Psynapse

ISSUE 1

PHOTO CREDITS

Images on the front-back cover spread and pages i and ii provided by Tamily Weissman. The Brainbow mouse was produced by Livet et al., Nature, 2007

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DESIGN TEAM

Letter from the Editor-in-Chief

Dear Readers,

It is my pleasure to present the inaugural issue of the *Psynapse*—PNB's very own undergraduate journal.

As students at McMaster University, we have the opportunity to learn and partake in a wide variety of research projects. After observing the hard work that undergraduates put into their research interests for three years, I realized that there was no formal and accessible platform to share our achievements. In September 2016, I shared my vision of an academic journal with a group of fellow students. Together, we dedicated time and energy, and worked diligently during a busy school year to see this idea come to fruition. Starting an undergraduate journal from the bottom up is a challenge that could only be overcome with the strength of a focused team with a shared goal. Thank you to the *Psynapse* executive team for sharing my vision, and for not losing sight of our goals, even when things got rough.

On behalf of the *Psynapse* team, I would like to extend our congratulations to the authors for representing excellent student writing at McMaster. I would also like to thank our faculty advisors for their guidance and support throughout this process. Having their support made all the difference on our journey.

Overall, we hope to encourage you to join the conversation of science. Perhaps one of the *Psynapse* articles sparks a new interest in you, or the Humans of PNB interviews show you that our faculty and staff are kind and approachable individuals. We hope the *Psynapse* can help you discover your passions and show you how PNB can help you explore these interests

Happy Reading,

Kathy Jiang
Editor-In-Chief

Dear Psynapse Reader,

The volume you are currently reading represents an outstanding achievement. Pulling together this inaugural volume of student writing for students required focus, effort, and perseverance. Each challenge the *Psynapse* Team encountered—establishing copyright, securing contributions, and ensuring academic integrity—was overcome through collaborative teamwork. Their interactions with faculty, administrators, and university staff were professional and productive. On all accounts, they deserve an A+.

This project represents an unimagined benefit of work completed over a decade ago. Several faculty members had a vision for an undergraduate curriculum that brought students together as a cohesive cohort. The goal was to help students help each other to learn the critical skills and knowledge needed beyond university. One critical skill we focused on was writing. PNB 2XD3 presented a unique challenge for our Department, and me personally as the faculty member teaching the course. Through great effort, cohorts of students have developed top notch communication skills, which are on display in this volume. The idea of a student journal stems naturally from the development of writing skills and a cohort mentality. We never envisioned this outcome, but in hindsight it makes sense—thank you for taking us the extra step.

As the faculty sponsor for this initiative, my job was exceedingly easy—I just stood out of the way and watched as the team self-organized, developed protocols, and sought submissions. At every step, they were collaborative and communicative. They took constructive criticism well, and through their responses developed a better product and process for this journal. Future cohorts of PNB students will benefit, both as readers of the content and future contributors to the Journal. Everybody should be extremely proud of these accomplishments.

Our Department looks forward to the next steps. As a reader of this volume, I hope you will contribute to the future success of the initiative.

Sincerely,

David I. Shore, PhD.
Professor – Department of Psychology, Neuroscience & Behaviour

Faculty Forewords

To the McMaster PNB Community:

I would like to take this opportunity to congratulate Psynapse for having worked so hard to put together this inaugural issue of its journal. Science communication is key to opening up science content and process to wide audiences, and our department is very pleased that our own students are so meaningfully and competently engaged in that activity. The fact that current students would work together to produce material that will benefit future students lays the foundation for the whole department to be a great place to teach and learn. A wonderful initiative!
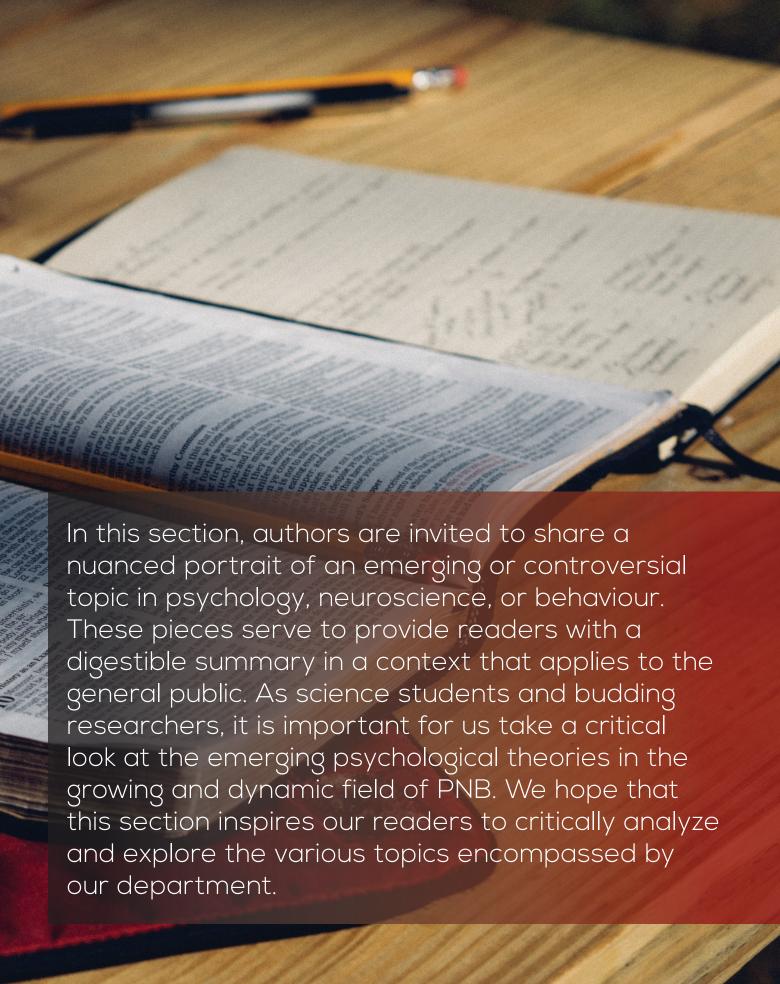
Sincerely,

Bruce Milliken, PhD.
Professor and Chair – Department of Psychology, Neuroscience & Behaviour

Teachable Essays

In this section, authors are invited to share a nuanced portrait of an emerging or controversial topic in psychology, neuroscience, or behaviour. These pieces serve to provide readers with a digestible summary in a context that applies to the general public. As science students and budding researchers, it is important for us take a critical look at the emerging psychological theories in the growing and dynamic field of PNB. We hope that this section inspires our readers to critically analyze and explore the various topics encompassed by our department.

Principle-Centred Therapy (PCT):

The Future for Therapeutic Interventions?

Muzammil Syed, Umair Majid, & Reda Siddiqui

Vulnerable populations, such as intimate partner violence (IPV) victims, constantly face psychological abuse by family members and society at-large. IPV victims are left to struggle with their mental health in isolation. Many are unable to receive the appropriate psychological help they need, largely due to a lack of accessible services and persistent stigma attributed to those seeking help. This proposed community garden venture offers vulnerable populations an opportunity to seek mental health aid in a communal space. Along with learning agricultural skills, IPV victims will be able to engage in Principle-Centred Therapy, a novel treatment focused on freeing individuals from negative thoughts and transferring patients from a state of dependence to one of interdependence. In addition to strengthening community resilience by encouraging the inclusion of isolated members, this program will produce marketable agricultural goods, thereby contributing to overall economic vitality within the community.

Vulnerable populations, such as intimate partner victims (IPV), often suffer from severe mental health issues (Campbell, 2002). Interventions rooting from positive psychology should be used to aid IPV victims to build on the current collection of data regarding their impact on both outcome (e.g., positive versus negative) and magnitude. Examples include Meaning-Focused Group Psychotherapy developed by Breitbart et al., (2012) and the Two-Factor Self-Esteem Enhancement Approach by Mruk (2006). These psychological interventions are increasingly prominent in mental health care and are capturing the interest of many professionals in psychiatry. While these interventions are not new, their incorporation into empirical research and clinical practice is relatively nascent.

Meaning-focused interventions — defined as interventions that spawn a sense of meaning in a person's life — in particular have been implemented in a range of clinical settings and significantly enhance the overall well-being of patients (Breitbart et al., 2012). Previously developed therapies also acknowledged the value of community in group-based interventions. Studies have shown its success, implemented through therapies for marginalized populations; Brandl (2000) used hope, empowerment, and collaboration to describe their empowerment model for intimate partner violence (IPV) victims.

There is an increasing trend within academic and clinical communities to recognize the importance of community in societal well-being. At the crux of this construct is belongingness, which Hagerty et al., (1992) define as "an experience of personal involvement in a system or environment so that persons feel themselves to be an integral part of that system". The essential characteristics of belongingness are mutually-valued relationships, social support and integration, and reciprocity. These features enable the cultivation of an atmosphere in which individuals are embraced and afforded the opportunity to thrive as integral and valued members of their communities.

Recent research into belongingness has unearthed the role it plays in common mental health problems. Chang, Kahle, and Hirsch (2015) found that the relationship between domestic abuse and greater depressive symptoms could be attributed to a loss of belongingness. Maslow (1954), in identifying basic human needs, identified belongingness as the third most basic human need that needs to be fulfilled. Furthermore, Dasberg (1976) concluded it was lacking sense of belonging that was the common factor in the mental breakdown of soldiers during wartime. Despite the understood importance, minimal data exists pertaining to belongingness and its translation into interventions for IPV victims. Better support and training is required for the development and implementation of a therapeutic intervention that uses belongingness to enhance the psychological health of IPV victims.

Moreover, gardening-based therapies have been reported to have a significant impact on psychological health, such as senescence in symptoms of depression and anxiety, as well as augmentation of attentional capacity (Clatworthy, Hinds, & M. Camic, 2015). Recognizing the potential of gardening to augment mental well-being, coupled with the realization that there is a shortage of positive psychology-focused therapeutic interventions, spawned Principle-Centred Therapy (PCT). PCT is an eight-week, community-driven intervention designed to increase belongingness in vulnerable populations around the world. It incorporates language, culture, and context of communities to create an environment that is inclusive, accepting, and empowering. PCT uniquely amalgamates agriculture, community gardening, farming and other forms of horticulture with evidence-based group psychotherapy, making it a novel therapeutic approach.

At the heart of PCT is Dr. Stephen Covey's (1989) Maturity Continuum, which delineates the stages of a person's development from dependence to independence, and then to interdependence, the zenith stage. With interdependence serving as the underpinning for a person's thoughts, feelings, and behaviors, a cognitive framework is provided within which authentic and effective action can take place in the context of the overall community. Furthermore, interdependence ameliorates the terminal uniqueness that vulnerable populations suffer from, the belief that their situation is idiosyncratic and cannot be understood by others. Vulnerable populations will realize that alone they cannot accomplish much, but together

they can achieve so much more. PCT allows these individuals to gain a sense of community by meeting others who have experienced similar situations, as well as their loved ones and supporters. Interdependence is the conduit that allows for continued personal growth while providing an avenue to connect, serve, and meet the needs of the community holistically. The potential of PCT as a treatment strategy lies in its unique emphasis on interdependence.

Additionally, PCT features a social entrepreneurship component known as Gardian. Crops grown in community gardens have immense business potential; from 1978 to 1989, $8.9 million worth of produce was grown in Milwaukee community gardens (Bremer, Jenkins, & Kanter, 2003). Furthermore, the fifteen New York gardens organized by the City Farms program by Just Food grew close to 11,000 pounds of fresh vegetables and fruits. Due to substantial initial funding, these community gardens were able to produce an enormous quantity of crops, so much so that they generously donated nearly 50 percent of the crops to community soup kitchens and food pantries (Englander, 2001). These statistics describe the potential of community gardens to function successfully under the guidance of local organizations.

The production of crops plays a big role in PCT, due to their therapeutic benefits and their business potential (Clatworthy, Hinds, & M. Camic, 2015). Crops that have been grown by PCT groups can then be sold to the market place. Depending on the amount and value of the crops, the vulnerable population in question will receive monetary compensation. A portion of the profit gained will be allocated to the farmer for the continued use of their land and resources. Any surplus will assist with expansion of the community gardening enterprise, and extension of the program to farms in other regions. The profit garnered from crop production supplies vulnerable populations with a sustainable source of income, while also providing them with the therapeutic care they need. This mitigates a lot of the worries and stress that vulnerable populations possess—often relieving them of duties that they have to do to sustain themselves, but which often also puts their physical and mental health at risk.

PCT utilizes and amalgamates concepts that are empirically supported to formulate an eight-week intervention. Psychological concepts such as the growth mindset, grit, mental toughness, and empowerment are harmoniously coalesced with activities including horticulture, journaling, and visualization. The intervention is meticulously designed to help people transition from a state of dependence, to independence, and then to interdependence. Two aspects separate PCT from other therapeutic interventions. The first is the overarching emphasis that PCT places on community building, collaboration, and connection. PCT promotes symbiotic and meaningful relationships by allowing for the building of new relationships while maintaining and enhancing existing ones. This leads to the empowerment of vulnerable populations through the establishment of a profound sense of belonging, meaning, and a redefined purpose. Secondly, by participating and

partaking in agricultural activities, vulnerable populations are provided with a reliable source of income in addition to a therapeutic intervention which addresses their psychological and emotional needs. Moreover, PCT fosters an environment free of the stigma that often delays treatment for mental illness. Patients that would normally avoid seeking mental health care for fear of being associated with negative stereotypes can freely partake in PCT without their diagnostic labels on display. Thus, with PCT, vulnerable populations are not only provided with a stigma-free space for mental, emotional, and physical growth, but are also afforded the opportunity to develop a new skill set pertaining to both farming and the sales and marketing of produce.

Currently, victims of intimate partner violence are the priority for PCT. With a plethora of research already published on IPV victims, PCT aims to build on previously published research. Initially a population-based study will be conducted, followed by an observational cohort and qualitative study to understand the lives of IPV victims, with particular attention to their sense of belonging. The effectiveness of PCT will then be determined through rigorous, empirical research. This research process will consist of collaboration with business and clinical experts to refine the business model and clinical framework of PCT, respectively.

Among the long-term goals of PCT is to obtain seed funding to support a pilot program in a low- or middle-income country. South Asian countries are currently being studied and evaluated for the implementation of PCT. If the pilot program is successful, the next step will be to establish partnerships with the local and international organizations and to lobby governments to implement PCT. The next steps involve improving the sustainability of existing PCT programs and improving impact investments. Finally, the possibility of expanding PCT to other vulnerable populations, such as orphans and immigrants, will also be explored.

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Advanced Topics

Scientific American is one of the longest running published magazines, and for good reason. Founded in 1845, the magazine has been at the forefront of the dissemination of science and technology amongst the public for over a century. Scientific American articles showcase the innovative research and insights from all realms of science and technology, providing valuable discourse and discussion of novel ideas.

The Psynapse is proud to present our adaptation of Scientific American articles: Advanced Topics. The following original articles discuss current topics in the fields of psychology, neuroscience, and behaviour, written in the familiar Scientific American style.

Just a Spoon Full of Sugar?

Jennifer La Grassa

When it comes to healthcare, the placebo effect demonstrates that bedside manners might be just as important as accurate diagnoses and medication.

On a late South African evening, should you stumble upon the !Kung Bushmen tribe you may find them communally singing and dancing in elaborative costumes around a fire. Loud clapping and chants will resonate throughout the desert landscape in a seemingly playful manner. As the night wears on, these actions intensify to activate a powerful spiritual energy. Designated healers may begin to shake with sweat as the energy travels up their spines and lays itself at the bases of their heads. When the energy peaks, healers enter an alternate state of consciousness and physically struggle with the sick to relieve them of their illness. Should the healers succeed, the sick member will have been cured. The Western healing process isn't as elaborate, but maybe it should be.

Medical professionals of the Western world explain the healing dance of the !Kung Bushmen as a type of placebo. The placebo effect is traditionally described as the physiological effect of an inert substance, typically a sugar pill, which can alleviate symptomatic behaviours. As with the !Kung Bushmen, there is no medicine given to the sick and yet, they feel much better. Within the last decade, it's become evident that the placebo effect is a highly cognitive and biological phenomenon, one that is not entirely dependable upon the placebo treatment itself; rather, it depends on a combination of expectancy and classical conditioning. These two mental processes occur as a result of habitually attending the doctor's office upon the onset of an illness. In this case, expectancy refers to the expectation one has at the outset of a medical treatment, whereas classical conditioning involves a learned response that is acquired from contextual cues. For instance, during each doctor's visit, the same contextual cues—pill bottles, stethoscope, and the office itself—are repeatedly paired with some type of drug or medical procedure. The received treatment usually provides relief, which reinforces a positive expectation that going to the doctor's means that wellness awaits. Eventually, just being in the presence of those cues will provide a sense of relief, without any type of actual medication.

Though the surrounding environment has a significant impact on producing the placebo effect, a frequently overlooked component is the influence of the doctor-patient interaction. Placebo research was missing the bigger picture—until now. Researchers were primarily focusing on the context, much like an audience who has

just sat down to watch a stage production notes the scenic background and props. While these features enhance the quality of the play, the acting skills of the actors are arguably a more essential component. A good actor emotionally invests the audience and makes the events of the story seem all the more believable. Similarly, a good doctor will make you believe in the effectiveness of the treatment being prescribed and enhance your faith in the recovery process. If many of the improvements seen in the placebo effect result from doctor-patient interactions, then appropriate bedside manners may be a new facet that our healthcare system needs to explore. To further consider how the doctor-patient relationship should be improved, we must define what "appropriate" bedside manners consist of.

Encouraging Environment

The members of the !Kung Bushmen join together to create a caring and supportive atmosphere for their sick. Healers in particular invest a lot of energy into the process, demonstrating a kind character with a strong desire to help. How effective are these attitudes when applied to our doctor visits?

In a supportive atmosphere, patients exposed to a placebo treatment experience more symptom relief than those tended to in a non-supportive environment. Doctors that share minimal eye contact, focus on their computer, and dive into treatment options display a restricted interaction style. This type of limited and disinterested encounter makes most patients reluctant to share information or feel confident in their doctor's recommendations. In comparison, a doctor who expresses a warm, friendly, and understanding disposition is likely to create optimal relationships with their patients.

Active listening—which involves head-nods, eye contact, and seeking clarification—expressions of empathy, thoughtful consideration, and confident communication skills produce a comfortable environment for the patient. These qualities emphasize a patient-centered approach that individualizes the interaction and enhances the patient's faith in the doctor's expertise. Those with more trust in their healthcare provider are likely to experience beneficial health outcomes.

The doctor should empathize in a manner similar to that of a concerned parent whose child has just taken a fall; as the child runs indoors with a slightly scraped knee, they seek the comfort and attention of their parent, who calms the child by saying that they will "kiss it better." Though the kiss does not heal the wound, it does make the injury less painful. While it would be nice if all of our ailments could be kissed away, clinicians may be better off adopting the empathic and warming qualities expressed by the parent to make their patients feel better.

In order to feel as though proper care and consideration are being taken, the patient should also be given an appropriate amount of time to

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express their concerns. Doctors tend to have busy schedules, so if they appear stressed and flustered upon entering the room, the patient may withdraw to prevent taking up more of their time. The doctor's disposition influences the type of atmosphere that patients will experience, which can subsequently affect the success or failure of a prescribed treatment. These characteristics are not difficult to convey, but can a smile alone truly change the effectiveness of a treatment?

Positive Expectations

The placebo effect demonstrates that symptom improvement partially depends upon the doctor's belief in the success of the prescribed treatment. Verbal suggestions made by the doctor can cause the patient to develop positive or negative expectations that may influence the trajectory of their illness and the recovery process, particularly in regards to pain.

Patients are more likely to show improvement when the doctor speaks highly of the prescribed medication by using statements such as "I think this will work for you" or "most of my patients get better with this treatment." These comments reassure the patient that they will get better, which is all anyone wants to hear when talking to their doctor. Neutral statements such as "it may or may not work" or "it really depends on the patient" tend to provide no extra boost for improvement. Negative comments fair even worse, as they can bring about nocebo effects. Nocebo effects are adverse physiological responses that arise from fake treatments and often present themselves after having been suggested. Doctors should avoid using phrases that convey uncertainty or ambiguity such as "this medication may help, but we're not sure". Understandably, a doctor cannot guarantee the success of any medical treatment, so it may be more beneficial to provide a pro/con explanation. The doctor should discuss why they are recommending that particular treatment, in which circumstances it hasn't been successful in, and what the next steps would be should that treatment prove ineffective.

On the other hand, being too specific can introduce jargon. For example, using the phrase "the heart's right dorsal tricuspid valve has slight regurgitation" would only add further distress to a concerning diagnosis. As well, emphasizing a negative outcome or making the procedure seem trivial won't make the situation any better— like when the doctor says "this will only hurt a little", but it ends up hurting a whole lot more. In circumstances where the doctor knows it will hurt, they should acknowledge the pain level, but attempt to find a bright side; for example, saying "the procedure will be over shortly" will reassure the patient and direct their attention to the end of the process.

Evidently, the doctor can influence the effectiveness of the suggested treatment through expressions of certainty or doubt. For these

purposes, research is investigating patient-practitioner communication as it relates to those diagnosed with cancer, Parkinson's, and other severe illnesses. Though a simple phrase cannot dissolve a tumor, it could mean the difference between severe to mild pain, tiredness, or nausea.

The power behind these verbal suggestions is their source. In Western society, the white-lab coat doctor is a prestigious figure, one who has the utmost knowledge on healing and good health. Medical dominance refers to the hierarchical relationship between the patient and practitioner, whereby the doctor's status allows their viewpoint to be favoured. It is likely by these means that the doctor's words become highly influential, enough so to improve or worsen symptoms even in the absence of medication.

While these suggestions may seem simple, doctors can't deliver all prognoses in a positive manner or disregard the side effects and potential risks of a recommended treatment. Patients must be rightfully informed, but the manner in which doctors engage in this conversation could be refined. Providing neutral comments while remaining upbeat might be all the difference a patient needs.

Side Effect Revelation

The amount of emphasis placed on the side effects of any medical intervention increases the likelihood that they will appear. Placebo studies that administer fake acupuncture, creams, or medication will often list potential side effects that cannot actually occur as a result of the medical procedure. Surprisingly, patients tend to report experiencing the very symptoms they were warned about and, in extreme cases, have physical reactions that lead them to drop out of the study. It could be assumed that an individual who experiences adverse symptoms from a fake treatment is partaking in a self-fulfilling prophecy. That is, they know the symptoms they should expect to feel, which is what causes them to occur. Consider an individual who has just been prescribed anti-depressant medication and is told by their doctor that headaches are a common side effect. The individual may experience slight head pains in the next few days as a result of their expectation. Although the root cause is psychological, people can experience very real physiological symptoms.

"Although the root cause is psychological, people can experience very real physiological symptoms."

Brain imaging techniques have observed elevated activation within various frontal regions upon the anticipation of pain. These neural mechanisms are a bit complex and not fully known, but anxiety appears to facilitate their activity. Distress or discomfort are often experienced when the doctor emphasizes the potential pain level of the procedure or attempts to sympathize with patients during treatment. Those who have experienced negative side effects or have witnessed them in others are most susceptible to nocebo effects. Nocebo effects are even capable of overriding the effects of pharmaceutical drugs, whereby individuals who are told that their pain medication has stopped suddenly report feeling more pain even though the drugs were still being administered.

The placebo effect has provided medical researchers the opportunity to study the influence

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of different aspects of our healthcare system in the absence of medication. By doing so, they've revealed that contextual cues and genuine interactions with medical personnel have their own role in the healing process. It's as simple as a friendly disposition and positive reassurance that can potentially mean the difference between getting better or worse. Placebos have revealed that healing can be a very ritualistic and performative experience, two factors that the scientific community often overlooks. While medication and surgery are essential components, doctors should begin to consider how their social interactions affect patients in the long-term. Refining these encounters may provide a boost within our healthcare system. Though it's clear that bedside manners won't completely heal nor injure a patient, they do influence the treatment process.

An optimal healthcare system would be one that combines proper diagnosis with good medication, and personable medical staff. Initially, the healing ritual performed by the !Kung Bushmen seems quite foreign and absurd, but it has implications for feeling better. Observing their communal care and connection highlights qualities and attitudes Western healthcare should adopt. As useful as medication and technology are, compassion is fundamental for human care.

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The Two Faces of Social Media

Marija Lukic

Social networking sites can either help or harm your mental health, depending on what you do when you're online.

Is social media good or bad for your mental health? In today's hyper-connected digital world, this is a controversial question. Using social media excessively is associated with many mental health issues including anxiety, depression, low self-esteem and poor body image. But this seemingly bleak picture does not tell the whole story: Could using social media ever be a positive activity with profound benefits for mental health? Research suggests that the answer is yes.

While it's true that social media users are more likely to report feeling depressed and socially isolated, we don't know why that is. Social networking sites could be causing mental health issues, but it's also possible that individuals with poor mental health are more drawn to social media in the first place. Furthermore, studies in the field of social media and mental health suggest that social networks can be a healthy tool for identity construction, a way to seek support for mental health challenges, a place to make new friends and strengthen existing relationships.

The reach of social networking sites has never been wider and their popularity is growing. 1.8 billion people worldwide use at least one form of social media. Facebook alone has over 1 billion daily active users. In North America, the average person reports spending 61 minutes every day logged onto social media and checking favorite sites 30 times per week. Social media is becoming a part of everyday life. The research on social media and mental health is split: Social media can be a minefield for mental health, but it can also be a powerful force for good if used carefully and strategically. Interacting with others through social media presents new challenges, but also new possibilities for relating to ourselves and to the world.

Social Comparisons

Imagine this: A young woman browses her Facebook feed to see her friends' updates. She

is greeted by a parade of good news: Amy just got engaged, Blair was promoted, and, the icing on the online cake, Brian just posted pictures of a fun night out three days after their breakup. Meanwhile, she sits at home on a rainy Saturday, the third such night in a row, and wonders why her life isn't as good as theirs. But maybe she's wrong. Selective self-presentation is the double-edged sword of social media, and can contribute to either depression or empowerment.

People often present idealized versions of themselves online. U.S. adults surveyed about their social media habits admit that they prioritize positivity over accuracy in their online self-presentation. The logical conclusion is that online, everyone looks happier and more successful than they really are. This situation creates a breeding ground for comparing the self to others—and coming up short. Upward social comparisons (comparing ourselves to others who we feel are better than us) both online and in "real life" have been associated with poor mental health. Online comparisons can be especially damaging because of the 24/7 artificial window social networks provide into others' lives. Unlike in the physical world, which only affords the

opportunity to envy what is, the digital world lets social media users feel jealous of a carefully constructed image of what might be.

Compounding the problem, the highly visual nature of social media can impact body image. Unrealistic portrayals of physical appearance are common online. Estimates for the percentage of social media users who post photos that have been digitally altered range from 10% to 70%, with North American young adults and women in particular being the most common culprits. Editing aside, anyone can post the one photo out of a hundred that makes them look thinner, younger, and more attractive. Everyone not only looks happier online, they look better too.

The empowering flip side is that actively controlling one's self-presentation and constructing a positive online identity boosts self-esteem, at least for the person doing it. The Hyperpersonal Model of Behavior theorizes that social media gives users the time and opportunity to pick, choose, and ultimately optimize how they present themselves to others in a way that they wouldn't be able to do in a face-to-face interaction. This self-construction of social identity often leads to enhanced self-esteem. Survey respondents report feeling that social media is a way to authentically express who they are and share it with the world, which at first seems contradictory to the self-enhancement that we know goes on, but is it really?

Maybe these positive self-portrayals are how people really see themselves, and sharing that positive self-perception can raise self-esteem. More evidence for the benefits of using social media in an empowering way comes from a recent University of California-Irvine study. Students who took smiling selfies every day for four weeks and shared those selfies with

researchers reported feeling both happier and more self-confident than they were before. The positive change could be attributed to adopting a different view of the self (as someone who is happy and smiling) and to sharing this happy image of the self with others. Presenting oneself positively, controlling the construction of one's own social narrative, and sharing the good things in life with others can benefit mental health for the person sharing.

Social Communities

Social media can benefit mental health, but there is another side to the coin. How can you be lonely when you can connect to hundreds of people in seconds with the click of a button? Social isolation is a problem that affects people all over the world, and perceived social isolation has been shown to increase with frequent social media use. Young adults who use social media for two to three hours per day are twice as likely to feel alone as those who were online for less than half an hour daily. Checking social media fifty-eight times or more per week is also linked to perceived social isolation, while checking social sites nine times per week or less—the equivalent of just over once a day—seems to be much less detrimental.

The core of the super-connected loneliness paradox may be that more time spent online often means less time fostering offline friendships. Excessive online interaction distracts from IRL ("In Real Life") relationships. It is unlikely that having hundreds of friends on social media can replace two or three close, deep friendships with people that we see in person. In fact, one

" . . . more time spent online often means less time fostering offline friendships."

study shows that in teenagers, larger Facebook network size is associated with higher levels of stress. Many online friendships are, by necessity, shallow—as humans we only have the capacity to maintain so many meaningful friendships at a time. Feelings of exclusion can also add to loneliness. Social networks make users privy to their friends' social lives, making it glaringly evident when someone has been left out of a gathering. Another potential source of stress is the ever-present temptation to ruminate over how many people have "liked" a recently shared photo or post.

On the other hand, social networks can be used as a positive tool to strengthen existing friendships. Teenagers that reported acting in supportive ways such as liking friends' posts or making encouraging posts on friends' pages had decreased levels of cortisol, indicating that those activities reduced stress. Young adults who used social media to keep in touch with friends also experienced higher levels of well-being compared to those who didn't. Another piece of evidence comes from the selfie study: individuals who took and shared "groupies" (photos of a group of people, usually friends) got the same benefits of happiness and improved self-esteem as those who posted smiling selfies. The implication seems to be that social networking activities that strengthen offline friendships can benefit mental health.

Online connections also have merit in their own right. Shy individuals are one group who can especially profit from social media's distance and anonymity. Social networks facilitate

connections for those who have a harder time interacting in person, which can elevate mood. Social media's power to connect isn't limited to the young; the elderly can also benefit. Research from the University of Sweden links social media participation in seniors to healthier aging. Seniors who participated in an intervention designed to promote engagement in daily meaningful Internet-based activities (including social media) reported increased feelings of involvement in society, stronger social networks, and reduced loneliness. Social media can be a helpful way to connect for groups of people who are more likely to be socially isolated.
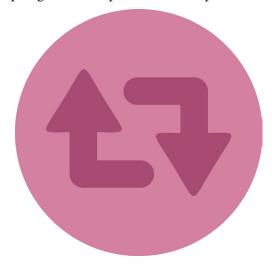
Social media can also prove an important resource for individuals who are struggling with mental health challenges. Apart from traditional social networking sites, a number of online forums exist that are oriented around mental health and offer support and the ability to find and connect with others who are going through similar situations in a safe way. Using social media as a support for mental health can be a delicate balancing act though; for instance, in the case of pro-anorexia forums, online communities can actually propagate the illness by preventing meaningful recovery. Social media can be a valuable way to connect, but one that should be used with care and caution, especially by those who are more vulnerable to mental health issues.

Social Conduct

Active social media use seems to be better for mental health than its passive counterpart. "Lurking", a phenomenon that involves viewing others' online activity without contributing or engaging with them, is tied to various negative mental health outcomes. Lurking comes in many forms: looking at friends' photos and posts, perusing the content of complete strangers, or even cyber-stalking. Active behavior, like making positive posts, in other words, controlling the narrative, is not associated with any of these negative outcomes and can actually help mental health.

Specific actions on social media are associated with worse mental health. Some of the online behaviors that are consistently found to be detrimental online are: wasting time on meaningless and unproductive activities ("killing time" online), engaging in negative or upward comparisons, envying others, ruminating on one's perceived shortcomings, and friending or accepting friend requests from ex-partners.

Moderation seems to be key to mental health on social media. Individuals who spend a lot of time online are more likely to experience consequences with regard to their mental health, as are those that check frequently. The moral of the story: social media itself is not the problem, rather excessive use of social media is. In the modern world, completely avoiding social networks may not even be feasible, but using them in a limited and strategic manner definitely is. Setting limits on how frequently to check Facebook each week, sticking to a daily time

quota, or both, could be effective and healthy ways to make sure that social media use helps rather than harms.

Social media use has been associated with many mental health issues. It is easy to paint this pervasive part of modern life a villain. Saying that we should avoid social media is the easy answer, and the impractical one. It is almost impossible to function in society without a computer. Employers regularly check employees' social footprint before hiring, busy professionals are meeting through online dating more and more, and younger generations can't even imagine a world before online was a "thing". In this context, the minefield of social media can't be ignored, but instead has to be navigated. Using social media smartly, actively, in moderation, and taking breaks when necessary are ways to maneuver through the online world in a healthy way. Avoiding harmful behaviors and engaging in positive ones is the best way to engage in this important aspect of the social life of the future—whatever new gifts and challenges online communication may bring.

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Mild Traumatic Brain Injury

Muskaan Sachdeva

Abbreviations:
- **mTBI**: mild Traumatic Brain Injury
- **CIS**: concussion in sports
- **LOC**: loss of consciousness

Introduction

Concussion in Sports (CIS), also known as mild Traumatic Brain Injuries (mTBI), was not deemed to be a hot topic in research two decades ago. As a result, there had been a poor management of mTBI symptoms, such as headaches and concentration difficulties, which served to be an impediment to the physical, social and mental functioning of affected athletes. Recently, recurrent concussions to several athletes, some of whom were forced into retirement, have increased awareness amongst sports personnel and general public. Since 1999, many researchers have focused their attention on concussions resulting from sports and uncovered various long-term cognitive and emotional disturbances associated with mTBI. The literature primarily outlines management of students' return to their respective elementary and high schools following an mTBI; however, research on the management of post-mTBI symptoms for students returning to post-secondary school has also recently gained attention amongst researchers. Persistent symptoms following mTBI, labelled as post-concussive disorder, include headache, fatigue, disordered sleep, dizziness, irritability, anxiety, depression and changes in personality. These can result in substantial functional disability interfering with patients' ability to return to work or school and can result in low levels of satisfaction with quality of life. The following article will detail the current state of knowledge on the symptom management guidelines for students upon their return to post secondary school in two defining categories: those who arrive at post-secondary school already having suffered an mTBI, and students who suffer mTBI while attending post-secondary school.

Definition of Concussion

Concussion and mTBI are separate entities wherein concussion is a sub-set of TBI. Four international symposia on CIS were held in the Committee on Head Injury Nomenclature of Congress of Neurological Surgeons: Austria in 2001, Czech Republic in 2004, Switzerland in 2008 and Zurich in 2012 respectively. The consensus statement that emerged from the third symposium defined concussion as "a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces". Moreover, the consensus definition proposed five major features that help identify the nature of a concussive head injury:

1. Concussion may be caused by a direct blow to the head, face, neck, or elsewhere on the body with an "impulsive" force (sudden large force acting for short time) transmitted to the head.

2. Concussion typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously.

3. Concussion may result in neuropathological changes, but the acute clinical symptoms largely reflect a functional disturbance rather than structural injury.

4. Concussion results in a graded set of clinical syndromes that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course.

5. Concussion is typically associated with grossly normal structural neuroimaging studies.

It has also been taken into account that post-concussive symptoms can prevail for prolonged periods. Alternatively, DSM-5 categorizes concussion as, "Major or Mild Neuro-cognitive Disorder Due to Traumatic Brain Injury" and distinguishes between two categories based on the severity of impairment in language, attention and memory.

Epidemiology

There are 300,000 cases of CIS reported annually. Students in post-secondary schools, primarily the 18 year olds, have a higher incidence rate of CIS than 13-14 year olds and high school students combined. The reported rate of concussion injuries is 0.5-3 injuries per 1000 athlete exposures at collegiate level compared to 0.14-3.66 injuries per 100 player seasons at high school level. Football, a very popular sport in post-secondary education, has the highest incidence of concussion. However, CIS injuries are often underreported due to inaccuracy in self reporting and the varying definitions of mTBI. This is primarily due to the likely absence of clinical symptoms in most cases and also because of the myth that concussions do not require medical intervention. People often identify concussions after the occurrence of loss of consciousness (LOC); however, only 10% of CIS cases involve LOC. Hence, 300,000 annual cases of CIS just represent the tip of the iceberg!

Apart from sports, TBI in children and adolescents can occur following motor vehicle accidents, crashes, falls, and physical abuse and can leave them with long lasting and significant alterations everyday functioning, including social, physical, behaviour, and cognitive functioning/aspects.

"CIS injuries are often underreported due to . . . the myth that concussions do not require medical intervention"

Effects of mTBI

CIS can be difficult to diagnose because the majority of concussions that occur in sports occur without loss of consciousness. CIS involves a constellation of cognitive, physical, emotional and social effects in affected athletes and can follow a long and protracted course. Emotional and social effects of CIS have not been extensively investigated due to their subjective nature, making these variables harder to quantify.

Physical

Post concussion syndrome (PCS), a condition resulting after a mild or moderate head injury, may lead to headaches, nausea, vomiting, dizziness, fatigue, migraines, sensitivity to

noise, and vision problems. The most frequently reported out of these symptoms are headaches.

Cognitive

Cognitive effects include problems in general intellectual function, memory and attention, reaction time, and visual and motor abilities. Additionally, there can be significant impairments to the ability to organize, concentrate, and plan and monitor behaviour. Bassett and Slater reported residual cognitive deficits in verbal learning, abstraction and reasoning, with relatively intact cognition in other domains. Surprisingly, students who suffer an mTBI as children do not show cognitive symptoms until they reach adolescence. As a result, such students may suffer from academic difficulties as they enter post-secondary education even though their high school academic life remained unaffected by their CIS.

Emotional
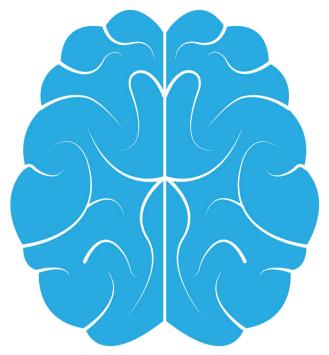
Students in post-secondary school with a history of mTBI show increased emotional distress compared to their peers without a history of mTBI. The limited literature on students who arrive at postsecondary school already having suffered a TBI suggests that while academic and cognitive issues may be resolved, it is likely that these students will still have significant emotional problems such as anxiety, depression, apathy, aggression, irritability, frequent mood swings or emotional symptoms for several years afterwards. Often times, emotional symptoms resulting from an acquired CIS go unnoticed by physicians due to their subjectivity and lack of guidelines for diagnosis. Also, psychological symptoms may be hard to distinguish from psychological reactions secondary to being kept out of sports or school. Ewing-Cobbs and Fletcher in 1987 stressed that emotional and behavioural effects of childhood

and adolescent mTBI need further investigation.

Social

TBI adversely affects leisure and recreation, social relationships, functional status, quality of life, and independent living.

Due to the physical, cognitive and emotional deficits after CIS, individuals having suffered CIS might face social implications including fears of being scrutinized, judged or embarrassed in public. As a result, they might avoid social activities such as public speaking and attending social gatherings. The individual may also feel isolated from peers and social networks leading to many emotional effects such as feeling lonely, sad and frustrated.

The physical, cognitive, emotional and social effects are interlinked and occur simultaneously in a cyclic manner. Given this inter-relationship, concussion effects can vary across students demanding that academic adjustments

are tailored to each student's particular circumstances.

mTBI: A growing issue gaining attention

In 1987, Ewing Coobs and Flescher stressed the need for more research in childhood and adolescent mTBI. Compared to adults, the effects of TBI in children may be long lasting and widespread due to the role that developmental changes in physical (puberty, body image and sexuality), interpersonal (family functioning, peers and self-concept) and environmental (transition to post-secondary education) domains play in the recovery from TBI. Many other moderator variables such as psychiatric history and family functioning impact the severity of signs and symptoms caused by CIS in post-secondary students. However, these variables are difficult to evaluate due to their subjective nature. Therefore, it might not be appropriate to predict functional outcomes of CIS in adults based solely on objective results; other variables (such as social, emotional, cognitive) and their interlinks should also be taken into account.

A remarkable increase in the awareness of mTBI resulting from sports has been witnessed since 1999. Before that time, children and adolescents were allowed to resume their regular academic and recreational activities immediately after their symptoms subsided. The issue of returning to school and recommencing play was not discussed until the 3rd International Conference on CIS held recently in 2008. The consensus panel in the fourth international symposium on CIS agreed that concussion is one of the most complex sports injuries to diagnose, assess and manage. Since then, multiple researchers have been focusing on the symptomatic course of CIS, primarily the prolonged cognitive and emotional effects on the individual's brain. Post concussion symptoms may not manifest until return to work . Increasing knowledge about the risks of CIS has yielded better strategies and guidelines of managing students' return to their respective elementary and high schools. However, the studies pertaining to CIS in adolescents and their return to post-secondary school still remains an area that has not been thoroughly explored.

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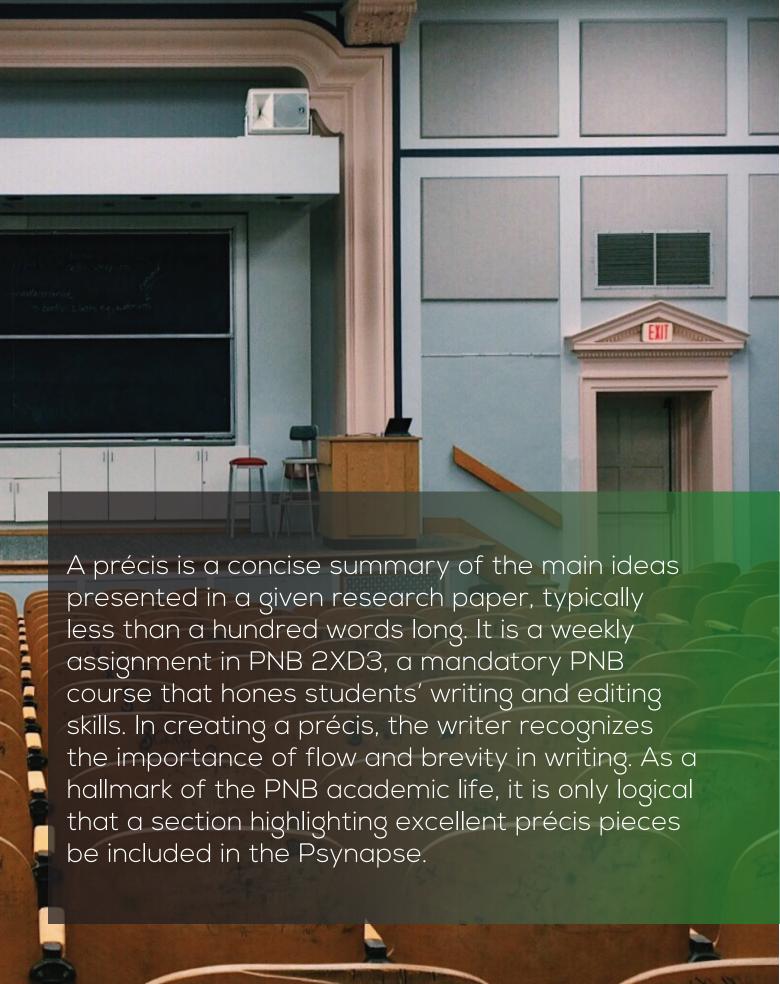
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Précis

A précis is a concise summary of the main ideas presented in a given research paper, typically less than a hundred words long. It is a weekly assignment in PNB 2XD3, a mandatory PNB course that hones students' writing and editing skills. In creating a précis, the writer recognizes the importance of flow and brevity in writing. As a hallmark of the PNB academic life, it is only logical that a section highlighting excellent précis pieces be included in the Psynapse.
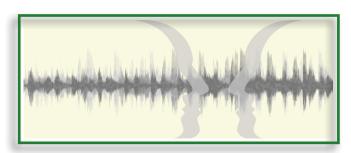
Fundamental Frequency of Human Male Voice and Attractiveness

Melanie Renshaw

Human females find males with low frequency voices more attractive than males with high frequency voices.

Females are especially choosey when selecting a mate. Females find males with lower sounding voices to be more attractive. Even further, the taller the female, the greater the mate preference for males with low sounding voices. The frequency of a male's voice is determined by the amount of testosterone in his system; more testosterone leads to a lower voice. More testosterone also leads to more masculine males with higher reproductive success. Therefore, human females use male voices as a measure of mate value.

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Probabilities Predicting Perception

Farriyan Hossain

Bayes' theorem predicts perceptual inferences.

The brain integrates prior and current sensory experiences to determine the probability of an event outcome. Bayes' theorem is a three-part equation that models this neural pathway. The theorem first considers prior probabilities, which are equivalent to the brain's prior expectations. Likelihood probabilities, which are analogous to current sensory experiences, are then computed. The product of these two probabilities determines the posterior probability, which represents the combination of past and present experiences to infer the outcome of an event. Bayes' theorem is a mathematical model for describing perceptual processes.

Goldreich, D. (2015). The tau of tactile spatial perception. Lecture in PNB 2XD3, McMaster University, Hamilton, Ontario.

$$P(H|E) = \frac{P(H) \times P(E|H)}{P(E)}$$

The Mating Call of the Wild

Samantha Edwards

What's that sound? Is it secret navy drilling or nesting bees? These were the speculations of houseboat owners when they heard the loud humming, mating call of the Plainfin Midshipman Marine Toadfish. This fish is interesting because it has two male reproductive tactics, and the males provide parental care. As a member of the Aquatic Behavioural Ecology Lab (ABEL), I counted the Midshipman fish eggs, laid under rocks, to further our understanding of fish mating and parental care habits. This data will help the fishing industry to better meet the supply and demand of our growing populations.

This précis is based on research at the Aquatic Behavioural Ecology Lab (ABEL).
Published with permission from Dr. Sigal Balshine.

Eyes Without a Face

Farriyan Hossain

Face identification depends on facial features.

Humans rely on faces to identify others. During facial processing, humans visually fixate on the eyes and eyebrows. These facial features provide crucial information for recognizing individuals. They also provide information about a person's disposition and intentions—factors that are key parts of social interactions. Manipulating a facial image via facial inversion or eye and eyebrow removal hinders face recognition. Face identification is essential for developing social relationships.
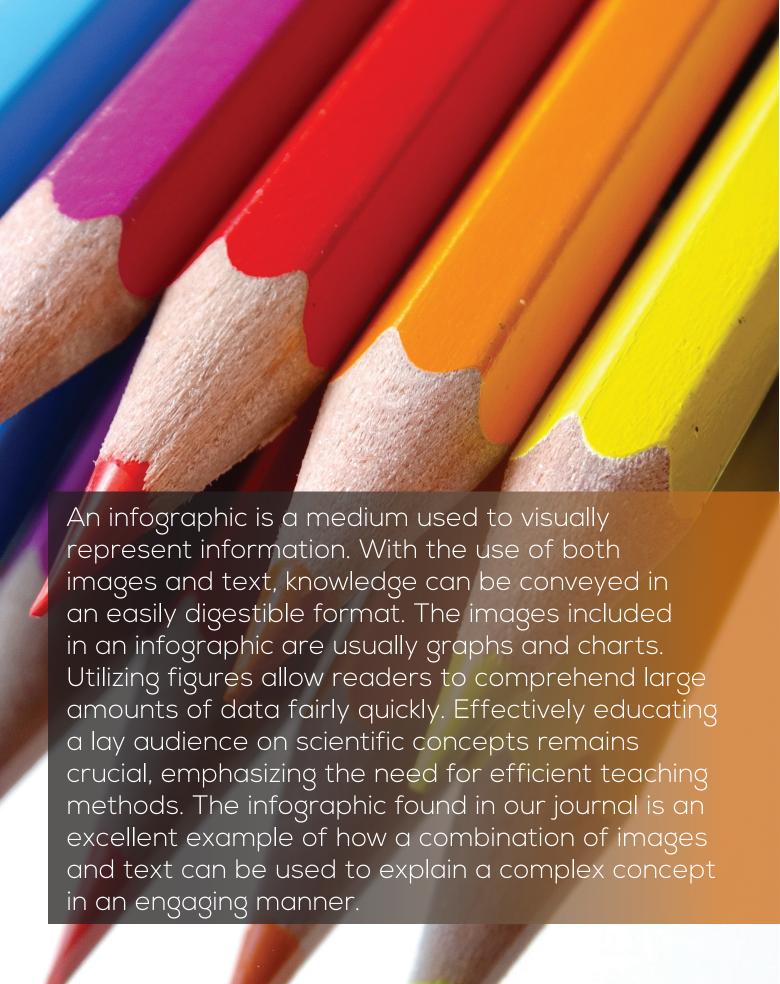
Pachai, M. V. (2015). What's in a face? Lecture in PNB 2XD3, McMaster University, Hamilton, Ontario.

Infographics

An infographic is a medium used to visually represent information. With the use of both images and text, knowledge can be conveyed in an easily digestible format. The images included in an infographic are usually graphs and charts. Utilizing figures allow readers to comprehend large amounts of data fairly quickly. Effectively educating a lay audience on scientific concepts remains crucial, emphasizing the need for efficient teaching methods. The infographic found in our journal is an excellent example of how a combination of images and text can be used to explain a complex concept in an engaging manner.

DEPRESSION
+ students

1 in 3 university students have difficulty functioning due to depression

65% of students have felt overwhelming anxiety

14% of students have seriously considered **SUICIDE** in the last 12 months

NEED FOR
UNIVERSITY MENTAL HEALTH SERVICES

College and university counseling center presenting concerns

Percentage of students who presented with depression, anxiety or a relationship problem as their main reason for seeking help at a counseling center.
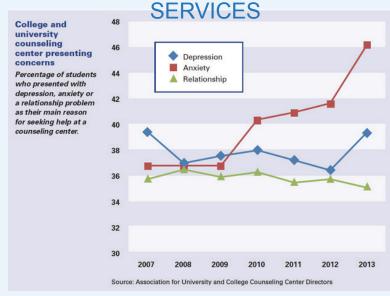
- Depression
- Anxiety
- Relationship

48
46
44
42
40
38
36
34
32
30

2007 2008 2009 2010 2011 2012 2013

Source: Association for University and College Counseling Center Directors

"Those who have worke... for the last decade ha... ringing a bell saying som... **are getting worse wit... student men...**

- Ben Locke, PhD, Centre... Health (...

SUPPORT FOR UNIVER... SERV...
LEAD...

Minimized drop out rates

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Delivers therapy to stu... over computer or sma...

34% of stud... previou... experi... online

② WellTrack
Online guided self-inte... stress, depression an...

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CCMH)

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Relief of
Suffering

TREATMENTS

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therapy

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d anxiety

500 000+
students currently use WellTrack

78% of students with mental health
concerns first seek help from
friends & family

FOCUS TO INCREASE
STUDENT MENTAL
HEALTH AWARENESS.
EDUCATE.

Sources:
Mental Health and Academic Success in College:
https://www.degruyter.com/view/j/bejeap.2009.9.1/
bejeap.2009.9.1.2191/bejeap.2009.9.1.2191.xml?
format=INT
Ontario University and College Health Association
(OUCHA) Spring 2016 Survey:
http://www.cbc.ca/news/canada/ottawa/mental-health-
ontario-campus-crisis-1.3771682
Students Under Pressure: http://www.apa.org/monitor/
2014/09/cover-pressure.aspx
The Association for University and College Counselling
Centre Directors (AUCCCD) Survey:
http://www.aucccd.org/assets/documents/aucccd
%202016%20monograph%20-%20public.pdf
Therapy Assistance Online:
http://www.taoconnect.org/
UT Counselling and Mental Health Centre:
https://cmhc.utexas.edu/index.html
WellTrack:
http://www.welltrack.com/

Humans
of PNB

The Department of PNB comprises of phenomenal individuals, be it faculty, researchers or students. The people of this department hail from a variety of diverse backgrounds, all engaged in scientific research and discovery. The purpose of "Humans of PNB" is to appreciate the people behind the monumental work being done at McMaster University. These selected interviews, taken in a format similar to the popular photo blog "Humans of New York", not only celebrates the achievements of these people, but provides inspiration through gaining a greater understanding of their backgrounds, their paths, and the work they do at McMaster.

Dr. Sigal Balshine is a professor in the Department of Psychology, Neuroscience & Behaviour, as well as an associate professor in the Department of Biology. Her research focuses on evolutionary behavioural ecology, paying close attention to sociality, breeding system evolution, and the anthropogenic impacts on behaviour.

Can you tell us more about yourself and your research history?

I completed my undergraduate degree in Zoology at the University of Toronto, where I fell in love with animal behaviour. I had a professor who taught me to use evolutionary and ecological theories to understand why and how animals behave the way they do, and I've never looked at animals the same way again. I love to understand animal behaviour mysteries and evolutionary puzzles! I studied Zoology during graduate school in Cambridge, and spent several years completing my postdoctoral when I heard that McMaster was hiring someone. I was very lucky they hired me!

I know that you've worked in places like Vienna and Israel. Do you think travel plays an important role in research?

I would say that there are two trajectories in research: you either stay in the same place and get a very deep understanding of an idea or move around a lot and experience different approaches and ideas. I'm excited by many things, so I'm probably not someone who would take the first path, but I do think that both are paths to success. I travel a lot and collaborate with researchers all over the world who help explore our questions from another perspective. That's the way I have fun with science. For me, it was important to follow the second path in life, but everyone's different.

So, you're teaching, you're doing research, and you've got other things going on in your life. What is your typical workday like?

I might be doing an experiment with my students in the lab, or I might be training people in the lab to do experiments without me. I also do a lot of fieldwork. For example, all through Reading Week, there are 20 of us going out to the field together. We'll be wearing baseball caps, lots of sunscreen, waders, and getting dirty. We're all going to be processing fish that we've caught from traps and running them through behavioural and physiology experiments. My days usually start early and end late, but I try to make time for my students and help them with their research.

Speaking of students, how do you incorporate undergraduates into your lab and into a research environment?

Undergraduates are very welcome in my lab! Usually students apply as a volunteer and I put them on easy tasks at first. If they are good at those tasks, come on time, and are conscientious and responsible, they usually stay in the lab to do a research practicum course. If they like that, they might even stay on and do a thesis in my lab.

One thing undergraduates struggle with is time management. How do you manage to achieve balance in your life, and how do you make sure to stay sane?

Sometimes I feel like I could be a better mom, and a better partner to my husband if I wasn't an academic, or vice versa. I want to do all of it, but sometimes you just have know that everything can't be perfect and try your best and hope that people understand. Having good people in your life—that's the key to keeping you sane.

What is your favourite thing about teaching undergraduates?

Their ideas and the enthusiasm! Sometimes graduate students can get a little bit jaded; they've done an experiment a hundred times, so it gets kind of boring for them. Undergraduates are so excited! They have enthusiasm for research and think anything is possible. I love when they debate, have different ideas and ask questions to challenge me and add to our experience of learning together.

An extended version of this interview can be found at the Psynapse *website.*

Dr. Sigal Bashine

Dr. Karin Humphreys

Dr. Karin Humphreys is currently an associate professor in the Department of Psychology, Neuroscience & Behaviour. She teaches the undergraduate thesis course (PNB 4D09), psychometrics (PNB 3MT3), psychology of language, and graduate statistics. She, along with Dr. Scott Watter, is also the departments' newest Canadian citizen; congratulations Dr. Humphreys and Dr. Watter!

Tell us a little about your path to McMaster University.

I graduated with a first-class Hons. Cognitive Science from the University of Queensland. I originally thought I was going to be studying history and government. I was avoiding psychology, given that my father and my grandfather were both academic psychologists. I wasn't originally planning on following the tradition, but then I ended up taking an introductory psychology course and I found it fascinating. I also realized at the time that I was much more of an empirical scientist. I like empirical data. I knew that I wanted to go on and study psycholinguists. As far as I knew, my field of interest was just beginning to be explored. The folks at Illinois were doing tremendous work in language production in both normal and pathological speech. That's the stuff I was genuinely interested in. So, I completed my masters and PhD at the University of Illinois. After completing a post-doc there, we [Dr. Scott Watter and I] began applying to faculty positions at universities all around the world. I got the call from McMaster in the fall of 2003.

An extended version of this interview can be found at the Psynapse *website.*

In your lab you take on many undergraduate students. How does an undergraduate student fit into the lab picture?

It's something that I personally enjoy. It's a valuable experience to get in there and really see how actual science is being done and be involved in real research. Usually, at the beginning, they start off learning how the actual process goes, how to design stimuli, how to run subjects, which is an whole art form unto itself. In my work, we often have a lot of coding and transcribing of language data, so students learn about that as well.

People get exposed to different projects, instead of sticking to one, students get a wide-ranging experience in everything that's going on. [Undergraduate] students are an important part of my lab.

Do you have any advice for students who are considering pursuing graduate studies in this field or a related field in PNB?

Yes, getting research experience is really good. Get involved in a lab. Often, it's a good idea to try out a few different labs and see what your interested in. See what you like and what you don't like. Pick the brains of everyone around you as much as possible. It's not too difficult to coast through and do the minimal effort, but the more you put into the more you can get out of it. So, ask all the questions you can.

What is your favourite thing about teaching undergraduates and what do you think is the biggest challenge facing undergraduates today?

I like the energy that is involved. I think it, it keeps you younger. So much enthusiasm! Always something new, always a fresh start every semester.

I think that [undergraduates] are having to work a lot more than they used to. I think sometimes we as professors forget that. We didn't necessarily have to hold jobs as well

as school. Students are needing to work long hours and deal with all of that. On top of that, the requirements are going up. What value a bachelor's degree used to have [has] been diminished, now Masters, sometimes even PhDs. are beginning to become the default requirement.

At a big university, it can also be difficult. Undergraduates can get lost in the crowd, especially if they don't have experience in a lab or get to know their professors. And I think there is something valuable in knowing, and being known by, your professors.

Dr. Karin Humphreys
Humans of PNB

Dr. Jonathon Stone is a professor in the Department of Biology. His research interest lies in computational biology. He is currently teaching Biology 3FF3: Evolution.

How do you incorporate undergraduate students into your research?

I involve undergraduates exclusively and inclusively in research. I usually have students start a project, and if they don't finish the project in one year, it gets continued by students in the next year. It keeps getting handed down until it's finished or to a point where you can publish. I've had students who told me they wanted to do research from bacteria to elephants. I don't study nor have the expertise for bacteria or elephants. Usually it's the student's passion that's hard to say no to.

What is the worth of an undergraduate student?

They're dedicated. There are a lot of students who want to volunteer. Often times I find that they're willing to sell themselves a little bit short because they need experience as a checklist on something, for example graduate school. I find that when students arrive, they have passion. If you can use that passion to get research done, it benefits both parties. They get compensated by getting an academic credit, and ideally a publication. And I benefit because my research progresses. They're also industrious and hardworking and their interest are diverse.

What do you think is the biggest challenge facing students these days?

I would say their outlook. When they arrive, I'm sure some of them have a preconception of where they want to be after they graduate. I would say most don't. If you ask first year students, "where do you want to be in 5 years," some might have an automatic response, such as medical school. And then over the next three and a half years, that starts to change. I think, for students who arrive with a preconcieved idea—that may not be their own desires—identifying oneself with a position becomes harder as you go through [university]. I think that's the hardest part.

They're too busy taking courses, that they're not taking the time for themselves. Budgeting time is always hard when you're taking five courses, which I think is a lot in to handle at a time for anyone. But that's a smaller scale problem, I think the bigger problem is, what am I going to do when I'm done.

Given your research background, what is one person in history that you see as very influential?

Scientist-wise, I've always felt Einstein was very influential. Because he never had to step into a laboratory to propose a theory or idea. He he published five landmark papers in one year, without ever having been in a lab or worked in a lab. So that always inspired me to the idea that, like he said, "imagination is important." Ideas are important, and you can contribute a lot to a scientific discipline just through thought. He didn't have computers at his disposal, but I would like to think that he would be the kind to use computers to take his ideas and run simulations and say well this is how I imagined, say, origin of space-time.

To a lesser extent there are two other underappreciated scientists: one is D'Arcy Thompson. He's been described as the most influential biologists ever left on the fringes of science. He was an anti-Darwinian, interestingly. He took the viewpoint that organisms are put together in certain ways that have to obey laws of physics and engineering and structures, which can play as much a role in shaping organisms as natural selection. That's still considered a fringe idea, but his methods and the way he thought were very influential on me.

And of course Darwin. He ruminated on his thoughts for 20 years before putting it out to the public. Although he was more of a naturalist, he went out and observed the world. It was through thought which he brought these patterns that he was observing together, he thought about what could unite all these organisms and he came up with the process of natural selection. Their ability to see things and conceptualize things is what is special about these individuals.

An extended version of this interview can be found at the Psynapse *website.*

Dr. Jonathon Stone

Amy Pachai is a final year graduate student and PhD. candidate at the Department of Psychology, Neuroscience & Behaviour at McMaster University. She is currently working under Dr. Joe Kim in the LIVELAB, studying attention, teaching, and mind-wandering. Psychology students may also know her as a Teaching Assistant for IntroPsych.

When did research open up to you as a possible path forward?

I applied to be an IntroPsych TA in third year and that gave me the opportunity to be exposed to teaching. That's really where I found my passion. It was like being in front of a class and watching the light bulb go off for students. Realizing that they understand the concepts when I was a TA is still, to this day, the best part of my undergrad. Having this experience with teaching is a beautiful moment. I approached Dr. Kim saying "this is something that I really enjoy doing and I know you do research on it". And so, I did my thesis on teaching. As I was in that experience, I thought, "this is something that I'm good at, this is something that I know how to do, and I am excited about, and I felt that I am making a difference". So, I really found my passion for it while working on my thesis.

If you could pick one notable individual whom you feel has had the most impact in your specific field of research, who would it be and why?

My instinct is to say William James for a number of reasons. I've read his work and I find the way that he writes and thinks about psychology to be interesting. I certainly don't agree with everything he says, but I do think he has very strong opinions about what is and isn't psychology and how it should be studied. I also think he had a lot to say about consciousness and what that means and how to study it. That is something that has been weighing on my mind a lot lately (just for context I study mind-wandering). So, we ask people to report their mental experiences and states of minds through a variety of tasks. And in a lot of

ways these issues of attentiveness and consciousness not only had a huge influence on psychology generally, I think that his opinions on field specific things for me are quite interesting.

What is one piece of advice that you would give to your undergrad self?

I feel like there are a lot of things I would have liked to tell myself. One of them is flexibility and having faith that things are going to turn out the way they are supposed to. For example, I started thinking about if I really had the personality for clinical psychology or if it would be too difficult for me as a person to bear. It really took a while for me to try to figure out what I wanted. It was stressful for a while as I was interested in psychology, but I didn't see anything enticing my interest. I wish I had spent a little less time being stressed about the outcome and kind of lived in that flexible place where I tried to have some faith that things would work out.

The other big thing that I wished I had thought more about as an undergrad is how to use my time effectively. I feel like I wasted a lot of time (and not in a good self-care sort of way) in a "procrastination, don't know what to do with my time" kind of way. Not that I didn't had work-life balance, I just didn't know how to study. So, I had a hard transition into first year. I actually did not get into psychology in second year because my grades were a lot lower than I wanted them to be. Some days I do better that others I would say. Even as a grad student, it is still a work in progress for me. I think that everyone struggles with work-life balance and I think it's important for students to keep that in mind.

An extended version of this interview can be found at the Psynapse *website.*

Amy Pachai