostracised from the group (Juvonen, 2008). I hypothesize self-harming can in certain contexts meet the criteria of a pro-social-behaviour in that it differentiates an individual from their parents by violating current social norms and fosters peer inclusion by creating an identity within the group which engages in self-harm.

When I was a trainee, I admitted an individual who tended to self-harm by cutting with sharp implements. Her legs, arms and torso were a patchwork of keloid scars and she always chose to wear cropped tank tops unlike others who tended to hide scarring. She came onto the ward with a copy of A Little Life by Hanya Yanagihara. This book chronicles the life of a man with a traumatic past who self-harms. By the end of the second week of her admission that book had made its way through most of the patients and I dressed and steri-stripped many of their wounds. I have observed that within the context of certain peer groups, such as adolescent patients in a CAMHS Unit, there is a risk of becoming a social pariah if one did not engage in self-harming behaviours.

For those with poor attachment, like many of the children in CAMHS, the onset of puberty often fosters an intense need for close interpersonal relationships with peers (Nicole Heilbron, 2008). If intimacy with others is predicated on engagement in self-harming behaviours it is not surprising that such behaviours spread very quickly. Self harming behaviours especially those that leave scars could also allow for a non-verbal display of status and an increase in social currency (Nock, 2008). There is a strong desire therefore to adopt the behaviour of high-status individuals, despite the physical cost of self-harming.

The social spread of behaviours is further hastened by the empathic nature of adolescents who have emerging Borderline Personality Disorder (BPD) traits. Whilst those under the age of 18 are not routinely given the diagnosis of BPD, many self-harming adolescents meet the criteria of Emerging BPD. Individuals with BPD, show deficits in theory of mind where they are unable to gauge the intentions of others. However, they exhibit greater degrees of empathy, scoring higher on self-reported scores of distress than controls when exposed to the negative emotions of others (Kılıç, et al., 2020). Those with BPD have difficultly differentiating between their own emotions and those of others. Socialization with others seems to be driven by emotions rather than intellectualizing. For example, when around anger, those with BPD feel anger themselves instead of understanding the viewpoints of others.

This likely creates intense bonds between groups of people with BPD (Gunderson JG, 2018). Another characteristic of BPD is rejection hypersensitivity, where due to poor early life attachment, individuals are understandably afraid that they will lose connections with others and will go to great lengths to maintain them.

The social milieu of a CAMHS unit which is filled with highly empathic yet isolated individuals with poor attachments and difficulty regulating emotions is therefore ripe for the formation of a group identity based on self-harm.

How self-harm spreads on social media

Outside the setting of a CAMHs Unit, the internet has been able to create spaces where self-harm is normalised. This landscape is further complicated by the advent of social media that allows the dissemination of images and methods of self-harm through user generated content. Whilst many platforms do direct online users to suicide prevention services, users are also directed to more self-harm content. When I explored these sites, I observed that content was often humorous and creative sites but was often interspersed with self-harm images and tips on how to evade care services and parental oversight. Posts often utilized language which was intentionally vague yet filled with double meanings which were only accessible to those who understood the code, for example the use of the pill emoji. Whilst this was done to evade oversight, it results in the creation of a group who understand the language and excludes those who do not (Daine K, 2013). Unique imagery and

video styles are shared by self-harm communities online resulting in the development of a culture with its own methods of communication and conventions.

Self-Harming in Cultures across the World

In order to understand the growth of self-harming subcultures in modern times we need to examine the history of self-harming and its spread across cultures.

Self-harming behaviours are neither unique to humans or to modern life. Primate relatives such as Rhesus Monkeys are known to engage in scratching behaviours when highly distressed (Meyer, 2021).

With regards to humans, ritual acts against the self is a distinguishing feature of many cultures in the world and persists throughout history. The acts could include self-immolation, piercing and flagellation which aim to cement identity and communicate the ideology of the group to those who are external to the group. I will explore some examples across the world to illustrate the commonality of these rituals.

East Asia

Fire has spiritual significance in many cultures and religions. The Lotus Sutra, a seminal Mahayana Buddhist Text describes how the Bodhisattva Bhaisajyaraja swallowed a flammable liquid and set fire to himself as an offering to the Buddha. This act reflects individual willingness to abandon their body and transcend to a different plane of existence. Ritual burning of limbs and head has been part of the Buddhist Monk ordination practices in Eastern China since the 4th Century. Self-immolation is also a feature of practices from this period and seemed to have been a response to religious persecution. An example of suicide by self-immolation is the death of Thích Quảng Đức, a Mahayana Buddhist priest who burned himself alive on the 10th of June 1963, to protest against the persecution of Buddhists by the South Vietnamese government (Michael Jerryson (ed.), 2013).

Europe

Among Flagellants, a subsect of Catholicism which arose during the early 14th century, the belief in the suffering of Christ compelled members to self-flagellate as an act of penance. This act involved the use of the whip against the skin of their back causing physical pain, blood letting and scarring. These acts coincided with the period of the Black Death and were a lamentation of the pain that Jesus endured during his crucifixion. (Michael Jerryson (ed.), 2013). The Black Death was a period of social upheaval and suffering which likely contributed to the emergence of this ritual.

Middle East

The death of Husayn, the grandson of the Prophet Muhammad (PBUH) is marked in some Shi'a communities through lamentations and rituals such as the beating of chests and self-flagellation. Flagellation symbolically repeats the blood loss suffered by Husayn and his family. His death marked the separation of different strands of Islam and the sectarian conflicts that remain to this day. The act of self-harm in this context further binds the group and mobilizes sentiment against an opposing side (Michael Jerryson (ed.), 2013).

South Asia

The ceremony of Thaipusam originated in Tamil Nadu in India and spread across the world and is practiced in various countries including Canada and Singapore. This festival in honour of the Hindu

god Murugan, involves devotees carrying a Kavadi (Ward, 1984). The Kavadi, a semi-circular platform weighing several kilograms is attached to the body using multiple metal hooks and skewers which pierce into the skin. Devotees carrying Kavadis join a procession and walk barefoot to the temple. Devotees often report entering a trance like state which limits the pain they experience. The procession involves thousands of people and lasts several hours. The altered states of consciousness during the carrying of Kavadi is followed by a decrease in stress and increase in prosocial behaviours such as charity giving (Lee EM, 2016).

The rituals described above which involve self-harming behaviours are not primarily a representation of suicidal ideations. They are instead a mechanism of group expression of emotions such as piety or an act of protest through the body. Violence against the self is both used as a mechanism to form and maintain as group in the face of resistance and persecution as well as to unlock transcendent experiences during periods of suffering.

It would be interesting to explore if there is a commonality between cultures that self-harm. Have they arisen in locations that have more variable weather and therefore famines? Has there been a greater exposure to conflict and other strife?

Adaptive significance of Ritualised self-harm

Those undergoing the rituals described above endure great physical pain that should result in a fitness cost, so why are these rituals so common? That they have developed over a wide and diverse set of populations and a long period of time suggests that there is a common mechanism to explain its recurrence. It is possible that they improve reproductive fitness of the group at the cost of the individual.

It seems the intense feelings elicited within a group context cement an individual to a group identity. This especially occurs in the context of severe traumatic events that could affect the population, such as climate stressors, discrimination or poverty. Stronger interpersonal relationships are protective against external threats and allows the continuation of the group. Xygalatas et al (2013) examined attitudes towards others following involvement in Thaipusam in Mauritius. They compared amount of money donated to the temple between those who carried Kavadi and those who participated in the ceremonies but did not carry Kavadi. Each of the 86 participants of the study were given 200 rupees which they had the opportunity to donate to the temple behind a closed booth. Those who carried Kavadi donated an average of 132 rupees whilst non-carriers donated 80 rupees. This suggests that extreme rituals increase prosocial behaviours such as generosity (Xygalatas, 2013). Prosocial behaviours would likely be and adaptive advantage in during periods of adversity as it fosters generosity rather than competition over minimal resources. This is advantageous as it increases chances that the greatest number of the group survive and reproduce.

These prosocial behaviours are further enhanced by the use of rituals to clearly delineate those who are members of a group from outsiders. Rituals in the form of socially stipulated behaviours are universal and range from how to eat to religious practices. Despite rituals costing time, effort and resources, they are utilised to facilitate group cohesion especially between non-kin (Legare CH, 2020). Those who engage in the rituals of the group are considered a part of the “in” group are perceived much more positively than those outside of the group (Molenberghs P, 2013). Self- harm displays are also shocking to outsiders which could lead to strong in-group affiliation. It is interesting to note that in the examples of self-harm rituals in different cultures the practitioners were male. This suggests that these rituals could also be displays of strength and fitness (Nock, 2008).

Navigating group living and its numerous social complexities is necessary for an individual's survival as well as the group. For example, both the act of giving birth and hunting are much more successful when individuals are supported by others, thus enhancing reproductive fitness. Ostracism from the group risks an individual's physical safety and reproductive success (Plavcan, 2012).

It is imaginable that during periods of great adversity such as famine or persecution, individuals would use self-harm as a coping strategy. Overtime these behaviours would spread throughout a group of peers with self-harming becoming ritualised to glue the group together against outside forces. These groups with greater cohesion had greater reproductive success.

The formation of self-harm cultures in a modern day context such as Goth subculture in the late 20th century and online communities currently, could represent a repetition of these ancient processes. Individuals develop self-harm as a coping mechanism and spread these ideas to peer groups. This in turn creates in groups and out groups. Self-harmers within the group engage in the practice of self-harm, use specific signals of communication and are wary of outsiders such as mental health professionals. Those within the self-harm community develop a sense of belonging to other members and share information about themselves using language that cannot be understood by outsiders. Individuals outside the community see such behaviours and have strong emotions of shock, disgust and annoyance (Huband N, 2000). This in turn further excludes those who self-harm from others.

Unlike the self-harm rituals of the past where groups consisted of a particular ethnic or religious identity comprising whole families, current self-harm groups contain adolescents and are associated with suicide. They are therefore unmoored from the family unit and are only able to seek solace and understanding from their peers. The lack of cultural constraints can lead to an escalation from self-harm to suicide (Carroll R, 2018).

Conclusion

Self-harming behaviours have been observed across species, time and cultures and varies depending on whether it is a private or public act. While psychiatry textbooks exclusively focus on the individual and familial causes of self-harm, they have neglected the possible social, cultural and evolutionary aspects.

Those who engage in self-harming behaviour are lonely, isolated individuals who use desperate means to forge and maintain social connections. The rise of self-harming behaviours in the 21st century is likely due to increased anxieties and a lack of belonging amongst many teenagers; feelings exacerbated by the recent pandemic. There is clearly a deep sense of pain in the modern adolescent experience that has resulted in use of self-harm as a coping mechanism and the creation of a self-harm subculture.

Though the internet as a vehicle for spreading self-harming behaviours is new, the usage of these rituals to form groups is ancient. Violence against the body is used for self- expression and to foster cohesion and manage emotions in groups that have undergone immense suffering. In the past these rituals improved the reproductive success of the group but now they have become maladaptive leading to suicide.

Understanding these behaviours in a modern context could help to generate new ways to tackle this dangerous sub-culture. Tackling online self-harm communities which normalise these behaviours is important. However, tweaking algorithms is not enough. What is needed are alternative avenues for

self-expression and encouraging other ways to develop positive peer relationships. This could lead to a reduction in self-harm and ultimately save lives.

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