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ADDRESS

Psychology Complex (PC)
Building 34, Room 102
1280 Main Street West, Hamilton, Ontario L8S 4K1

CONTACTS

Email | Facebook | Website

Psynapse McMaster Undergraduate Journal of Psychology, Neuroscience & Behaviour

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LETTER FROM THE EDITOR

Dear Readers of Psynapse,

As we embark on the journey through the seventh edition of Psynapse: McMaster's Undergraduate Journal of Psychology, Neuroscience & Behaviour, I extend a warm welcome to each of you. Within these pages lies a mosaic of insights and discoveries crafted by the diligent efforts of our dedicated undergraduate scholars.

I extend my gratitude to every individual whose contributions have been instrumental in bringing this issue to completion. Your collective efforts have truly made a difference, underscoring the significance of collaboration in academic endeavors.

Your unwavering interest and enthusiasm for advancing undergraduate research are extremely commendable. It is my hope that the contents of this issue ignite a spark within you, inspiring further exploration and involvement within the vibrant research community, both at McMaster and beyond.

To the esteemed executive team, your unwavering dedication to the vision of Psynapse has been a driving force behind our success. I am deeply grateful for your tireless efforts throughout the year, which have undoubtedly shaped the trajectory of this publication.

A special acknowledgment goes to Kaitlyn Mah and the design team for their invaluable contributions to the visual appeal and presentation of this issue. Your creativity and dedication have enhanced the overall impact of our publication, captivating readers with each turn of the page.

To the Mariyah Shaikh - our Editorial Director & our editoral team, our co-social media Directors Noor Butt and Emily Melo & the social media team, your patience, efficiency, and unwavering support have been indispensable to the completion and promotion of the issue. I extend my sincere appreciation to Bella Chang, our Communications Director, thank you for your diligent efforts in facilitating communication and engagement with our audience.

To the aspiring researchers and esteemed authors featured in this issue, your relentless pursuit of knowledge and innovation is truly inspiring. I commend you for your dedication to pushing the boundaries of our understanding within the realms of Psychology, Neuroscience & Behaviour, and I eagerly anticipate witnessing your future contributions.

With warm regards,

Alyssa Georgescu
Editor-in-Chief 2023-2024

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ADVANCED TOPICS & ESSAYS

Man-Made: How Hyper-Masculine Culture Promotes Radicalization

art by Iyijana nieto

By: Jack McPherson

What makes young men so susceptible to hyper-masculine culture? Over the last decade, there has been a sharp increase in male social groups who, like incels, glorify hyper-masculinity and misogyny. This is reflected by the numerous hate crimes which have been committed by radical misogynist groups in recent years. Discrimination and other forms of oppression are by and large the most common ways for an individual to adopt radicalized ideology (Trip et al., 2019). With groups like the incel movement comprised of primarily young, heterosexual, Caucasian men, they are the most societally privileged demographic (Salojärvi et al.,

2020). What is causing them to join this movement?

Some say an answer already exists for why non-discriminated individuals such as heterosexual Caucasian men become radicalized. When perceiving unfairness and injustice towards themselves, privileged demographics feel oppressed, even if that is not the case. Although this contributes to what makes men vulnerable to radical ideologies, there is a lack of explanation on why men feel oppressed and what they feel they are lacking psychologically which radical ideology replaces (Salojärvi et al., 2020). There is a better explanation for why young men have started to become so radi-

calized, and it lies in masculine culture.

It is easy to claim that men want simply to propagate the current status quo by keeping women oppressed, therefore keeping them in power. This cannot always be the case though. Men are more privileged than women universally, however, there are still social crises that affect men disproportionately, like the high prevalence of male suicide (Oliffe et al., 2019). Although the patriarchy that society has been built around benefits men significantly, there are issues with gender roles that negatively affect men in a significant way.

Men die by suicide 3 times more than women, yet women are more likely to be diagnosed with depression (Covello, 2020). Let's dissect this statistic. Men don't happen to commit suicide for reasons other than depression, what happens is men don't reach out to professionals when their mental health worsens, leading to catastrophic results such as suicide. Research has found that men have a lower help-seeking behaviour than women (Covello, 2022; Sagar-Ouriaghli, 2019). This is likely because masculine culture enforces the idea that men need to be able to do everything themselves (Scheff, 2006). Lacking this coping mechanism, men often let mental health problems go on without consulting a mental health professional, leading to mental strain and illness, sometimes resulting in fa-

tality (Mursa et al., 2022; Covello, 2022; Sagar-Ouriaghli, 2019; Lynch, 2018).

Not only does masculine culture prevent men from seeking help but also stigmatizes discussing mental health. By not discussing mental health, men do not even learn how to recognize the symptoms of mental health which leads to ignoring symptoms until it is too late (Sagar-Ouriaghli et al., 2019; Mursa et al., 2022; Covello, 2020; Oliffe et al., 2019). Imagine never learning what the symptoms of COVID-19 are and waking up with a sore throat one morning. Not knowing you could be carrying a highly contagious virus leads to detrimental effects on both yourself and the people you interact with. By not immediately taking care of yourself and preparing for worse symptoms, your symptoms may increase further in severity as the illness affects your underprepared body. This is the same with mental illness as being able to recognize symptoms can make all the difference as you can preemptively take medicine and take care of yourself before harsher symptoms arise (Lee et al., 2020).

Hygiene is the standard maintenance of health through a set of conditions or practices. Historically, many public health officials have promoted different types of hygiene to the public such as the Canadian Dental Association recommending brushing your teeth at least twice daily. As such,

men are considered to have poor mental hygiene because of their lack of mental health knowledge paired with their lack of help-seeking behaviour (Tremblay et al., 2021). Men learn at a young age that vulnerable feelings are treated as signs of weakness by others. This is contrasted by the finding many boys have that showing anger, even if false anger, is seen as a sign of strength by others. Although this is usually out of self-defence, men learn to suppress their feelings to not show vulnerability (Scheff, 2006). These learned behaviours collect into something called emotional isolation, where men feel isolated with their mental health problems leading to a lack of emotional and mental intimacy. When this poor mental hygiene is paired with emotional isolation, it results in an underlying long-term stressor that men feel from a young age. When the effects of emotional isolation and poor mental hygiene start to accumulate, men try and seek those who feel similarly to try and combat the feelings of emotional isolation (Trip et al., 2019). However, they don't want to show vulnerability. So, they seek out men who are feeling an emotion which is acceptable to others: anger (Scheff, 2006). Many of these hyper-masculine-focused radical groups endorse that anger is one of the few acceptable emotions and show this heavily in their messaging, making it easy to attract mentally isolated men. But

even if men find these groups, why do they choose to stay with them and follow their radical doctrine?

Discrimination, political repression, and socioeconomic crises are unfortunate realities for many people worldwide. Those faced with these kinds of injustices often struggle to rationalize why this is happening to them. These intense stressors shake the foundations of these individuals' core beliefs as they become more desperate to find meaning in their psychological suffering. This phenomenon is called cognitive opening as it is the point at which an individual becomes receptive to radical new beliefs that can help them cope with the stressors they are facing. This is the process of radicalization (Trip et al., 2019). Research in cult indoctrination shows similarly that a short-term stressor in addition to an existing long-term stressor can cause a cognitive opening which causes individuals to accept a new ideology in order to find support and relief (Grant, 2022). Many men who become radicalized by hyper-masculine ideology have felt the long-term stressor of emotional isolation and poor mental hygiene since their youth. These short-term stressors can take many forms such as the death of a family member or a period of extreme loneliness. This stressor is the breaking point where an individual will start to think that adopting a whole new view on life through a radical ideology is the only

way to escape their mental distress. One study estimated around 80% of cult members join when there are short-term stressors present in their lives. This new way of thinking helps the individual cope and provides them with community support. Once this support helps get the individual past the short-term stressor, the new ideology and community help fulfill the underlying long-term stressor, emotional isolation in the case of men (Grant, 2022). When men experience a cognitive opening, they are vulnerable to the radical misogynistic ideology promoted by many social groups. Groups such as this offer community to others suffering in similar ways. This builds a sense of community and intimacy among the members through their understanding of each other. Through the acceptance of a new ideology, they gain the benefit of a common enemy they can now use as a scapegoat for their mental distress which rationalizes the mental distress they feel because of emotional isolation (Trip et al., 2019). Even if members don't believe in all of the tenets of the group they have joined, they fear losing the social support and community the group has given them. This keeps members from leaving. Further time spent with the group causes new group members to reassess their beliefs and often leads to conforming completely to the group ideology in order to preserve their new interpersonal support

and community (Grant, 2022). This is not the only reason they stay, however.

Borrowing from Maslow's Hierarchy of Needs theory, we can reinterpret the short and long-term stressors that cause a cognitive opening as a lack of needs being met by the individual's current belief system and way of life. After the short-term stress is resolved with time and support from the new ideology and community adopted by the individual, these kinds of new ideologically focused groups help fulfill needs that are near the top of Maslow's Hierarchy. These needs such as belonging, community, self-esteem, and a sense of purpose are fulfilled as they work towards the goal of the ideology. Interviews with former cult members found that nearly 80% of them had a long-term stressor that they felt the cult fulfilled and cited this as one of the main reasons they found it hard to leave the cult. This long-term stressor is often caused by a lack of psychological needs being fulfilled (Grant, 2022). Men continue to stay with this group as their new radical ideologies scare away their previous social support, making them fully reliant on the group to fulfill these needs. Individuals become fully indoctrinated into these radical beliefs and fully believe in whatever scapegoat the group presents as the primary cause of their group's common mental distress. Having another group of individuals

to blame means men don't have to confront their own problematic beliefs and experience cognitive dissonance.

Consider a young man, his whole life he has been made to believe through masculine culture that he shouldn't show weakness, whether through showing vulnerable emotions or by asking for help. He lacks any kind of mental hygiene because discussing mental health is also shunned by others who perpetuate hyper-masculine culture. He feels alone and isolated even though he has friends he talks to daily. He has trouble with his romantic relationships because he has trouble communicating his emotions and needs to his partner. All of a sudden, his pet dies unexpectedly. This leads to a period of intense but temporary distress. When going through this period of stress, he sees a post from an internet celebrity saying how women are causing all of the problems in society. This young man is so upset and has been feeling so isolated for so long that he is willing to reach out to this group of people being led by this person and accept their beliefs because he is desperate for the mental distress caused by his long-term emotional isolation and the loss of a beloved pet to stop. This is magnified by how others in this group show similar symptoms of mental distress. Although he might not fully believe that all women are evil for wanting

equal rights, he may believe that some women are. This feeling of community the young man feels is so great that he doesn't want to leave the group even though he is now finished grieving his pet. As his friends learn about his involvement with this group, they become withdrawn from his life as they recognize that this group has radical beliefs. This causes him to become increasingly dependent on this group for his social needs. This group also bullies him if he ever shows that he thinks otherwise from their ideology or shows interest in leaving or distancing himself from the group. Often they do this by threatening his place in their radical ideology, calling him "not man enough" for faltering in his belief or wanting to leave the group. Not able to leave the group, he eventually accepts all of the beliefs of the ideology and becomes fully radicalized.

Hyper-masculine culture slowly has been recognized as being toxic to the mental health of men over the last few years but this finding still needs more traction in the media in order for men to realize they need to reassess their beliefs before they become victims of radicalization. Newer research into the topic of men's mental health has been discussing what the most effective interventions could be, however, interventions need to start being introduced into the public sector in order for this radicalization pipeline to be interrupted

(Mursa et al., 2022; Lynch et al., 2018). Most deradicalization interventions focus on the rehabilitation of those who have already been radicalized (Trip et al., 2019). As discussed, the radicalization of young men starts with problematic beliefs being instilled at a young age. A more effective intervention must be done earlier to have a greater effect. Educating young men about the effects of hyper-masculine culture on their mental health can help prevent this process of radicalization from happening and help with the prevalence of mental health isolation and poor mental hygiene in men.

References

Covello, K. (2020). Stigma and help-seeking behaviours of men with depression: a literature review. *Mental Health Practice*, 23(4).

Grant, S. (2022). The Cultic Lifecycle: A Thematic Analysis of Fulfillment and Fear in Cult Membership.

Lee, H. Y., Hwang, J., Ball, J. G., Lee, J., Yu, Y., & Albright, D. L. (2020). Mental health literacy affects mental health attitude: is there a gender difference?. *American Journal of Health Behavior*, 44(3), 282-291.

Lynch, L., Long, M., & Moorhead, A. (2018). Young men, help-seeking, and mental health services: exploring barriers and solutions. *American journal of men's health*, 12(1), 138-149.

Mursa, R., Patterson, C., & Halcomb, E. (2022). Men's help-seeking and engagement with general practice: An integrative review. *Journal of Advanced Nursing*, 78(7), 1938-1953.

Oliffe, J. L., Rossnagel, E., Seidler, Z. E., Kealy, D., Ogrodniczuk, J. S., & Rice, S. M. (2019). Men's depression and suicide. *Current psychiatry reports*, 21, 1-6.

Sagar-Ouriaghli, I., Godfrey, E., Bridge, L., Meade, L., & Brown, J. S. (2019). Improving mental health service utilization among men: a systematic review and synthesis of behavior change techniques within interventions targeting help-seeking. American journal of men's health, 13(3), 1557988319857009.

Salojärvi, E., Rantanen, M., Nieminen, E., Juote, A., & Hanhela, H. (2020). The'Incel'Phenomenon in the Digital Era--How Echo Chambers have Fueled the Incel Movement.

Salojärvi, E., Rantanen, M., Nieminen, E., Juote, A., & Hanhela, H. (2020). The'Incel'Phenomenon in the Digital Era--How Echo Chambers have Fueled the Incel Movement.

Scheff, T. J. (2006). Hypermasculinity and violence as a social system. UNIversitas: J*ournal of Research, Scholarship, and Creative Activity*, 2(2), 1-10.

Tremblay, G., Rodrigues, N. C., & Gulati, S. (2021). Mental Hygiene: What It Is, Implications, and Future Directions. *Journal of Prevention and Health Promotion*, 2(1), 3-31.

Trip, S., Bora, C. H., Marian, M., Halmajan, A., & Drugas, I. M. (2019). Psychological mechanisms involved in radicalization and extremism. A rational emotive behavioral conceptualization. *Frontiers in Psychology,* 10, 437.

When the Walls Come Crashing Down: The Neuropsychology of Grief

By: Izabela Tolovska

Introduction

After losing a loved one, you may be confused about what exactly is going on in your mind; there are various difficult emotions to navigate, all while you are trying to get through the day. This kind of grief can be hard to decipher, sometimes making you feel lost in the process. Grief is an emotional process experienced by an individual after they go through a loss. In this case, however, it specifically pertains to the death of a loved one (a term known as bereavement). The plethora of emotions that follow this loss may include sadness, longing, anger, and denial, among many others.

art by alyssa georgescu

Previous research done on grief and bereavement mainly focused on its psychological effects, seldom investigating the neuropsychological aspects. Neuropsychology depicts a combination of psychology and neuroscience. A summary of this research would provide a more objective viewpoint on the aftermath of losing a loved one. Although each individual who faces grief expresses it differently, the literature shows commonalities regarding how it affects the brain.

Summary of Literature

After an analysis of the pre-existing literature on grief and bereavement, a few themes emerged: the effects on the brain, the role of attachment, and how it affects people afterwards.

Brain

Several studies examining brain scans showed that experiencing bereavement altered many brain regions. One study involved eight participants who had someone close to them pass away (Gündel et al., 2003). The researchers compared the participants' reactions toward neutral photos and words versus those related to the death. They discovered that, among other regions, the severely impacted region involved control and coordination of their episodic memory retrieval, indicating that these individuals had trouble remembering the subjective details of events from their lives (Gündel et al., 2003). Bereavement can feel all-encompassing, consequently making non-related events in life blurry. After observing activity in the corresponding brain regions (such as the posterior cingulate cortex and the cerebellum), the researchers found another affected function—emotional processing (Gündel et al., 2003). When these brain regions activate together, they contribute to the powerful emotionality paired with grief.

Similarly, Freed et al. (2009) conducted functional brain scans (fMRI) on 20 participants who lost a pet, observing their brain activity when shown death-related words compared to neutral words. These participants' attention demonstrated biases toward the death-related words, to which they also had a strong emo-

tional response (Freed et al., 2009). The amygdala (the brain's main emotion region) predicted the intensity of the participants' sadness, and the dorsolateral prefrontal cortex (responsible for several cognitive functions, such as decision-making, attention, and short-term memory) correlated with attention reduction when the participants viewed the neutral words (Freed et al., 2009). These results suggest that grief affects attention regulation, as there are stronger emotional reactions to triggers related to grief.

In relation to decision-making, Fernández-Alcantara et al. (2016) investigated 38 bereaved individuals and divided them into two groups based on high and low symptoms of grief. They ran neuropsychological tests on both groups, which examined areas such as short-term memory, inhibition, and emotional decision-making (Fernández-Alcantara et al., 2016). Compared to the low symptom severity group, the high symptom severity group only performed worse on the assessment for emotional decision-making (Fernández-Alcantara et al., 2016). Although this is not a causal claim, this study provided further evidence for the possibility of an altered brain after bereavement. After losing someone, an individual likely experiences an increased baseline of emotionality, which means they are more emotional than usual. This would make

daily decision-making more difficult. Grief overwhelms people, and often, thinking about anything other than the death of their loved one feels like too much to handle.

Attachment

Attachment seems to play an integral role in the expression of grief symptoms after losing a loved one. The attachment formed to the person who passed away, whether they were a family member or not, affects resilience afterwards.

O'Connor and Seeley (2021) composed a literature review that explored attachment theory concerning bereavement. They hypothesized that there is a conflict between knowledge of a person's existence and memories of their death, therefore suggesting that grieving might be a manner of learning (O'Connor & Seeley, 2021). To further explain, the brain is confused because this person was alive and there were endless memories of them, yet simultaneously the brain is receiving information that this person is gone forever. Adjusting to this new knowledge requires lots of time as the brain theoretically accommodates their death into the previous idea of that person. The researchers explained that creating a bond with someone causes encoding, which triggers a stress response in the brain when apart from them (O'Connor & Seeley, 2021). Encoding is the part of the memory process that involves processing and storing a new memory in the brain. They suggested that this response continues even when the person passes away (O'Connor & Seeley, 2021). Typically, the return of a person rewards the brain through dopamine. In the case of bereavement, there is no longer a reward, and the brain needs to learn to update the existing knowledge of that person. O'Connor and Seeley (2021) stated that strengthening other bonds revises the attachment hierarchy to adjust for the loss of this person. The attachment hierarchy describes the differing attachment levels to various people (e.g., one might be more attached to their mother than to a classmate). The mind holds onto these memories despite wanting to let go, making the bereavement process even more difficult. It takes a while to get used to a life without the lost loved one, but learning happens eventually for most people.

Dealing with grief for a prolonged period can cause it to develop into Prolonged Grief Disorder or complicated grief, where the individual is unable to recover from the loss. O'Connor et al. (2008) explored this in further detail when they tested 11 women with complicated grief and 12 with non-complicated grief, who all lost their mom or sister to breast cancer. They did fMRIs on these women, finding that in those with complicated grief, memories of the loved

one activated the reward system in their brain (O'Connor et al., 2008). The memories almost felt like a reunion for the participants because they still had not accepted the death. Grief can bring along a wide variety of daily struggles, but there are significant risks with failing to recover from it.

Another study looked at how children deal with bereavement and how their parents' attachment style to their parents affected it. Sochos and Aleem (2021) provided questionnaires to 133 parents of bereaved children aged 6 to 16 and 101 questionnaires to parents of children who had never lost someone. The results showed that parents with high attachment anxiety or avoidance magnified the correlation between parental complicated grief and child post-traumatic stress (Sochos & Aleem, 2021). Anxious attachment involves an inability to identify emotions, while avoidant attachment involves an inability to describe emotions (Oskis et al., 2013). Anxiously attached parents often fail to provide enough support and care to their children. If there is an anxious attachment from the parent to their parents, the child would likely have a harder time adjusting to the recent death in their life due to inadequate parental support (Sochos & Aleem, 2021). Such difficulty could lead to higher rates of both internalizing problems (e.g. anxiety, depression, etc.) and ex-ternalizing problems (e.g. aggression, criminal activity, etc.).

Aftermath

Although there are positive outcomes for many people who deal with a loss, some individuals struggle with mental disorders later on. In a study done by Keyes et al. (2014), where half of the 27 534 participants lost a loved one unexpectedly, there was a higher risk of developing Panic Disorder, Post-Traumatic Stress Disorder, and depressive episodes. The risk continued at nearly every point of their lives after the loss (Keyes et al., 2014). In later adulthood, they found that there was an increased risk of having manic episodes, developing phobias, alcohol use disorders, and General Anxiety Disorder (Keyes et al., 2014). However, the most common lifelong disorders after bereavement were alcoholism (35.9% of participants) and major depressive episodes (23.7% of participants) (Keyes et al., 2014).

Figuring out how to live life after losing someone important is a lengthy, complex process; however, it is not a lost cause. One review study talked about the effects of resilience after a loss, among other positive outcomes (Chentsova Dutton & Zisook, 2007). Most people do manage to recover and adapt to their new lives successfully. Although each person grieves differently depending on a multitude of factors, the difficulties

some people experience are not universal. Bereavement can be associated with better coping mechanisms for future problems, personal growth, and a new appreciation for life (Chentsova Dutton & Zisook, 2007). Many find that commemorating their loved ones through spirituality, souvenirs, and rituals helps with their emotional struggles (Chentsova Dutton & Zisook, 2007). Sometimes, the loss allows people to strengthen their existing relationships because they suddenly realize that people are not permanent (Chentsova Dutton & Zisook, 2007). Interestingly, there are cross-cultural differences after losing someone. Shuchter and Zisook's multidimensional model of bereavement suggests that people in collectivist cultures (e.g., South American or African regions, among others) experience increased trust in other people after losing a loved one, while individualistic cultures (e.g., North America, Australia, etc.) tend to note the opposite (Chentsova Dutton & Zisook, 2007). While everyone expresses grief in various ways, they each have an opportunity to learn and grow from it.

Conclusion

Evidently, many changes can occur after someone passes away (whether neurological or psychological), increasing the importance of maximizing your support during those times through support groups, family, friends, or activities. Each person will have a different coping style, but there are endless available healthy coping mechanisms. Grief does not have to be debilitating. These are not necessarily negative changes but rather more obstacles to adjust to. However you decide to deal with loss, there is always a light at the end of the tunnel.

References

Chentsova Dutton, Y., & Zisook, S. (2007). Adaptation to bereavement. *Death Studies, 29*(10),877-903. 10.1080/07481180500298826

Fernandez-Alcantara, M., Perez-Garcia, M., Perez-Marfil, M. N., Catena Martinez, A., Hueso-Montoro, C., & Cruz- Quintana, F. (2016). Assessment of different components of executive function in grief. *Psicothema, 28*(3), 260-265. 10.7334/psicothema2015.257

Freed, P. J., Yanagihara, T. K., Hirsch, J., & Mann, J. J. (2009). Neural mechanisms of grief regulation. *Biological Psychiatry, 66*(1), 33-40. 10.1016/j.biopsych.2009.01.019

Gundel, H., O'Connor, M-F., Littrell, L., Fort, C., & Lane, R. D. (2003). Functional neuroanatomy of grief: An FMRI study. *The American Journal of Psychiatry, 160*(11), 1946-1953. 10.1176/appi.ajp.160.11.1946

Keyes, K. M., Pratt, C., Galea, S., McLaughlin, K. A., Koenen, K. C., & Shear, M. K. (2014). The burden of loss: Unexpected death of a loved one and psychiatric disorders across the life course in a national study. *The American Journal of Psychiatry*, 171(8), 864-871.

O'Connor, M-F., & Seeley, S. H. (2022). Grieving as a form of learning: Insights from neuroscience applied to grief and loss. Current Opinion in Psychology, 43, 317-322.

O'Connor, M-F., Wellisch, D. K., Stanton, A. L., Eisenberger, N. I., Irwin, M. R., & Lieberman, M. D. (2008). Craving love? Enduring grief activates brain's reward center. *NeuroImage*, 42(2), 969-972.

Oskis, A., Clow, A., Hucklebridge, F., Bifulco, A., Jacobs, C., & Loveday, C. (2013). Understanding alexithymia in female adolescents: The role of attachment style. *Personality and Individual Differences*, 54(1), 97-102.

Sochos, A., & Aleem, S. (2021). Parental attachment style and young persons' adjustment to bereavement. *Child & Youth Care Forum*, 51, 161-179.

The Evolution of Parental Decision-Making

By: Ryan Hodgson

Abstract

Parents make crucial decisions that can dramatically impact their own and their offspring's fitness. Across the animal kingdom, various parenting behaviours display these fitness-influencing decisions. As environmental conditions changed and fluctuated, evolution has favoured animals' ability to flexibly adjust their parental care behaviour to maximize their fitness under their current contexts. Yet, this flexibility is not without cost. With decision-making abilities comes the opportunity for mistakes to occur, and thus, some species display rigid and inflexible parental care behaviour. This essay highlights the adaptive contexts where evolution has favoured behavioural flexibility and decision making of care, providing insight into how and why decisions over parental care evolved.

Introduction

Parents are critical components of our lives. They raise us, nurture us, teach us and leave a lasting impact on our lives. They are the unsung heroes of our societies. Yet, how do parents make their decisions over about to raise us? Why are there vast differences in parenting? In order to understand these questions, we need to understand the costs and benefits of care and how they change while also closely examining the contexts where animals display flexibility and decision-making abilities over parental care.

Fitness Costs and Benefits of Parental Care

To understand the evolution of parental decision-making, we first need to understand that parental care is only selected for when the fitness benefits of care outweigh the fitness costs (Kölliker, 2012). By taking care of offspring, parents can incur many costs, such as high energetic expenditure, loss of future mating opportunities and high predation risk (Kölliker, 2012). Yet, they also stand to gain many fitness benefits, such as increased offspring lifetime reproduction and survival (Kölliker, 2012). Thus, the evolution of parental care decision-making involves balancing the complex trade-offs of fitness costs and benefits of care to make the most fitness-maximizing decisions.

Behavioural Plasticity of Parental Care

These competing trade-offs of costs and benefits of care are sensitive to a host of environmental factors which can change over time and context (Royle et al., 2014). Throughout an individual's lifetime, there are changes in abiotic factors, such as food availability and mating opportunities, and biotic conditions, such as temperature and wind. As these environmental conditions change, the pros and cons of investing in parental care also change. Thus, animals have developed decision-making abilities, allowing them to flexibly adjust their parental behaviour to maximize their fitness based on current conditions (Royle et al., 2014). This flexibility, known as behavioural plasticity, evolved under many conditions, creating variability in an individual's parental care behaviour. This within-individual variability introduces the potential for the phenomenon of noise in decision-making to exist. As animals decide how much parental care to invest, they are susceptible to making incorrect decisions that may have harmful downstream fitness consequences. Animals may choose to apply too much or too little parental care — inadvertently harming their fitness. Thus, evolution has shaped behavioural plasticity to exist only under certain conditions where the factors involved in decision-making are simplified and where flexible behaviour provides large enough fitness benefits. Even with these constraints, decision-making abilities that allow flexible parental care are plentiful in the animal world. The great fitness-maximizing benefits of flexible behaviour often far outweigh the costs of noise and the potential for mistakes.

Adaptive Contexts of Behavioural Plasticity

The presence of predators is a prime example of an environmental condition that invokes behavioural plasticity and decision-making in parental care. Predators are a salient factor that have a critical impact on offspring survival and heighten the costs of parental care. When faced with predators, animals must make decisions to adjust their level and
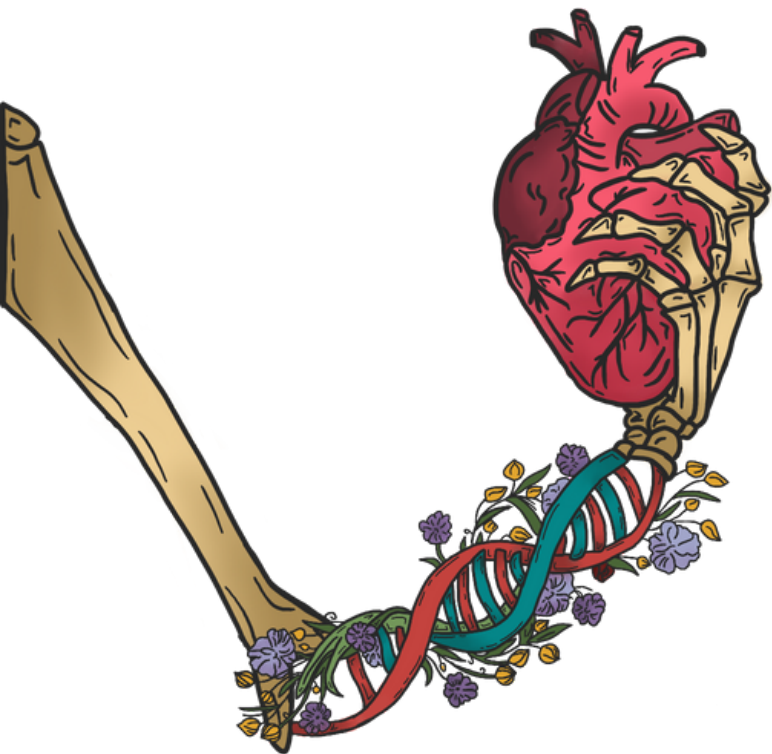
art by alyssa georgescu

type of parental care to minimize fitness costs and maximize offspring's survival. Siberian Jays (Perisoreus infaustus) show this by limiting the number of times they visit the nest and increasing the amount of food they provide on each visit while living in areas of high predation (Eggers et al., 2005). By reducing visits, Siberian Jays limit the likelihood of predators discovering their nest while providing their offspring with enough food to survive by increasing the amount per visit.

Abiotic environmental factors can also play a major role in influencing and shaping behavioural plasticity in parental care. Evidence for temperature-induced parental behavioural plasticity has been found in a small Australian passerine bird (Microeca fascinans). Individuals display drastic changes in nesting and egg incubation behaviour to rectify the costs of increased temperature (Sharpe et al., 2021). Under high-temperature conditions, females double their nest attendance and switch from incubating to shading their eggs (Sharpe et al., 2021). This behavioural change and plastic response to temperature enables the species to reduce egg mortality—albeit to a low degree, as high temperatures still claim many eggs.

Individuals, typically in biparental species, change their parental behaviour in the presence or absence of a partner (Ringler et al., 2015; Osorno & Székely, 2004). For example, in Frigate Birds (Fregata magnificens), when the male abandons his brood before the nestlings are independent, the female will double her investment into parental care to make up for his desertion (Osorno & Székely, 2004). Similar, flexible behavioural plasticity also occurs in uniparental species such as the poison frog (Allobates femoralis) (Ringler et al., 2015). In this species, males transport tadpoles on their backs as a form of parental care, but when they abandon their young, females take over this duty in a flexible response documented both in nature and the lab (Ringler et al., 2015).

In general, changing environmental conditions can play a determinant role in shaping the evolution of parental decision-making and flexible behaviour. Individuals need to be able to change their parental behaviours based on context, as this allows them to adapt to quick and temporally random changes in environmental pressures. Whether it is predation, temperature, or the presence of a partner, animals have evolved decision-making abilities that allow them to flexibly apply the most adaptive amount of care under their current conditions. These decision-making abilities have evolved under critical fitness pressures where decision-making only relies on easily identifiable and simple sources of contextual information, such as the presence or absence of predators, amount of food availability, or temperature. Under these con-

texts, noise levels are low, as decisions involve minimal factors, reducing the likelihood of mistakes. It is clear that the evolution of parental decision-making optimizes the trade-offs between the costs and benefits of care and appears to occur in contexts where noise is limited.

Sexual Selection and Consistent Parental Care

Although parental decision-making and behavioural flexibility have evolved under low-noise contexts, noise still exists. Where decision-making exists, there exists an opportunity for mistakes to occur. Thus, evolution selects for rigid, inflexible, and consistent parental care behaviour in high-noise environments. If parental behaviour is too variable and unreliable, then selection can work against decision-making abilities. One way that this occurs is through sexual selection and mate choice. Female partners often select males with consistent parental care to eliminate the costs of brood desertion. For them, consistency of parental care behaviour is an attractive cue that indicates reliability and trustworthiness, increasing their fitness (Hale & St Mary, 2007). In the monogamous, bi-parental cichlid (Pelvicachromis pulcher), females select individuals who display consistent aggression—an important parental behaviour for nest and offspring defence (Scherer et al., 2018). For this species, consis-

tency is an attractive cue for mate choice. House sparrows (Passer domesticus) also demonstrate consistency as a parental care behaviour. In this species, males show considerable consistency in parental provisioning behaviour, even when altering contexts, such as brood size and level of partner provisioning (Schwagmeyer & Mock, 2003). The sexual selection framework furthers understanding of how males remain consistent regardless of changes to brood size and partner provisioning rate. Once again, illustrating how female mate choice and selection work to constrain parental care decision-making abilities and limit variability and noise that may impede and decrease their fitness.

Discussion

In conclusion, the evolution of parental behaviour involves complex decision-making over maximizing fitness benefits and minimizing costs. It involves multiple selecting factors that allow behavioural plasticity in parental care to exist. In response to salient abiotic and biotic environmental conditions such as temperature, predators, food availability and partners' presence or absence, animals decide how much parental care to invest to maximize their fitness. From the literature, it seems that conditions that favour these decision-making abilities and flexible parenting behaviour are: (1) the environmental change

is fitness relevant and thus changing behaviour provides significant fitness benefits while minimizing costs, and (2) the information used to make these decisions is reliable and simple (ex: partner presence, food availability, environmental temperature). Under these constraints, it is evident that minimized noise enabled the evolution of animal decision-making. Literature does not identify the complex decisions that consider these multiple factors to make behavioural changes. A possible explanation may be due to experimental bias as it is harder to design experiments that involve multiple cues for decisions. Future work leads to assessing whether more complex animal decision-making exists under contexts involving multiple cues, allowing additional understanding of noise's impact on decision-making and whether it is a relevant factor in limiting evolution's decision-making abilities. The current understanding is that sexual selection is one factor limits decision-making abilities and entirely eliminates noise. Documentation of fish and bird species demonstrates that consistency in parental behaviour is attractive and that mate choice selection for individuals displays consistent parental behaviours. Evolution shaped the complex ability of animals to elicit variation, affecting decision-making on how and how much parental care to invest. Discounting variation in care as noise dismisses its

evolutionary roots, and this evolutionary perspective can further understanding on how and why parents make decisions.

References

Andersson, M., Wiklund, C. G., & Rundgren, H. (1980). Parental defence of offspring: A model and an example. *Animal Behaviour*, *28*(2), 536–542. 10.1016/S0003-3472(80)80062-5

Eggers, S., Griesser, M., & Ekman, J. (2005). Predator-induced plasticity in nest visitation rates in the Siberian jay (Perisoreus infaustus). *Behavioral Ecology*, *16*(1), 309–315. 10.1093/beheco/arh163

Ghalambor, C. K., Peluc, S. I., & Martin, T. E. (2013). Plasticity of parental care under the risk of predation: How much should parents reduce care? *Biology Letters*, *9*(4), 20130154. 10.1098/rsbl.2013.0154

Hale, R. E., & St Mary, C. M. (2007). Nest tending increases reproductive success, sometimes: Environmental effects on paternal care and mate choice in flagfish. *Animal Behaviour*, *74*(3), 577–588. 10.1016/j.anbehav.2006.12.013

Harrison, F., Barta, Z., Cuthill, I., & Székely, T. (2009). How is sexual conflict over parental care resolved? A meta-analysis. *Journal of Evolutionary Biology*, *22*(9), 1800–1812. https://doi.org/10.1111/j.1420-9101.2009.01792.x

Kölliker, M. (2012). The Evolution of Parental Care. *OUP Oxford*.

Osorno, J. L., & Székely, T. (2004). Sexual conflict and parental care in magnificent frigatebirds: Full compensation by deserted females. Animal Behaviour, 68(2), 337–342. 10.1016/j.anbehav.2003.06.027

Ringler, E., Pašukonis, A., Fitch, W. T., Huber, L., Hödl, W., & Ringler, M. (2015). Flexible compensation of uniparental care: Female poison frogs take over when males disappear. *Behavioral Ecology*, 26(4), 1219–1225. https://doi.org/10.1093/beheco/arv069

Royle, N. J., Russell, A. F., & Wilson, A. J. (2014). The evolution of flexible parenting. *Science*, 345(6198), 776–781. https://doi.org/10.1126/science.1253294

Scherer, U., Kuhnhardt, M., & Schuett, W. (2018). Predictability is attractive: Female preference for behaviourally consistent males but no preference for the level of male aggression in a bi-parental cichlid. *PLOS ONE*, 13(4), e0195766. 10.1371/journal.pone.0195766

Schwagmeyer, P. L., & Mock, D. W. (2003). How Consistently are Good Parents Good Parents? Repeatability of Parental Care in the House Sparrow, Passer domesticus. *Ethology*, 109(4), 303–313. https://doi.org/10.1046/j.1439-0310.2003.00868.x

Sharpe, L. L., Bayter, C., & Gardner, J. L. (2021). Too hot to handle? Behavioural plasticity during incubation in a small, Australian passerine. *Journal of Thermal Biology*, 98, 102921. 10.1016/j.jtherbio.2021.102921

Right in Front of Your Eyes

art by joshika jaswal

By: Chiara Fricano

Nonna is preparing her traditional eggplant parmigiana with increasing challenges and despair—slicing vegetables, simmering a fresh pot of sauce, and layering the ingredients. The centre of her vision is impaired, causing the knife she is using to look wavy and blurry, and she slices her finger (John Hopkins University, 2023). Nonna is losing her independence. Her central vision loss, due to age-related macular degeneration (AMD), interferes with daily tasks such as cooking, driving, and reading. The lack of accessible treatment and support increases AMD symptom progression, and consequently, despair. This meta-analysis explores how AMD leads to higher rates of depression in elderly people.

Mental and physical health progressively declines with age, especially in elderly AMD patients. Physical ailments of the aging population lead to pain, loss of independence, and loneliness, which are risk factors for developing a depressive disorder (U.S. Department of Health and Human Services, 2021). The elderly, debilitated by such ailments, including AMD, must rely on healthcare staff or their family to help them navigate their constantly changing world.

Rovner and colleagues (2002) characterized depression of AMD patients by loss of valued activities. Of the recruited AMD patients, 70% reported that impaired vision prompted activity loss, and consequently more depressive symptoms. A study conducted by Brody and colleagues (2001) found that 32.5% of community-dwelling AMD patients were diagnosed with depressive disorders, a statistic comparable to outpatients with life-threatening diseases such as cancer and cerebrovascular disease. Worse physical health in the aging population resulted in more lifestyle limitations and strongly correlated with more severe depressive symptoms on the Geriatric Depression Scale. As elderly patients lose their independence, depression diagnoses often follow.

Medical research neglects elderly people with AMD. Research funding is highly dependent on societal priorities. Although the aging population steadily increases as the baby boomers surpass 80+ years of age, geriatric healthcare is still neglected. For example, Lech and colleagues (2023) analyzed the relationship between depression and daily activities in elderly people living at home; however, they excluded visually impaired participants from their study. This exclusion demonstrates underrepresentation of AMD in elderly medical research. Non-inclusive trends were also found in other elderly AMD depression studies, including Rovner and colleagues (2002), which used a predominantly white (98%), female (73%) sample. Additionally, a study by Vasiliadis and colleagues (2013) found that the excess healthcare costs associated with elderly patients suffering from depression and anxiety are equally comparable to adults with mental health disorders, burdening the healthcare system proportionately. Geriatric patients do not receive equitable attention and resources in medical research, despite the comparable healthcare costs and prevalence rates. 288 million people are expected to suffer from AMD by the year 2040 (Wong et al., 2014), yet recent AMD research examining depression is outdated and limited. If research continues to underrepresent the elderly population, many questions will be left unanswered and evidence-based practices will remain non-generalizable. For example, could elderly patients respond differently to treatment than younger adults? Do racial or gender differences influence treatment outcomes? Could visual impairment affect treatment accessibility? Depressed, elderly, AMD patients deserve more attention in medical research, especially since they equally burden the healthcare system.

Problem-solving treatment (PST) can help prevent depression. Rovner and colleagues (2007) randomly assigned AMD patients to a control

group or to a PST group receiving six in-home counselling sessions over eight weeks. Two months of counselling treatment reduced the odds of developing a depressive disorder by 50% in the PST group relative to the control group. Patients with AMD who received PST treatment were also more likely to continue valued activities. Therefore, even if PST does not directly decrease the prevalence of depressive symptoms, their severity will be reduced. However, six months after discontinuing PST, the depression prevalence was no longer significantly different between groups. This finding supports the idea that PST is only a short-term preventative treatment against depression in AMD patients. Specifically, regular PST sessions are required to reap the benefits, otherwise the patients' depression risk returns to baseline. Furthermore, given the lengthy wait times to receive mental health treatment (Fraser Institute, 2023), a simpler depression screening tool would expedite the process for diagnosis, then PST. Augustin and colleagues (2007) compared the Hospital Anxiety and Depression Scale (HADS) with "three complex depression screening instruments. Two HADS questions could accurately identify 95% of severely/moderately depressed AMD patients. Simplification of the HADS as a depression diagnostic tool, from seven questions to two questions, would allow ophthalmolo-

gists to quickly screen AMD patients for depression, which will in turn allow patients to start PST earlier and reduce the burden on the healthcare system.

Depression in elderly patients suffering from AMD is common, yet manageable; however, it is not well researched nor treated. Conducting more inclusive research would improve our evidence-based practices, since one method of treatment does not necessarily fit the needs of an entire population. Elderly patients experience reduced income, variable treatments covered under the government drug plan (Cortes & Smith, 2022), and high deductibles that act as a barrier to drug plan accessibility (Clement & Memedovich, 2018). It is important to minimize financial worry as patients try unsuccessful treatments, until identifying what works best for them. Modification of the HADS depression diagnostic tool would allow for faster depression diagnoses in AMD patients, especially given the limited resources in our current healthcare system. Once a patient has been diagnosed with a depressive disorder, PST is an accessible treatment option to successfully manage their depressive symptoms. It is simple and important to ensure that the oldest and most vulnerable population maintains connections and involvement in valued activities in the community. This allows visually impaired elderly people to preserve a

level of independence, consequently improving mood. Ultimately, elderly patients need more inclusive and streamlined medical research and healthcare. The people who built society as we know it deserve to see its future. More accessible and equitable mental health care will improve the quality of life of elderly people, allowing them more time to share their knowledge and experience, such as Nonna's eggplant parmigiana recipe.

References

Augustin, A., Sahel, J., Bandello, F., Dardennes, R., Maurel, F., Negrini, C., Hieke, K., Berdeaux, G., MICMAC Study Group. (2007) Anxiety and depression prevalence rates in age-related macular degeneration. *Invest Ophthamol Visual Sci*, 48(4), 1498-1503.

Brody, B.L., Gamst, A.C., Williams, R.A., Smith, A.R., Lau, P.W., Dolnak, D., Rapaport, M.H., Kaplan, R.M., & Brown, S.I. (2001) Depression, visual acuity, comorbidity, and disability associated with age-related macular degeneration. *Ophthalmology*, 108(10), 1893-1900.

Clement, F., & Memedovich, K. A. (2018). Drug coverage in Canada: Gaps and opportunities. *Journal of Psychiatry and Neuroscience*, 43(3), 148–150. https://doi.org/10.1503/jpn. 180051.

Cortes, K., & Smith, L. (2022, November 2). Pharmaceutical access and use during the pandemic. www150.statcan.gc.ca/n1/pub/75-006-x/2022001/article/00011-eng.htm.

Fraser Institute. (2023, October 10). Health Care Wait Times. https://www.fraserinstitute.org /categories/health-care-wait-times.

Johns Hopkins University. (2023, October 17). Age-related macular degeneration (AMD). Johns Hopkins Medicine. www. hopkinsmedicine.org/health/conditions-and-diseases/ agerelated-macular-degeneration-amd.

Lech, S., Mümken, S., Kessler, E-M., & Gellert, P. (2023) Life-space mobility among home-living older adults with care needs and clinical depression—A cross-sectional analysis. Int J Geriatr Psychiatry, 38(1), 1-9.

Rovner, B.W. & Casten, R.J. (2002) Activity loss and depression in age-related macular degeneration. *Am J Geriatr Psychiatry*, 10(3), 305-310.

Rovner, B.W., Casten, R.J., & Hegel, M.T. (2007) Preventing depression in age-related macular degeneration. *Arch Gen Psychiatry*, 64(8), 886-892.

U.S. Department of Health and Human Services. (2021) Depression and older adults. *National Institute on Aging*. www.nia.nih.gov/health/depression-and-older-adults.

Vasiliadis, H-M., Dionne, P-A., Préville, M., Gentil, L., Berbiche, D., & Latimer, E. (2013) The excess healthcare costs associated with depression and anxiety in elderly living in the community. *Am J Geriatr Psychiatry*, 21(6), 536-548.

Wong, W.L., Su, X., Li, X., Cheung, C.M.G., Klein, R., Cheng, C-Y., & Wong, T.Y. (2014) Global prevalence of age-related macular degeneration and disease burden projection for 2020 and 2040: a systematic review and meta-analysis. *Lancet Glob Health,* 2(2), 106-116.

Healthy Body, Healthy Mind: How Exercise, Diets, and Socialization Slow the Progression of Alzheimer's Disease
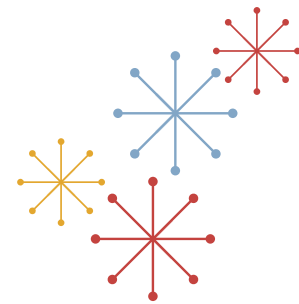
By: Hafsa Shafi

Alzheimer's Disease (AD) is the most common form of dementia, a condition of the brain projected to affect up to 82 million people worldwide by 2030 (Guerchet et al., 2020). Being a neurodegenerative disease, AD affects many parts of the nervous system, including the hippocampus, a brain region responsible for memory (National Institute on Aging, 2017). The symptoms of AD include memory loss, cognitive deficits, issues with reading and writing, recognition, personality, and spatial awareness (MacGill, 2020). These factors can contribute to an inability to manage one's health and a deteriorating sense of autonomy. AD primarily affects the elderly, and less than 10% of patients are younger than 65 (Kumar et al., 2022). Unfortunately, doctors cannot officially diagnose AD until death and examination of the brain, so they can only hypothesize its causes. Without a clear cause for the disease, effective treatments and in-

terventions do not yet exist. As a result, the aging population worldwide may experience poor quality of life and early mortality. Fortunately, various researchers from different fields in the life sciences are approaching this challenge. Research from physiology, nutrition, and sociology suggests that healthy lifestyles are the key to treating AD.

Brain health is heavily related to cardiovascular health. The brain needs a constant supply of oxygen and nutrient rich blood to function properly. Exercise physiologists propose that maintaining a healthy heart can be an effective therapy for AD. In a randomized control trial, individuals with early-onset AD were put in a 26-week aerobic exercise program (Morris et al., 2017). Researchers measured memory, executive function, and hippocampal volume before and after patients underwent exercise. Aerobic exercise was positively associated with memory performance

and hippocampal volume. Greater hippocampal volume is related to increased cognition, while a reduction is associated with worsening AD. Thus, implementing daily aerobic exercise can slow the progression of AD and serve as an effective therapy for people at risk of AD. Exercise physiologists recommend living a healthier lifestyle to reduce the risk of AD.

Dieticians are tackling the challenge of AD from a nutrition-focused lens. A study by Morris and colleagues investigated the effectiveness of different diets at reducing the risk of AD in individuals (2015). They examined the effects of following the MIND diet, a modified combination of Mediterranean and DASH diets which stress dietary approaches to stop hypertension. These diets consist of foods rich in potassium, calcium, magnesium, fiber, and protein and low in saturated fat and sodium (Mayo Clinic, 2021). They found that following this diet resulted in a reduction in the rate of progression of AD, with up to 53% reduction in those adhering most strictly to the MIND diet. People with AD showed a slower cognitive decline with a diet of two servings of leafy vegetables a day and two servings of berries with one fish meal a week. This diet is better for the overall functioning and protection of the brain. Nutrition researchers em-

art by joshika jaswal

phasize eating healthier diets to aid in AD prevention in our aging populations.

Socialization also plays a significant role in maintaining brain health. Sociologists have studied the effects of socialization on AD progression. A study by Sutin and colleagues found that loneliness is associated with a 40% increased risk of AD (2020). Other studies have also observed the lives of people with AD and found that even those with a low genetic predisposition for dementia still developed the disease due to loneliness (Salinas et al., 2022). These studies indicate that a lack of socialization is correlated with an increased risk of AD, and increasing social activities and bonding can serve as a potential therapy. Sociologists encourage individuals to engage in continued healthy social connections and bonding, to slow the progression of AD.

Researchers across the sciences concur that adopting a healthy lifestyle is crucial for people with AD. Findings from kinesiology, sociology, and dietetics show that a change in lifestyle choices can slow the progression of the currently uncurable disease. One comprehensive way to integrate the results of these three research areas is to find fitness buddies for people with AD (Shen et al., 2021). Participating in healthy diets and fitness activities with a group of people can help individuals with AD enjoy physical and nutritional wellness as a social activity! Employing such an interdisciplinary therapy has the potential to decrease the cognitive decline of people with AD and improve the lives of the aging population. With continuing advancements in such interdisciplinary research areas, we can soon gain holistic interventions for AD. Until then, living a healthy lifestyle is a great way to cope with AD and its effects.

References

Guerchet, M., Prince, M., & Prina, M. (2020, November 30). Numbers of people with dementia worldwide. *Alzheimer's Disease International (ADI)*. www.alzint.org/resource/numbers-of-people-with-dementia-worldwide/

Kumar, A., Sidhu, J., Goyal, A., & Tsao, J.W. Alzheimer Disease. [Updated 2022 Jun 5]. In: StatPearls [Internet]. Treasure Island (FL): *StatPearls Publishing*; 2023 Jan-. Available from: www. ncbi.nlm. nih.gov/books/NBK499922/

MacGill, M. (2020, September 23).What to know about Alzheimer's disease. *Medical News Today*. www. medicalnewstoday.com/articles/159442

Mayo Clinic (2021, June 25). Healthy Lifestyle, Nutrition-and Healthy Eating. DASH diet: Healthy eating to lower your blood pressure. https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/dash-diet/art-20048456

Morris, J. K., Vidoni, E. D., Johnson, D. K., Van Sciver, A., Mahnken, J. D., Honea, R. A., Wilkins, H. M., Brooks, W. M., Billinger, S. A., Swerdlow, R. H., & Burns, J. M. (2017). Aerobic exercise for Alzheimer's disease: A randomized controlled pilot trial. *PloS one*, 12(2), e0170547. 10.1371/journal.pone.0170547

Morris, M. C., Tangney, C. C., Wang, Y., Sacks, F. M., Bennett, D. A., & Aggarwal, N. T. (2015). MIND diet associated with reduced incidence of Alzheimer's disease. Alzheimer's & dementia : *the journal of the Alzheimer's Association*, 11(9), 1007–1014. https://doi.org/10.1016/j.jalz.2014.11.009

National Institute on Aging (2017, May 16).What Happens to the Brain in Alzheimer's Disease?

Salinas, J., Beiser,A.S.,Samra,J.K, O'Donnell,A., DeCarli,C.S., Gonzales,M.M, Aparicio,H.J & Seshadri, S. (2022). *Neurology* 98(13) e1337-e1348; 10.1212/WNL.0000000000200039

Shen, L. X., Yang, Y. X., Kuo, K., Li, H. Q., Chen, S. D., Chen, K. L., Dong, Q., Tan, L., & Yu, J. T. (2021). Social Isolation, Social Interaction, and Alzheimer's Disease: A Mendelian Randomization Study. *Journal of Alzheimer's disease : JAD*, 80(2), 665–672.

Sutin, A.R., Stephan,Y., Luchetti,M., Terracciano,A. (2020). Loneliness and Risk of Dementia, *The Journals of Gerontology*, 75(7), 1414–1422.

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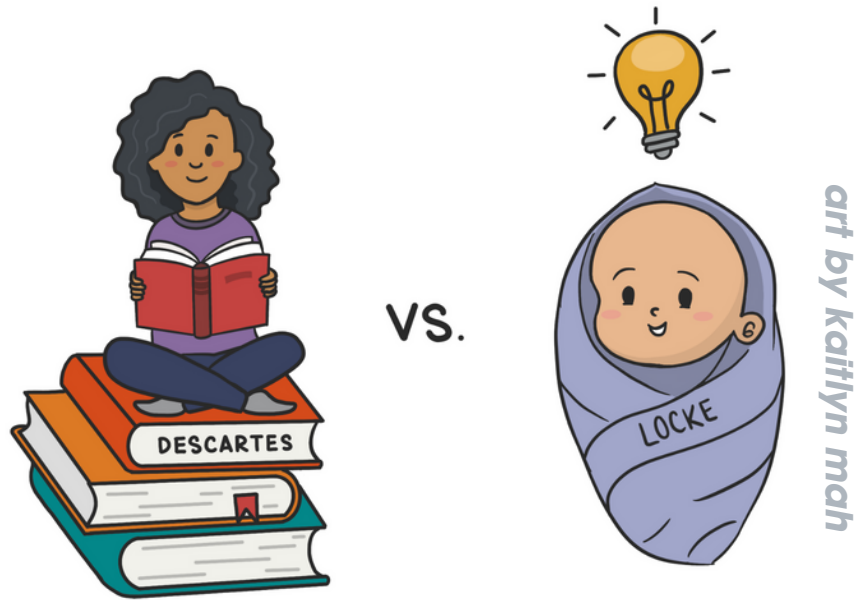
Human Knowledge: How Does One Explain It?

By: Mariyah Shaikh

How does one explain the vast amount of knowledge humans possess? This is the question many early epistemologists such as Locke and Descartes attempted to answer. According to their philosophical thought, there are two opposing explanations: Locke argues for an empiricist perspective that humans acquire the knowledge through experience, while Descartes argues that humans are born with some innate knowledge (Schultz & Schultz, 2011). How do we know which explanation is right? Well, according to Occam's razor, when there are two competing theories explaining the same phenomenon, such as the theory of human knowledge, the simpler theory is to be preferred (Duignan, 2022). The preferred theory between the two would be the one with the fewest assumptions (Duignan, 2022). Therefore, this paper will argue how an empiricist philosopher, like Locke, follows Occam's razor when arguing the theory of knowledge. Contrarily, a rationalist philosopher, like Descartes, violates Occam's razor, while attempting to explain the same phenomenon.

Background on Empiricism and Locke

According to an empiricist, knowledge can only be acquired through experience (Markie & Folescu, 2021). John Locke, the founder of British empiricism, argues that all human ideas come from experience (Rockwood, 2021). Thus, humans must be born without any knowledge (Schultz & Schultz, 2011). Locke reasons that ideas a person is thought to be born with, for instance, the idea of God, seeminnate because individuals were taught these ideals in early childhood, and therefore, cannot remember a time in which they were unaware of the concept (Schultz & Schultz, 2011).

Background on Rationalism and Descartes

Rene Descartes, the father of rationalism, believed that the mind and body were different entities that interacted with each other, but the only function of the mind is to have thought (Schultz & Schultz, 2011). Specifically, he suggested that the mind produced two types of ideas: derived or innate (Schultz & Schultz, 2011). According to a rationalistic philosopher like Descartes, human knowledge would be acquired through reason, independent of the external senses (Fieser, 2020). Thus, though Descartes believed derived ideas to be the result of experience with external senses, he suggested that even derived ideas contain some innate knowledge (Newman, 2019; Schultz & Schultz, 2011). This innate knowledge does not come from the external world, rather they develop through consciousness (Schultz & Schultz, 2011).

Assumptions

An empiricist perspective on human knowledge makes less assumptions than a rationalist. First, both Descartes and Locke assume humans have knowledge. With Descartes's rationalistic perspective, humans must have knowledge because some knowledge is innate. Similarly, according to Locke, humans will have knowledge because from the moment a person is born, they will always encounter experiences with their senses, such as feeling their mother's touch. These sensations allow for simple ideas to form knowledge, which can then become complex knowledge.

However, Descartes's innate idea of knowledge requires further assumptions on the notion that there must be something outside of the human which allows for the mind to have this innate knowledge. Formerly, this assumption can be known as The Innate Knowledge Thesis, which is essential to a rationalist perspective, and thus to Descartes (Markie & Folescu, 2021). The Innate Knowledge Thesis suggests that knowledge is just part of our nature, whether that is attributed to gaining that knowledge

from an earlier existence or if God provided us with that knowledge (Markie & Folescu, 2021). Specifically with Descartes argument, he assumes that innate knowledge is put into every human mind by God at the time of creation (Markie & Folescu, 2021). This assumption, that God is necessary for the existence of human knowledge, is not required with Locke and his empiricist perspective of human knowledge. Since Locke argues that all knowledge is acquired through experience, he follows a Tabula Rasa philosophy where the human mind is a blank slate (Uzgalis, 2022). Thus, with Locke's explanation there is no need for an entity outside of the human to preload the mind with certain knowledge before the human is even born.

Conclusion

According to Occam's razor, Locke's views on knowledge is preferred as ihas less assumptions than Descartes view. Both Locke and Descartes are trying to explain the existence of human knowledge. Locke believes the simpler explanation, arguing that experience is what allows humans to have knowledge. Thus, the only assumption Locke is making is that humans will have knowledge. Though Descartes also assumes that humans have knowledge, his theory of innate ideas forming knowledge requires more assumptions such as the existence of

God and the universality of human knowledge. Since Descartes is making more unnecessary assumptions than Locke to explain the same psychological phenomena, Descartes is grossly violating Occam's razor. Contrarily, with Locke, he is adhering to Occam's razor as he only has one assumption to how humans possess knowledge.

So, does that mean Locke is correct with his theory suggesting that humans acquire knowledge through experience? Behaviourism psychologists would argue that Locke is correct and that humans need experience to acquire knowledge. The theory of behaviourism simply states that behaviour, a type of knowledge, is learnt through experience (Rutherford, 2019). Psychologists who hold this behaviourist perspective, like Albert Bandura, would support Locke's theory on acquiring knowledge. Specifically, Bandura proposed the social learning theory, which suggests that behaviour is learnt through observation and imitation rather than punishment (Rutherford, 2019). Bandura based this theory on a series of experiments known as the Bobo doll experiments, where he found that children that observed adults engaging in more aggressive or violent behaviour were more likely to be aggressive towards a Bobo doll, thus learning to imitate the adult's behaviour (Rutherford, 2019). If Locke was alive when social psychology became

popular, he would agree with Bandura and suggest that children must have the experience of witnessing adult social behaviours for children to imitate those behaviours.

Although there is no certain answer to how humans possess knowledge, the simplest explanation is that humans acquire it through experience, as proposed by Locke. This empiricist perspective was argued hundreds of years ago and continues to be supported with modern-day psychology experiments explaining human behaviour.

References

Duigan, B. (2022). Occam's Razor. In *Encyclopedia Britannica*. www.britannica.com/topic/Occams-razor

Fieser, J. (2020). Continental rationalism. The History of Philosophy: A Short Survey. *University of Tennessee at Martin*. www.utm.edu/staff/jfieser/class/110/7-rationalism.htm

Markie, F., Folescu, M. (2021). Rationalism vs. Empiricism. In E. N. Zalta & U. Nodelman (Spring 2021 ed.). The Stanford Encyclopedia of Philosophy. *Metaphysics Research Lab, Stanford University*. plato.stanford.edu/entries/rationalism-empiricism/#Rati

Newman, L. (2019). Descartes' Epistemology. In E. N. Zalta (Spring 2019 ed.), The Stanford Encyclopedia of Philosophy. *Metaphysics Research Lab, Stanford University*. plato.stanford.edu/entries/descartes-epistemology/

Rockwood, N. (2021). Locke: Epistemology. I*n Internet Encyclopedia of Philosophy*. https://iep.utm.edu/lockee.p/#;-:text=John%20Locke%20(1632%2D1704),the%20 need%20for%20empirical%20 evidence

Rutherford, M. D. (2019). Developmental Psychology: An Evolutionary Perspective. *Lulu Publishing Services.*

Schultz, D. P., Schultz, S. E. (2011). A History of Modern Psychology (10th ed.). Wadsworth, *Cengage Learning*.

Uzgalis, W. (2022). John Locke. In E. N. Zalta & U. Nodelman (Spring 2022 ed.). The Stanford Encyclopedia of Philosophy. *Metaphysics Research Lab, Stanford University.*

Using Art Therapy for Treating Schizophrenia

By: Yu Qian

Abstract

Schizophrenia is traditionally treated primarily with medication. However, medication does not work the best on its own; one or more complementary treatment options are often suggested by medical practitioners. In this paper, art therapy is examined as a complement to schizophrenia treatment. Art therapy is a relatively new form of psychotherapy, and it is gaining attention from medical professionals as a part of schizophrenia treatment plan. This paper reviews pertinent literature to provide an understanding of schizophrenia, psychosis, art therapy and its process, as well as the outcomes of using art therapy for treating schizophrenia. Literature is accessed and retrieved through McMaster online library. The author found that art therapy not only can alleviate symptoms of schizophrenia but can also improve patients' social abilities. The findings are encouraging and promising, yet study deficits and insufficient evidence-based research are problems that impede the popularization of using art therapy to treat schizophrenia. More researchers and art therapists are directing their focus on producing empirical studies around art therapy treatment.

Keywords: schizophrenia. art therapy. treatment. symptom relief.

Schizophrenia: diagnosis and symptoms

The most clinically useful, reliable, and authoritative definition of schizophrenia so far is found in DSM-V (Tandon et al., 2013). Characteristic symptoms of schizophrenia defined in DSM-V include delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behavior, and negative symptoms (i.e., affective flattening, avolition—a pronounced inability to initiate and persist in purposeful activities, or alogia—an interruption in the cognitive process causing difficulties in speaking coherently and maintaining fluent speech) (Tandon et al., 2013). Diagnosis of schizophrenia requires the occurrence of two or more of the listed symptoms with each symptom existent for a month (Tandon et al., 2013). This paper adheres to the diagnostic

definition of schizophrenia from DSM-V to examine whether art therapy is capable of treating schizophrenia.

Psychosis: in relation to schizophrenia

Delusions, extended hallucinations, confused speech, or catatonic behavior altogether are referred to as psychosis (Beer, 1996), which are the positive symptoms of schizophrenia. Schizophrenic patients experience difficulties in differentiating self from non-self (Ruddy & Milnes, 2005) as many patients with schizophrenia experience psychosis. Reduced self-concept makes people with schizophrenia incapable of forming a relationship with the self and the external world (Patterson et al., 2011). The fear of not being able to trust neither the external world nor the internal world, leads to isolation. Patterson et al. (2011) quoted from one of the art therapists in their study to validate this point that when one cannot trust oneself and one's mind, it feels safer to withdraw than interact. Schizophrenic patients isolate themselves to have a sense of safety within, yet without intervention, this could lead to worsened symptoms and decreased life quality. Although the formidable obstacle resulted from the vicious cycle of isolation lies ahead, schizophrenic patients can seek symptom improvements through psychotherapy. They find it challenging to trust spoken words, making it difficult for the population to exchange perspectives verbally (Killick, 2017). Mainstream psychotherapy typically occurs through spoken conversation; art therapy would be, in this case, a perfect match to visualize the unspoken or uncovered thoughts, feelings, or traumas.

Art therapy: a complement treatment to medication

Art therapy incorporates psychotherapy and creative processes to help express thoughts and feelings that are otherwise difficult to articulate. It uses imagery, color, and shape as a part of the creative therapeutic process. Art therapy must be practiced by a licensed art therapist of the region or territory (Canadian Art Therapy Association, n.d.). One of the core therapeutic goals of art therapy is to facilitate self-exploration and to

art by lyljana nieto

articulate cognitions and emotions that are challenging to be expressed verbally.

Process of an art therapy session

While each art therapy session is unique to the patient, there is commonality of the art therapy process that is universally recognized and practiced. Patterson et al. (2011) depicted the process of art therapy in their study with art therapists' description. The patient makes art with the presence of an art therapist, who is observant and responsive to the patient's art making process, imagery, body language, and so on. The art therapist in the room is actively analyzing and interpreting the patient's behavior. They also ensure a safe and free environment for the patient. The patient should not feel obligated to make anything, which means patients are permitted to be present in the room without having to do anything (Patterson et al., 2011).

The main element of schizophrenia treatment is medication, but there remains 5-15% of medicated patients who continue experiencing symptoms (Ruddy & Milnes, 2005). Psychotherapy is often prescribed to patients who continue experiencing symptoms. Röhricht (2009) exhibited that traditional talking therapies showed limited treatment response for chronic schizophrenia, from which the author hypothesized that there are positive outcomes when using art therapy to treat schizophrenia. Art therapy has the ability to unveil one's nonverbal experiences, so that the patient and the therapist can uncover psychological structures that are difficult to be reached by talking therapies. Individual or group art therapy both reported positive treatment outcome for symptoms of schizophrenia. Individual art therapy facilitates self-exploration, with the intention to form connections within oneself (Patterson et al., 2011). Group art therapy offered the experience of being a member in a miniature community, and this sense of community strengthens the concept of self for each member during the therapeutic process (Killick, 2017). Art therapy emphasizes self-exploring and understanding, which is expected to enable psychosis symptom relief.

Methodology

This paper reviewed pertinent literature accessing the databases and journals from McMaster University online library. Three primary articles and books examined in this paper are Art therapy for people diagnosed with schizophrenia: Therapists' views about what changes, how and for whom by Patterson et al. (2011), Shaping consciousness: Phenomenological art therapy with adults in psychotic states in Art Therapy for Psychosis (Killick, 2017), and A neglected area in schizophrenia treatment and research: the efficacy of art therapy:

Results of a pilot randomized controlled trial and qualitative study in Arts Therapies and New Challenges in Psychiatry (Montag & Dannecker, 2018).

Results and Discussion

A randomized controlled trial on treating schizophrenia using art therapy, conducted by Montag & Dannecker (2018), yielded promising results. The researchers randomly assigned half of the screened patients to art therapy group and the other half to control group where they would receive standard hospital treatment without art therapy or exposure to art related therapeutic treatments (Montag & Dannecker, 2018). Patients with schizophrenia assigned to art therapy showed a significant reduction of positive symptoms at both post-treatment and the 12-week follow-up interview. Negative symptoms were also significantly curtailed in the art therapy treatment group. Psychotic and depressive symptoms were measured by the Scales for the Assessment of Positive and Negative Symptoms, outlined by Andreasen (1983, 1984) and the Calgary Depression Scale for Schizophrenia outlined by Müller et al. (1999) (Montag & Dannecker, 2018). Montag & Dannecker (2018) claimed that global psychosocial functioning was higher in art therapy group members. Higher functioning summarizes lower symptom severity,

enhanced personal skills, and improved reintegration of the participants into community (Gorwood, 2012). Global psychosocial functioning was also one of the primary outcomes measured using the criteria outlined by Saß, Wittchen, Zaudig, and Houben (2003) (Montag & Dannecker, 2018). It is evident that art therapy reduced both positive and negative symptoms of schizophrenia. Art therapy also has the potential to help schizophrenia patients phase out of isolation and reaccommodate to community.

Symptom relief can be realized in various ways in art therapy. Art therapy establishes a sense of being visible as realistic artwork is finished (Patterson et al., 2011). This works when the patient expresses onto the artwork and sees the important piece, witnessed by the art therapist (Killick, 2017). Patients often use objectification when exploring with the therapist during sessions to obtain relief. Objectification aids the patient in perceiving themselves as distinct from their thoughts and emotions, fostering a sense of existence and enabling them to scrutinize their thoughts without feeling threatened; these thoughts are temporarily viewed as integral components of the art created rather than inherent aspects of themselves (Ray, 2020). Ultimately, externalizing a thought or experience onto a media creates a distance for the patient to reflect, this

process validates patients' internal life and opens a gate to further self-exploration and understanding. This promises patients' enhanced capability in forming relationships with the self, and thus results in improved self-concept as for psychotic symptom alleviation.

Moreover, the process of art-making allowed patients in art therapy experience different levels of emotional fluctuation, which was described as "feeling alive" by Patterson et al. (2011). Although emotional fluctuation and "feeling alive" are dissimilar ideas, the author argues that both ideas are subjective evidence from patients' self-report of art therapy experience, indicating change in negative symptoms, particularly affective flattening remission. Affective flattening constrains schizophrenia patients' ability to feel and to experience emotions of different intensities. Art making in art therapy removes the constraints, allowing the participating patient to regain access to different emotions, and then ushering them into experiencing different sensations of the emotions. Progress of affective flattening remission after each therapy session varies individually, as it may be drastic for some, while subtle and stable for others. The levels of emotional change can be differential intrapersonally as well as interpersonally. Individual treatment differences explain why there are diverse degrees of emotional fluctuation. The

participant from the study conducted by Patterson et al. (2011) described their experience of affective flattening remission as another new beginning of feeling liveliness. The author argues that the term "feeling alive" was addressing the patient's excitement of being able to experience emotions again, and "feeling alive" was used as a rhetorical device to emphasize the emotional improvement from art therapy. Following evidence supporting the idea that art therapy alleviates affective flattening, art therapy also promotes "sensory presence" and subsequently reinforces the patient's basic sense of self (Killick, 2017). Killick's (2017) art therapy approach to the painting process commanded the patients to focus more on external reality, such as selecting colors while considering room lighting, rather than immersing themselves in repetitive internal rumination. Killick (2017) argued that participants in her group art therapy reported experiencing an absolute sense of presence, suggesting that art therapy enabled participating patients experiencing one's own sensations with the surroundings. Increased emotional fluctuation and enhanced sensations both demonstrate changes in the apathetic aspects of schizophrenia. It is safe to conclude that art therapy alleviates the negative symptoms in schizophrenia; it particularly posits affective flattening remission.

Alongside affective flattening re-mission, the art making process also showed improvements in schizophrenia patients' self-concept in terms of control, internal trust, and identity recognition. Firstly, they develop a sense of self-government and control (Patterson et al., 2011). During the therapy, patients are free to select preferred materials and apply them. Art therapists provide no instructions on what materials to use or how patients should create their own artwork. Patients have the freedom to share their creation with others or not. This hands-on therapy enables the patient to think and make decisions as an individual. It is one of the fundamental steps toward gaining better access and control over a schizophrenia patient's body and thoughts, signifying the process of recovery. Secondly, these patients begin understanding and trusting their internal truths (Patterson et al., 2011). Externalizing internal feelings onto a visible object solidifies their connection to the self. This process of externalizing one's internal reality fills the gap between the patient's perception and the self, which anticipates psychosis symptom relief. It may successfully elevate schizophrenic patients' connection to themselves. A third improvement is that many patients are given the power to identify as an artist (Patterson et al., 2011). This new identity is preferred to an identity as a person with schizophrenia or mental illness, because the latter not only involves negative social stigma, but also reminds the individual of their losses and pain due to schizophrenia. The sense of achievement is important to the patient's connection to oneself and their overall sense of self-worth. For many people with schizophrenia, this mental illness and its treatment compel them to leave their family, work, friends, and almost every aspect of their lives. A loss of identity can be devastating, but art therapy empowers patients to give themselves a new one.

Conclusion

Art therapy is relatively new to the contemporary, recovery-oriented mental illness field, as compared to the systematized, medicalized mental health care institutions. By using artwork as a mediator between the therapist and the patient(s), art therapy minimizes patients' fears or anxieties about therapists intruding into their internal world, while empowering patients to develop autonomy, boundaries, self-expression, self-exploration, and understanding. The artwork functions as an exporting tool for patients with schizophrenia. Despite difficulties in articulating a psychotic mind, schizophrenia patients can externalize their internal life. This paper demonstrates that the process of visualizing internal activities has numerous outcomes for patients with

schizophrenia, including validating the patients' internal self, eliciting complex emotions, increasing their sensations of the present. The process of art-making enables patients to develop a sense of autonomy and control, to begin to understand and trust their internal reality, to give themselves a sense of identity, and to regain the ability to be curious and creative. For patients with schizophrenia treated with art therapy, all changes converged into one simple result: art therapy reduced both positive and negative symptoms, along with an improvement in their global psychosocial functioning. This result supports the author's hypothesis that using art therapy for treating schizophrenia yields clear positive outcomes.

However, insufficient evidence-based research as well as small sample sizes of existing randomized controlled trials (RCTs) on this topic require urgent attention. Greater scientific evidence, such as compelling results from meta-analyses and larger RCTs, is crucial to advocate for the widespread adoption of art therapy at a national level. Nonetheless, Montag and Dannecker (2018) pointed out that the meta-analyses on art psychotherapy included only two RCTs. The two RCTs included 47 and 90 patients, respectively. One RCT suggested that patients with schizophrenic and major affective psychoses who completed art therapy had a more positive attitude toward themselves and better social interactions. The other RCT suggested that patients with chronic schizophrenia who completed art therapy had improvements on negative symptoms only, but other aspects such as psychosocial functioning or quality of life were indifferent to art therapy interventions (Montag & Dannecker, 2018). Even though both RCT suggest generally positive effects of art therapy on treating schizophrenia, implications may be biased because of small sample sizes and insufficient statistical power. Moreover, the elevated rates of drop-out raise concerns regarding the ability to identify individuals with schizophrenia or psychotic disorders who could potentially experience positive outcomes from participating in group art therapy, even though attendance has not been found to be related to results (Montag & Dannecker, 2018). Small group size in art therapy might have an impact on group dynamics and group member interactions and support (Montag & Dannecker, 2018). Hence, both working on evidence-based research and gradually increasing trial sizes for better statistical support of the efficacy of art psychotherapy in treating schizophrenic disorders are future directions, particularly in light of the promotion of using art therapy to treat schizophrenia in the future.

References

Beer, M. D. (1996). Psychosis: a history of the concept. *Comprehensive Psychiatry*, 37(4), 273–291. https://doi.org/10.1016/s0010-440x(96)90007-3

Canadian Art Therapy Association. (n.d.). What Is Art Therapy? *Canadian Art Therapy Association.* Retrieved June 28, 2023, from www.canadianarttherapy.org/what-is-art-therapy

Gorwood, P. (2012). W04-02 - psychosocial functioning (PSF) - definition and measurement. *European Psychiatry*, 27, 1. https://doi.org/10.1016/s0924-9338(12)75679-1

Killick, K. (2017). Shaping consciousness: phenomenological art therapy with adults in psychotic states. Art therapy for psychosis (1st ed., pp. 70–89). *Routledge*. https://doi.org/10.4324/9781315762 340-4

Montag, C., & Dannecker, K. (2018). A neglected area in schizophrenia treatment and research: the efficacy of art therapy: results of a pilot randomized controlled trial and qualitative study. In Arts Therapies and New Challenges in Psychiatry (1st ed., Vol. 1, pp. 70–95). *Routledge*. https://doi.org/10.4324/978131561663 6-6

Patterson, S., Crawford, M. J., Ainsworth, E., & Waller, D. (2011). Art therapy for people diagnosed with schizophrenia: therapists' views about what changes, how and for whom. I*nternational Journal of Art Therapy*, 16(2), 70–80. https://doi.org/10.1080/17454832.2011. 604038

Ray, P. (2020, June 23). Art therapy - A holistic view. *Emojar*. https://www.emotionjar.com/post/ what-is-art-therapy

Röhricht, F. (2009). Body oriented psychotherapy. the state of the art in empirical research and evidence-based practice: a clinical perspective. *Body, Movement and Dance in Psychotherapy*, 4:2, 135-156, https://doi.org/10.1080/17432970902 857263

Ruddy, R., & Milnes, D. (2005). Art therapy for schizophrenia or schizophrenia-like illnesses. Cochrane *Database of Systematic Reviews*. https://doi.org/10.1002/14651858.cd00 3728.pub2

Tandon, R., Gaebel, W., Barch, D. M., Bustillo, J., Gur, R. E., Heckers, S., Malaspina, D., Owen, M. J., Schultz, S., Tsuang, M., Van Os, J., & Carpenter, W. (2013). Definition and description of schizophrenia in the DSM-5. *Schizophrenia Research*, 150(1), 3–10. https://doi.org/10.1016/j.schres.2013.05. 028

The Roots of Conspiracy Theories

By: Arnav Mahajan

Do you know why people believe in conspiracy theories? Most people would say conspiracies come from a lack of education and brainwashing; however, the truth is far more complex. Conspiracy theories are beliefs that a group works secretly to control or change an event or society. People use conspiracies to explain important world events, such as pandemics or assassinations, while rejecting actual explanations. Conspiracies are dangerous for society and lead to negative social outcomes like vaccine hesitancy, targeting minority groups, or decreased voting (Cislak et al., 2021; Imhoff et al., 2021; Marchlewska et al., 2019). The causes of conspiracies are mediated by feelings of control and operate at three levels: how people feel about their environment, how they feel as part of a group, and how they feel about their society. The three levels show that adverse life circumstances lead to conspiracy theory beliefs.

Poor social standing promotes conspiracy thinking. A poor social standing has undefined causes and few solutions, which can lead to lost feelings of control. The desire to blame lost control on external factors can lead to conspiracy theory beliefs. Having a poor social standing, such as being unemployed, unmarried, and uneducated, is correlated with increased conspiracy theory beliefs (Freeman & Bentall, 2017). Poor social standing does not have to be an actuality of an individual's life. Individuals perceive increases in societal inequality the same way they perceive decreases in their social status. When people perceive higher economic inequality, whether real or manufactured, conspiracy theory belief increases (Jetten et al., 2022).

The belief in conspiracy theory can be disrupted at its roots by reducing social or economic inequality. People often turn to certain social groups for support, which may amplify their conspiracy beliefs. Collective narcissism amplifies existing conspiracy beliefs. Collective narcissism is the belief that one's in-group

is superior to others and that the in-group deserves more recognition in society (Cichocka et al., 2016, p. 558). Collective narcissism is an expression of a group-wide lack of control. Feeling one's group lacks control can be caused by unfavourable policy outcomes or another group gaining power. Collective narcissism leads to increased conspiracy beliefs about out-groups and decreased conspiracies about the in-group (Cichocka et al., 2016). threats to the in-group do not have to be real threats. Feelings of collective narcissism still predict conspiracy beliefs in groups even when they are overwhelmingly dominant within their culture (Marchlewska et al., 2019). Conspiracies within dominant cultural groups can lead to dangerous prejudice toward minority groups, such as anti-LGBTQ+ conspiracies (Marchlewska et al., 2019). Combating collective narcissism presents a promising solution for reducing conspiracy beliefs.

Societal threats to control increase conspiracy beliefs. When individuals cannot adequately explain a loss of control, they turn to conspiracy theories. A threat to control surrounding Y2K, a societal crisis where people thought all computers would break at once, was correlated with an increase in Y2K-related and unrelated conspiracy theories (van Prooijen & Acker, 2015). A societal crisis is not the only situation where control is

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threatened. Regardless of political beliefs, individuals whose political party has little power tend to have high conspiracy beliefs (Imhoff et al., 2022). This suggests that increasing political representation could potentially decrease political conspiracies. This is important because Political conspiracy theories are dangerous and can lead to increased violence to express political frustration (Douglas & Sutton, 2023). Explaining an unsafe or uncertain society with conspiracies allows individuals to bring control back into their lives.

Increasing control can aid in decreasing conspiracy beliefs. Conspiracies are prominent in today's world. Whether they are about COVID-19 or election tampering, conspiracy pro-

liferation has dangerous conse-
quences for society. Conspiracies de-
crease trust in the government, de-
crease belief in science, and increase
prejudice (Douglas & Sutton, 2023).
Feeling out of control is a severe
cause of conspiracy thinking. Exam-
ining the role of control in conspira-
cies is essential because it provides a
framework for understanding why
conspiracy beliefs form. The best
way to reduce the spread of conspir-
acy theories is to increase feelings of
control. Changing control can hap-
pen on three levels: individual, group,
or societal. Decreasing inequality, de-
creasing collective narcissism, and in-
creasing political representation can
all impact the prevalence of conspir-
acy theories. Addressing feelings of
control is the first step of many in
combating pervasive conspiracy the-
ories and the danger they pose to so-
ciety.

References

Cichocka, A., Marchlewska, M., Golec de Zavala, A., & Olechowski, M. (2016). 'They will not control us': Ingroup positivity and belief in intergroup conspiracies. *British Journal of Psychology*, 107(3), 556–576. https://doi.org/10.1111/bjop.12158

Cislak, A., Marchlewska, M., Wojcik, A. D., Śliwiński, K., Molenda, Z., Szczepańska, D., & Cichocka, A. (2021). National narcissism and support for voluntary vaccination policy: The mediating role of vaccination conspiracy beliefs. *Group Processes & Intergroup Relations*, 24(5), 701–719. https://doi.org/10.1177/136843022095 9451

Douglas, K. M., & Sutton, R. M. (2023). What Are Conspiracy Theories? A Definitional Approach to Their Correlates, Consequences, and Communication. *Annual Review of Psychology*, 74(1), 271–298. https://doi.org/10.1146/annurev-psych-032420-031329

Freeman, D., & Bentall, R. P. (2017). The concomitants of conspiracy concerns. *Social Psychiatry and Psychiatric Epidemiology*, 52(5), 595–604. https://doi.org/10.1007/s00127-017-1354-4

Imhoff, R., Dieterle, L., & Lamberty, P. (2021). Resolving the Puzzle of Conspiracy Worldview and Political Activism: Belief in Secret Plots Decreases Normative but Increases Nonnormative Political Engagement. Social Psychological and Personality Science, 12(1), 71–79. https://doi.org/10.1177/194855061989 6491

Imhoff, R., Zimmer, F., Klein, O., António, J. H. C., Babinska, M., Bangerter, A., Bilewicz, M., Blanuša, N., Bovan, K., Bužarovska, R., Cichocka, A., Delouvée, S., Douglas, K. M., Dyrendal, A., Etienne, T., Gjoneska, B., Graf, S., Gualda, E., Hirschberger, G., … van Prooijen, J.-W. (2022). Conspiracy mentality and political orientation across 26 countries. *Nature Human Behaviour*, 6(3), Article 3. https://doi.org/10.1038/s41562-021-01258-7

Jetten, J., Peters, K., & Casara, B. G. S. (2022). Economic inequality and conspiracy theories. *Current Opinion in Psychology*, 47. https://doi.org/10.1016/j.copsyc.2022.10 1358

Marchlewska, M., Cichocka, A., Łozowski, F., Górska, P., & Winiewski, M. (2019). In search of an imaginary enemy: Catholic collective narcissism and the endorsement of gender conspiracy beliefs. *The Journal of Social Psychology*, 159(6), 766–779. https://doi.org/10.1080/00224545.2019. 1586637

van Prooijen, J.-W., & Acker, M. (2015). The Influence of Control on Belief in Conspiracy Theories: Conceptual and Applied Extensions. *Applied Cognitive Psychology*, 29(5), 753–761. https://doi.org/10.1002/acp.3161

Groove 101: An Introduction to Groove

By: Julia Philip

When we hear our favourite song, we have an uncontrollable urge to nod our heads or tap our feet. Music and movement give us pleasure and are integral to the human condition. This experience is called groove, which describes the pleasurable urge to move when listening to music (Janata et al., 2012). Groove is embedded in all of us, from experienced dancers to non-dancers alike. The study of groove is an exciting new field with emerging research, overlapping with other psychology fields such as music cognition and multisensory integration. When "in the groove," we connect to the music and keep in time with the beat as if something has overtaken us. However, groove is more than just a mere feeling; there are tangible ways in which groove is influenced. The groove can be manipulated, altering behaviour.

Personal preferences such as the listener's favourite genre of music and familiarity affect the groove. The seminal paper by Janata et al. (2012) pioneered research into the study of groove as a psychological construct. Through a series of clever experiments, Janata et al. found that familiarity was highly correlated with groove. The genre of music consistently affected groove ratings, with soul/R&B rated the highest and folk rated the lowest (Janata et al., 2012). High groove stimuli created more significant movement in the head and feet, even when instructed to complete a mere tapping task (Janata et

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al., 2012). These aspects of familiarity and genre preference are unique to each listener but can strongly influence groove, thus changing our movements.

Beyond preference, specific musical elements affect groove. A study by Burger et al. (2013) used motion capture of participants dancing to see how timbre affected their movements, thus influencing groove. Timbre is the unique quality of sound an instrument produces, distinguishing it from other instruments even when the same note is played. When timbre varied between experimental trials, there was a systematic difference in how participants danced (Burger et al., 2013). The harmony of a musical excerpt also influences the groove. Harmony plays a role in the experienced emotion of a musical piece, which affects how the urge to move is manifested in the body. Moderate harmonic complexity interacts with other musical elements, such as rhythm, demonstrating a modulating effect on the groove (Matthews et al., 2019). Taken together, timbre and harmony influence how the groove is experienced by the listener, changing how the listener moves.

Listeners prefer medium syncopation, which elicits the most groove. Syncopation is a musical element which describes how much a rhythm strays from the expected pattern. A piece of music with low syncopation would be described as predictable, while high syncopation may have a beat structure so complex that it is difficult to infer any pattern in the music. Listeners prefer medium syncopation, which elicits the most pleasure (Witek et al., 2014). Medium syncopation compels listeners to move their bodies and was given the highest groove ratings (Witek et al., 2014). Building off of this research, when music with medium syncopation was played, participants in an fMRI showed greater activity in the areas of the brain corresponding to motor timing and reward (Matthews et al., 2020). These findings show a key way to measure grooves quantitatively, and researchers can take advantage of them to find which songs maximize grooves by examining the activity of these important brain areas.

Groove should be taken advantage of using these manipulations. Groove can be manipulated by the listener's genre preferences and familiarity with the music and by changing the music's timbre, harmony and syncopation. When the groove changes, behaviour changes, affecting the reward activity in the brain and altering movement and emotions such as enjoyment. We can apply this research to real-world scenarios as we continue to deepen our understanding of this relatively new field. We can use musical elements to increase the overall enjoyment of the listener's experience, which has strong applications for the music and nightclub in-

dustries. With groove research in mind, music producers can optimize the pleasure and amount of movement induced when listening to a song, allowing for a song to easily become the track of the summer. The groove can alter our behaviour, making a bad day better by simply turning the volume to a song.

References

Burger, B., Thompson, M. R., Luck, G., Saarikallio, S., Toiviainen, P. (2013). Influences of rhythm- and timbre-related musical features on characteristics of music-induced movement. *Frontiers in Psychology*, 4. https://doi.org/10.3389/fpsyg.2013.00183

Janata, P., Tomic, S. T., & Haberman, J. M. (2012). Sensorimotor coupling in music and the psychology of the groove. *Journal of Experimental Psychology: General*, 141(1), 54–75. https://doi.org/10.1037/a0024208

Matthews T. E., Witek M. A. G, Heggli O. A., Penhune V. B., Vuust P. (2019). The sensation of groove is affected by the interaction of rhythmic and harmonic complexity. *PLoS ONE* 14(1): e0204539. https://doi.org/10.1371/journal.pone.0204539

Matthews, T. E., Witek, M. A. G., Lund, T., Vuust, P., & Penhune, V. B. (2020). The sensation of groove engages motor and reward networks. *NeuroImage*, 214, 116768. https://doi.org/10.1016/j.neuroimage.2020.116768

Witek M. A. G., Clarke E. F., Wallentin M., Kringelbach M. L., Vuust P. (2014) Syncopation, Body-Movement and Pleasure in Groove Music. *PLoS ONE* 9(4): e94446. https://doi.org/10.1371/journal.pone.0094446

INFOGRAPHICS

A Technique for Inducing Lucid Dreaming:
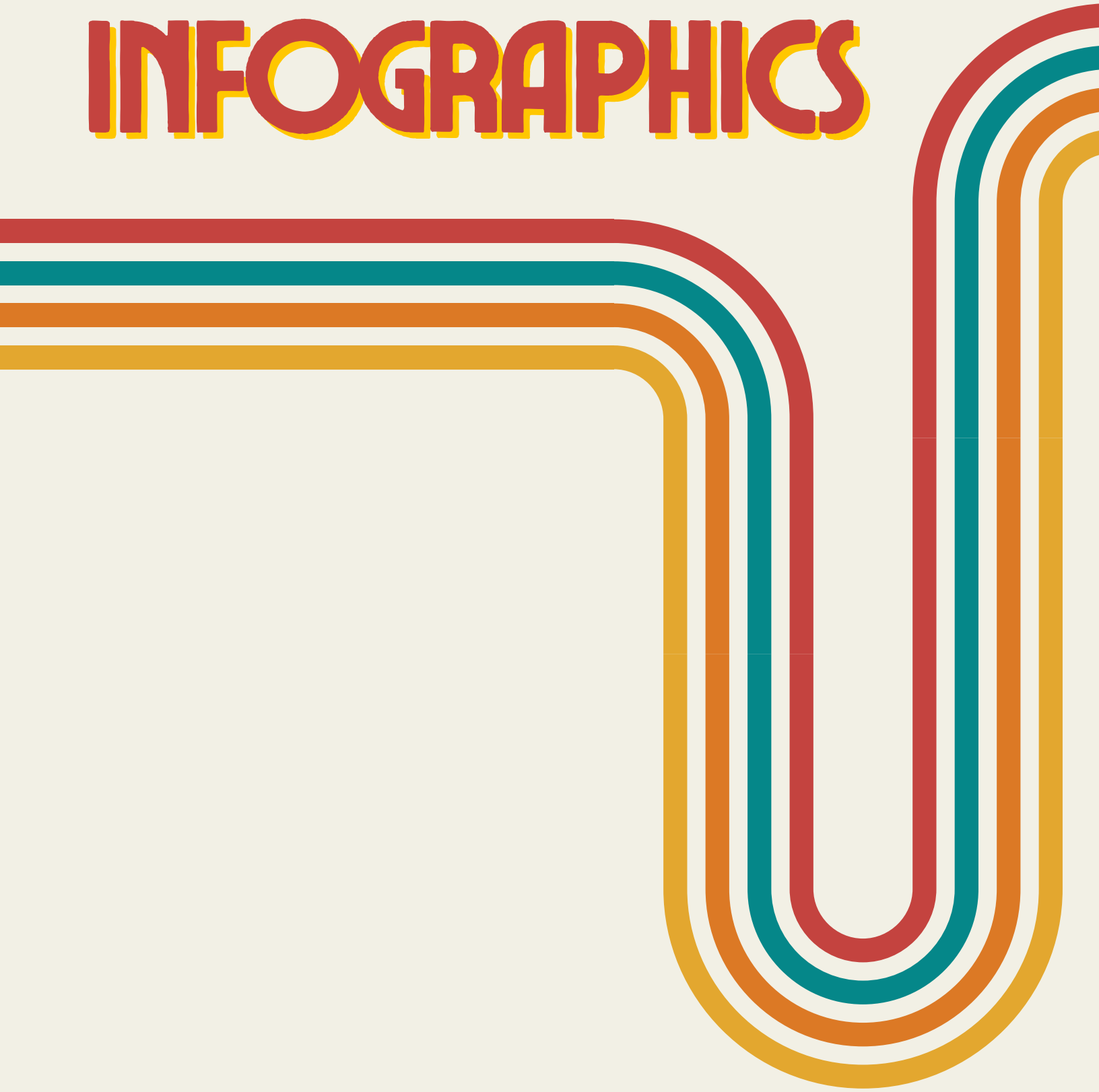
The Mnemonic Induction of Lucid Dreams (MILD) Method

By: Bella McQuade

Step One: Set an alarm to wake yourself up in the middle of the night.
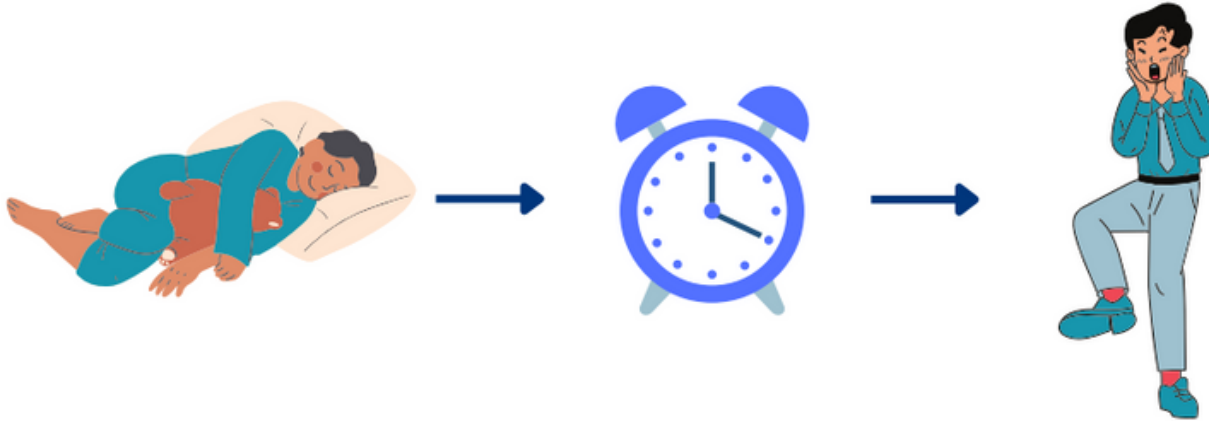
Step Two: Upon waking, imagine being in a previous dream while reminding yourself of dream signs that could trigger lucidity.

DREAM SIGNS

- time does not exist
- impossible situations
- (eg., using magic)

Step Three: Return to sleep in hopes of more easily recognizing your presence in the dream world -- leading to lucidity.

WOAH, I'm lucid dreaming! Should I start by flying? The options are endless!

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Breaking Down the Barriers: Challenging the Stigma Surrounding Depression

LOOKING AT
S T I G M A

By: Emma Resendes

? WHAT IS DEPRESSION?

People with depression often struggle to function in their daily lives. Depression is a mental illness characterized by low mood, feelings of sadness, and a loss of interest in life. Depression can also affect physical health causing sleep difficulty, appetite changes, and lethargy. Symptoms can vary, however, feelings of depression should always be taken seriously and approached with compassion (Torres, 2020)

Depression affects approximately 17% of people at some point in their life. The onset of depression most commonly occurs during the late teen years into the early twenties. Women are more likely to be depressed than men; 33.33% of women will have depression in their lifetime. While some groups are statistically more likely to be depressed, depression can affect any person of any age (Torres, 2020).

? WHAT IS STIGMA?

Unfortunately, there is stigma surrounding mental illness which causes feelings of inadequacy and a fear of judgment from others. Stigma describes shame around a specific experience or circumstance that does not align with societal norms (Goffman, 2009). Stigma involves negative labels, stereotypes, and lowered status. Stigma also encompasses feelings of humiliation that often cause social isolation (Heinz et al., 2021). There are several different types of stigma that interact to influence individuals. First, public stigma involves experiencing discrimination due to stereotypes and prejudice. Moreover, self-stigma occurs when the individual internalizes societal beliefs about their condition which consequently reduces self-esteem. Individuals who have self-stigma are less likely to reach out for help (Heinz et al., 2021). The third type of stigma is perceived stigma. This type refers to beliefs about how others view depression (Musa et al., 2020).

> Stigma negatively impacts people's feelings about themselves and can discourage people from seeking help (Conceicao et al., 2022)

THE IMPACT OF STIGMA

Support

Stigma affects the amount of support the depressed individual receives from their family. Parents who stigmatize depression are more critical and less supportive of their children who are struggling (Johnco & Rapee, 2018). Additionally, parents of children experiencing depression tend to distance themselves emotionally. Parents who are uneducated about depression wrongly attribute causes of the disorder and struggle to understand how to help manage their child's symptoms (Johnco & Rapee, 2018).

Education

Many students pursuing post-secondary education struggle with mental health challenges. Up to 34 percent of university students experience depression. Students with depression are often concerned that acknowledging or disclosing their disorder will negatively impact potential career opportunities (Musa et al., 2020). Students should feel free to access help and accommodations without worrying about potential repercussions.
People with depression are often incorrectly labelled as lazy, unreliable, weak, or dramatic (Reavley & Jorm, 2012). These labels do not represent the experience of depression. People who experience depression face challenges in their everyday lives and these challenges should be met with unconditional understanding (Johnco & Rapee, 2018).

Employment

Employment helps promote recovery in people with mental illness. However, people experiencing depression face challenges in obtaining and maintaining employment. People with common mental disorders are unemployed at two to three times the rate of people without common mental disorders. In the workplace, people with mental illness are burdened by stereotypes, prejudice, and discrimination (Florence & Marc, 2021). People often wrongly believe that mental illness causes workers to be inefficient and incompetent. As a result of stereotypes, employers are often hesitant to hire people with mental illness or offer these people low-level jobs (Florence & Marc, 2021). A diagnosis of depression should not affect how individuals are treated in the workplace.

THE IMPACT OF STIGMA
TREATMENT

Stigma is one of the primary factors that prevents people from seeking out professional help for their mental health. People who have internalized stigma surrounding their depression are more likely to try and cope with depression alone (Heinz et al., 2021). Depression is a very serious matter and no one experiencing depression should suffer alone. It is important to talk to a loved one or seek help when experiencing depressive symptoms.

When seeking help many people experiencing depression only report physical symptoms to their doctors because of stigma. Approximately 42% of patients with depression only described physical symptoms to their doctor. People experiencing depression often conceal the psychological symptoms they are experiencing and focus on physical symptoms to hide their mental health issues due to stigma. Further, patients who perceive a strong stigma surrounding depression are also less likely to consistently take medication prescribed for depression (Heinz et al., 2021).

WAYS TO REDUCE STIGMA
EDUCATION & DISSCUSSION

Education is a strong way to fight the stigma surrounding mental illness. When people are educated on depression, they gain empathy and are better able to recognize and understand the experiences of those who are suffering. Reductions in personal stigma occurs after simply watching educational videos on depression. Additionally, educational videos also improve a person's willingness to seek help (Conceição et al., 2022).

Further, educating parents on mental health issues improves outcomes for child and adolescent mental health. When parents understand depression and empathize with their children, they tend to provide more support and become less critical. A strong support system facilitates successful recovery and symptom improvement (Johnco & Rapee, 2018).

People seeking help for depression should keep in mind that their physician can be trusted and wants to help them feel better. Individuals seeking help for depression are encouraged to be open and honest with their doctor about their experiences (Heinz et al., 2021).

Opening up discussion about mental illness, in a safe space, helps to address stereotypes and prejudice. Discussing mental health issues can dispel incorrect beliefs about mental illness and increase empathy. When people are open about their experiences with depression, others may find the strength to open up or seek help (Florence & Marc, 2021). Designing programs to alleviate personal stigma, that involve speaking and listening to others who have experienced depression, would be beneficial to those suffering from the disorder (Musa et al., 2020).

SEEK HELP FOR DEPRESSION

If you or someone you know are experiencing depressive symptoms reach out for help! Mental health services are offered through schools, work and healthcare providers. Additionally, if you are in crisis reach out to a helpline. There are always people who care and want to see you get better!

Kid's Help Phone:
Call 1-800-668-6868 or text CONNECT to 686868
Open 24/7 and available to people ages 5-29 (Canada, Public Health Agency of. "Government of Canada", 2021)

References

Canada, Public Health Agency of. "Government of Canada." Mental Health Support: Get Help - Canada.ca, / Government Du Canada, 17 Sept. 2021, https://www.canada.ca/en/publichealth/services/mental-health-services/mental-health-get-help.html.

Conceição, V., Rothes, I., & Gusmão, R. (2022). The effects of a video-based randomized controlled trial intervention on depression stigma and help-seeking attitudes in university students. Psychiatry Research, 308, 114356. https://doi.org/10.1016/j.psychres.2021.114356

Create infographics, Posters & Presentations Online. Piktochart. (2021). Retrieved March 23, piktochart.com/

Florence, Y., & Marc, C. (2021). Implicit and explicit attitudes of employers toward hiring people who have experienced depression. Journal of Occupational Rehabilitation, 31(4), 903–915. https://doi.org/10.1007/s10926-021-09977-4

Goffman, E. (2009). Stigma: Notes on the management of spoiled identity. Simon and schuster.

Heinz, I., Baldofski, S., Beesdo-Baum, K., Knappe, S., Kohls, E., & Rummel-Kluge, C. (2021). "doctor, my back hurts and I cannot sleep." depression in primary care patients: Reasons for consultation and perceived depression stigma. PLOS ONE, 16(3). https://doi.org/10.1371/journal.pone.0248069

Johnco, C., & Rapee, R. M. (2018). Depression literacy and stigma influence how parents perceive and respond to adolescent depressive symptoms. Journal of Affective Disorders, 241, 599–607. https://doi.org/10.1016/j.jad.2018.08.062

Musa, A., Ashraf, J., Tsai, F.-J., Abolmagd, S., Liu, C., Hussain, H., Voslarova, E., Khalil, M. A., Wolitzky-Taylor, K. B., Lee, D., Sugar, J., Pendi, K., Lee, J., Abdelmaksoud, R., Adel, N., & Baron, D. (2020). Depression severity and depression stigma among students. Journal of Nervous & Mental Disease, 208(11), 884–889. https://doi.org/10.1097/nmd.0000000000001226

Reavley, N. J., & Jorm, A. F. (2012). Stigmatising attitudes towards people with mental disorders: Changes in Australia over 8years. Psychiatry Research, 197(3), 302–306. https://doi.org/10.1016/j.psychres.2012.01.011

Torres, F. (2020). What Is Depression? American Psychological Association. https://www.psychiatry.org/patients-families/depression/what-is-depression

Word cloud art creator. WordArt.com - Word Cloud Art Creator. (2022). Retrieved March 23, 2022, from https://wordart.com/

Are you depressed?

By: Maryam Qader

WHAT IS DEPRESSION?

Major depressive disorder, commonly known as depression, is a mood disorder where one feels persistent emotions of sadness and a lack of interest in life (Nolen-Hoeksema, 2020). It impacts how one feels, behaves, and thinks and can lead to emotional and physical problems ("Depression (major depressive disorder) - Symptoms and causes," 2018).

HOW COMMON IS DEPRESSION?

In a health study conducted by Mirzaei et al. (2019) in the Yazd Greater Area, 10, 000 adults participated in the shorter version of the Depression, Anxiety and Stress Scale (DASS) Questionnaire to in order to evaluate their existing depression, anxiety, and stress. Results showed that depression, anxiety, and stress were seen in 29%, 32.2%, and 34.8%, respectively, of adults in the Yazd Greater Area. These results were influenced by the adult's sex, education, age, marital status, employment, ethnic origin, etc.

FACTORS OF DEPRESSION

Biological

According to studies done by Lohoff (2010), genetics influence and increase the chances of developing depression by 35%. Twin studies show a heritability of 40% to 50%, while family studies reveal an increased chance of depression in one 's lifetime by twofold or threefold times. Changes in the neurochemical activity of the brain-especially in the norepinephrine and serotonin synapses cause depression.

Enviromental

Environmental factors heavily impact depression. These include stressful experiences, such as the death of a loved one, and traumatic cases, such as rape or assault. Child adversities are also a leading reason for depression. Furthermore, interpersonal inadequacies that contribute to a lack of social skills may impact depression through frequent rejection and stress (Nolen-Hoeksema, 2020).

Cognitive

There is a multitude of evidence stating that people who experience depression look at the world through a negative lens and have negative thoughts and emotions that take over. This contributes to depression and may further exacerbate it (Nolen-Hoeksema, 2020). A study done by Baune et al. (2018) involving the Mood Assessment and Classification (MAC) Committee, which is composed of academic psychiatrists who are clinical experts in mood disorder management, discussed controversial points of diagnosing mood disorders. They recognized that cognition is an integral aspect for future clinicians to highlight in the topic of depression.

SYMPTOMS OF DEPRESSION

Isolation
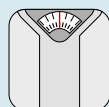
Change in eating habits

Lack of sleep

Persisent sadness

No concentration

No energy

Extreme weight gain or loss

Thoughts of death or suicide

HOW LONG MUST ONE SHOWCASE SYMPTOMS?

Psychiatrists diagnose depression, and patients must exhibit consistent symptoms for at least two weeks. It must be interfering with their day-to-day functioning (Nolen-Hoeksema, 2020).

WHAT TREATMENT OPTIONS ARE AVAILABLE?

There is no set cure for depression. However, there are many ways to treat the symptoms and cope with it.

1 Medication

Medication, called antidepressants, can be used to treat depression symptoms. When one has depression, the brain's neurotransmitters are affected. Antidepressants such as SSRI and SNRI help to treat depression by increasing and assisting neurotransmitters with their job of transporting serotonin, norepinephrine, and dopamine in the brain. This helps to relieve the anxiety and stress symptoms of depression (CAMH, 2012).

2 Psychotherapy

Talk therapy and counselling are great methods to help with depression. Therapists help patients by assisting them in setting realistic goals and identifying past or current life events that may be contributing to their stress and depression. Cognitive behavioural therapy (CBT) and interpersonal therapy (IPT) are two major therapies. These therapies aim to help patients better cope with the symptoms of depression. CBT helps patients manage negative thoughts, and IPT aids patients in building better social skills (American Psychology Association, 2023).

Depression affects more than 300 million people worldwide.

YOU ARE NOT ALONE.

HOW CAN I HELP MYSELF IF I AM DEPRESSED?

- Spend time with loved ones who will help you feel better.
- Talk about your feelings with a trusted person.
- Try to break tasks into smaller chunks, so they don't feel as overwhelming.
- Get out of the house and go for walks or get some form of exercise.
- Eat healthy meals and try to take your vitamins.
- Get some sunlight if possible.

HOW CAN YOU HELP SOMEONE GOING THROUGH DEPRESSION?

- Encourage them to seek help from their doctor or to call a mental health professional.
- Be patient with them and give them space when they ask for it.
- Be supportive and understanding.
- Remind them that they are loved and wanted.
- Invite them to activities such as walking and other outings.

WHO IS MORE LIKELY TO BE DIAGNOSED WITH DEPRESSION?

Depression is more commonly discussed among women as there is a stigma surrounding men's mental health in society. As a result, women are twice as likely to be diagnosed in comparison to men ("Women's increased risk of depression," 2019). However, the stigma that is surrounding men's mental health should be taken into consideration.

WHERE CAN YOU SEEK HELP?

Remember, you are not alone. It's okay to seek help, and there are various resources available to assist people who suffer from depression.

- Call your doctor.
- Call ConnexOntario at 1-866-531-2600.
- Call Kids Help Phone at 1-800-668 6868 or text CONNECT to 686868.

PRÉCIS

Improvement of Memory with REM Sleep

By: Alyssa Georgescu

art by lyljana nieto

Rapid Eye Movement (REM) sleep can improve memory. REM sleep consists of the eyes moving rapidly, usually occurring while dreaming. Intervals of REM and non-REM sleep occur while individuals fall asleep. During the active stage of sleeping, REM is crucial to restoring the brain. The active stage increases brain activity which in turn improves long-term memory. However, individuals who experience disturbed sleep are no longer able to experience REM and can inhibit memory improvement. Using intervals of REM sleeping, individuals can experience an increase in working memory. Therefore, the process of expanding human memory may be dependent on REM sleep.

References

Karni, A., Tanne, D., Rubenstein, B. S., Jean J. M. Askenasy, & Sagi, D. (1994). Dependence on REM Sleep of Overnight Improvement of a Perceptual Skill. *Science,* 265(5172), 679–682. http://www.jstor.org/stable/2884281

How Do You Tell Where Your Hands Are?

By: Arnav Mahajan

art by crystal eziokwu

Vision is instrumental in understanding where your hands are. Humans rely on two senses to discern the location of their hands: sight and touch. When a participant's hands are crossed, it is harder to tell which hand a vibration originates from. The confusion occurs due to a discrepancy between what participants see and the sensations they feel in their left and right hands. Blindfolding improves performance because reducing visual input minimizes the mismatch caused by vision. This research illustrates one of the numerous ways in which human senses are interconnected.

References

Shore, D. (2023). Haptic Space: A Bayesian Model of the Crossed-Hands Deficit in Tactile Temporal Order Judgments. [PowerPoint Slides].
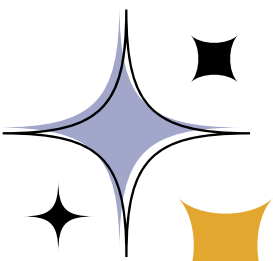
Changing the View on Procrastination

**By: Alyssa Georgescu**

art by crystal eziokwu

There is no academic difference between procrastinators and non-procrastinators. Schools praise students who are non-procrastinators for doing their work on time. However, procrastinators are seen as less intelligent for not completing their tasks promptly. This view is inaccurate; procrastinators and non-procrastinators had no significant difference in their grades. As procrastinators postpone doing their work, it translates to an inability to manage their time effectively. Having poor time management results in procrastinators' peers and teachers viewing them as less intelligent. The schooling system should cease viewing procrastinators as less intelligent than non-procrastinators.

References

Pychyl, T. A., Morin, R. W., & Salmon, B. R. (2000). Procrastination and the planning fallacy: An examination of the study habits of university students. *Journal of Social Behavior and Personality*, 15(5), 135.

Increases in Competitiveness of Male Aggressive Behaviour

By: Alyssa Georgescu
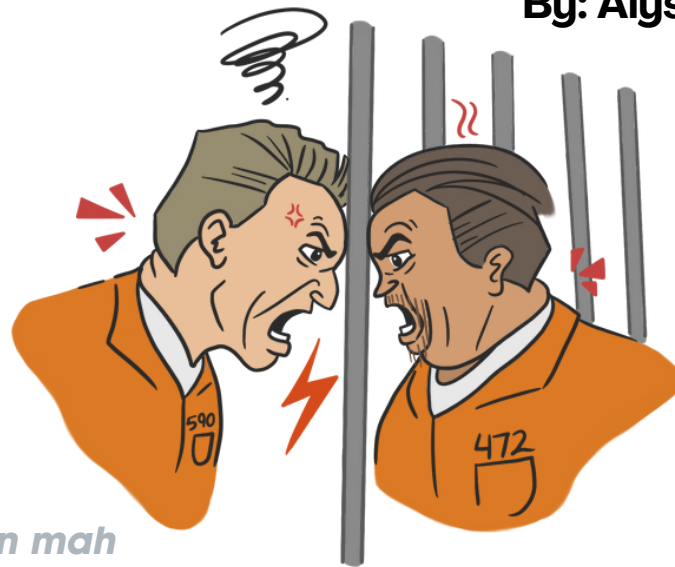
art by kaitlyn mah

Men participate in competitive and aggressive behaviour. Aggression increases when there is greater competition between men. Men compete by fighting other men for a dominate status in their community. A high social ranking means greater access to resources and mates. Increases in aggressive behaviour leads to more social conflicts among men, where intense conflicts may result in death. In today's society, incarceration is used to reduce violent behaviour. We should observe if incarceration successfully lowers rates of male aggressive behaviour.

References

Wilson, M.and Daly, M. (1985). Competitiveness, Risk Taking, and Violence: The Young Male Syndrome. *Ethology and Sociobiology*, 6(1), 59 –73.

The Neurological Basis of Moral Reasoning

By: Sarah Taghipour
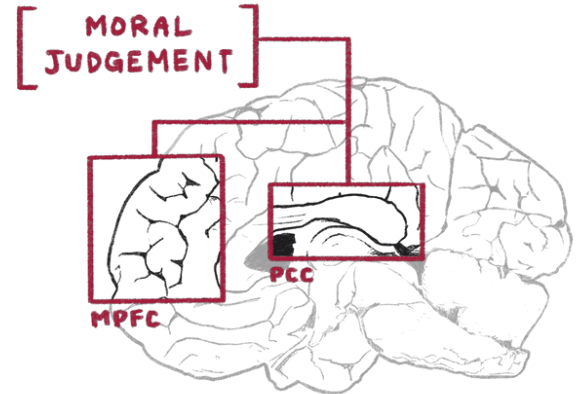
art by lyljana nieto

Daily, we encounter situations we consider wrong: a sick child, political corruption, a cheating partner, fraudulent science. These examples underline many moral issues ranging from care, fairness, and betrayal. But are there specific brain regions that are judging these volitions? Brain activity patterns demonstrate that moral judgement is instantiated across multiple brain regions, including the medial prefrontal cortex, temporoparietal junction, and posterior cingulate, among others. These regions become strongly activated during moral judgements, in contrast with mere social norm violations, such as eating cereal with a fork. Interestingly, the neural network involved in moral reasoning intersects with brain regions associated with the theory of mind. However, brain scans reveal fine-tuned networks processing moral issues along different neural pathways. Moral judgements related to loyalty, authority and self-righteousness activate regions connected to understanding others' behaviour rather than self-centred processing. Faced with a moral dilemma, questions such as who, what, when, and why are all at play which infiltrates deep cognitive processing that takes time. In essence, moral judgement is a complex cognitive process that engages many brain regions.

References

University of California - Santa Barbara. (2023, September 7). Moral reasoning displays characteristic patterns in the brain. *ScienceDaily*. www.sciencedaily.com/releases/2023/09/230907130424.htm

Medical School...Are You Sure?

By: John Badie

art by joshika jaswal

Medical school is a demanding and protracted journey. While doctors eventually enjoy substantial incomes in their later careers, many suffer from immense debt as medical students. Additionally, medical students work long low-paying hours with fluctuating night shifts that contribute to exhaustion and negatively impact social life. Debt, long work hours and poor social life can make life challenging and complicate plans such as starting a family or travelling. The pursuit of a medical career, contrary to its perceived splendour, entails hardships that necessitate prospective medical students to weigh the costs and benefits of medical schools diligently.

ABSTRACTS

Temperamental and Environmental Factors of Post-Operative Outcomes in Children: Who's the Main Actor?

By: Chaeeun Shin

art by joshika jaswal

Abstract

Paediatric surgeries are common, with more than 80,000 children undergoing surgery each year in Canada (Wright & Menaker, 2011). Many of these children and their caregivers experience preoperative anxiety (Ayenew et al., 2020). Preoperative anxiety has been found to predict intensity of physical, behavioural, and psychological postoperative outcomes (Kain et al., 2006; McCann & Kain, 2001). This study examined two factors that may influence postoperative outcomes: a child's temperament and the caregiving environment.

Method

Two models were designed to investigate the leading factor of postoperative outcomes: 1) the child as a main actor model, and, 2) the parent as a main actor model. The child as a main actor model investigated whether preoperative anxiety was a mediating factor in the relation between temperament and postoperative outcomes (Figure 1). The parent as a main actor model investigated whether caregiving environment was a moderating factor in the relation between child temperament and postoperative outcomes (Figure 2). Seventy children who went through elective surgery (Mage = 10.4 years, 51% female), and their accompanied parents (Mage = 41.8 years, 81% mother, 13% father, 6% other) participated in this study. The child's temperament, perioperative anxiety, postoperative outcomes, parent's state and trait anxiety, and parent's behaviour were collected.

Results

In the child as a main actor model, shyness subscale from all three temperamental measures, and a fear measure predicted higher preoperative and postoperative anxiety. Therefore, preoperative anxiety significantly mediated the relation between temperament and postoperative outcomes. In the parent as a main actor model, no moderating effects were found. However, some significant correlations were identified. Parent's behaviours such as empathic touch and presence of distressed behaviour correlated significantly with the child's perioperative anxiety. However, parent's reported state and trait anxiety did not correlate with the child's perioperative anxiety. These correlational results indicate that it was the parent's behaviour, not the experienced anxiety, that correlated with the child's state anxiety. Although no significant moderation occurred in this model, the correlational results tell us
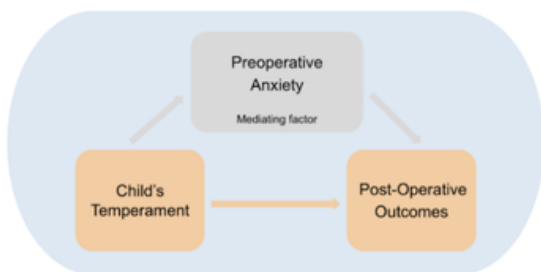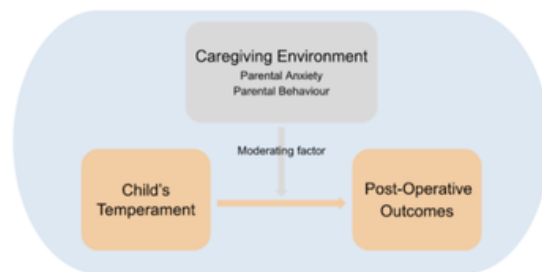

Figure 1
Child as a main actor model

Figure 2
Parent as a main actor model

that further investigation of these relations may be worthwhile.

Discussion

Overall, the child as a main actor model more significantly explained the factors of postoperative outcomes. The present study can aid in designing of interventions to reduce their preoperative anxiety. We proposed that an audiovisual intervention that involves general hospital and surgery related information could possibly help reduce uncertainty of the situation and thus reduce preoperative anxiety.

References

Ayenew, N. T., Endalew, N. S., Agegnehu, A. F., & Bizuneh, Y. B. (2020). Prevalence and factors associated with preoperative parental anxiety among parents of children undergoing anesthesia and surgery: A cross-sectional study. *International Journal of Surgery Open*, 24, 18-26.

Kain, Z. N., Mayes, L. C., Caldwell-Andrews, A. A., Karas, D. E., & McClain, B. C. (2006). Preoperative anxiety, postoperative pain, and behavioural recovery in young children undergoing surgery. *Pediatrics*, 118(2), 651-658.

McCan, M. E., & Kain, Z. N. (2001). The management of postoperative anxiety in children: An update. *Anesthesia & Analgesia*, 93(1), 98-105.

Wright, J. G. & Menaker, R. J. (2011). Waiting for children's surgery in Canada: the Canadian paediatric surgical wait times project. *Canadian Medical Association Journal*, 183(9), 559–564.

Social Environment Impacts the Gut–Microbiome of Macaques

By: Danielle Bukovsky

The brain-gut-microbiome axis has garnered widespread attention as a contributor to primate overall health and wellbeing. While recent research indicates that various types of stress, including social deprivation, can disrupt regulation of the brain-gut-microbiome axis much of this literature is based on studies in rodents. In humans, microbiome research is complicated by the influence of uncontrolled external and lifestyle factors (i.e., diet) making it challenging to establish a causal relationship between the gut-microbiome and social environment. The present study uses a non-human primate model to investigate changes in the gut-microbiome through manipulations of social conditions in a controlled setting. We conducted two longitudinal studies, inverse in design. In the first study, we observed 13 male macaques as they transitioned from single housing to divided social living and then back to single housing. In the second study, we tracked the experiences of 6 female macaques as they moved from group housing to single housing and returned to group housing. We found that changes in social environment significantly altered the gut-microbiome in as little as 6 weeks. Moreover, increases in potentially beneficial bacteria were observed in male non-human primates living in social groups, notably Lactobacilus, Coproccocus, Clostridium XIVa, and Limosilactobacillus. Our results suggest that group living has a significant impact on the composition of the gut-microbiome, potentially mediating positive effects on the brain-gut-microbiome axis. Overall, we suggest sociality can significantly impact the gut-microbiome of macaques, which may underlie primate wellbeing and mental health.

art by crystal eziokwu

Effects of Outdoor Bright Light Exposure, Near Work, Digital Screen Use, and the COVID–19 Pandemic on the Development of Myopia in Children: A Systematic Review

By: Helen Dang

art by kaitlyn mah

Myopia, also known as "nearsightedness", is a medical condition in which the view of distant objects becomes blurry. Myopia is caused by lengthening of the eyeball (increased axial length) or increased curvature of the lens (Turbert, 2022). According to the World Health Organization (WHO)'s global estimate in 2015, 312 million people under 19 years old had myopia, making it the most common type of refractive error found in children (World Health Organization, 2019). The prevalence of myopia in children continues to increase in 2023. This review paper first examined physiological evidence underlying myopia in animal models. The paper then examined how the exposure to outdoor light, time spent on near work, digital screentime, and the COVID-19 pandemic impact the prevalence of myopia in children. We found that exposure to bright ambient outdoor light provides a protective effect against myopia in children; increased near work and digital screen use are associated with the development of myopia. On a behavioral level, myopic children tended to spend more time indoors reading or studying at a near distance while spending less time outdoors compared to non-myopic children. This trend has been amplified during the ongoing COVID-19 pandemic, in which home confinement and online school further limited the time children spent outdoors while promoting near work and screen use.

References

Turbert, D. (2022). *Nearsightedness: What Is Myopia? - American Academy of Ophthalmology.* American Academy of Ophthalmology. https://www.aao.org/eye-health/diseases/myopia-nearsightedness

World Health Organization. (2019). *World report on vision.*

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Psynapse

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