

SCIENCE, TRANSLATED

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VOL 5

FEATURED TOPICS

EARTH & SPACE
BIOTECHNOLOGY
HEALTH & MEDICINE
PSYCHOLOGY & SOCIETY



Science, Translated

MEET THE EXEC

Welcome to Science, Translated! Our organization is an international platform for undergraduate students to disseminate scientific knowledge, share their ideas, and connect with other budding scientists through scientific journalism. By producing scientific articles on topics relating to biology, physics, chemistry, astronomy, medicine, ecology, and psychology, students have the opportunity to expand their own scope of knowledge while simplifying the jargon of scientific research and making it more accessible to the general public. We hope to highlight some of the work our talented journalists have been doing this past year with this newsletter! Lots of people have been working behind the scenes to make our publication possible, but here, we'd like to introduce you all to our executive team!



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In her free time, Ashley enjoys going to the beach, sailing, and playing with her cat, Maya.

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Outside of lab, she loves hiking with friends, creative writing, and playing chess.

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Research Interests: Impact of cigarette smoke on brain diseases. Previously, modeled the effects of hypoxia on stem cell-derived vasculatures and developed nanoparticles for preventing gum disease

She also enjoys nail art and exploring small businesses in Georgetown with her dog Yuuki

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Research Interests: To understand epithelial cell proliferation and repair in response to damage.

Uses the zebrafish model to determine how signaling pathways involved in these processes play a role in cancer

In her free time, she loves to paint, cook, and watch TV

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SOCIAL MEDIA

Another group of people who make Science, Translated possible is our wonderful social media team!



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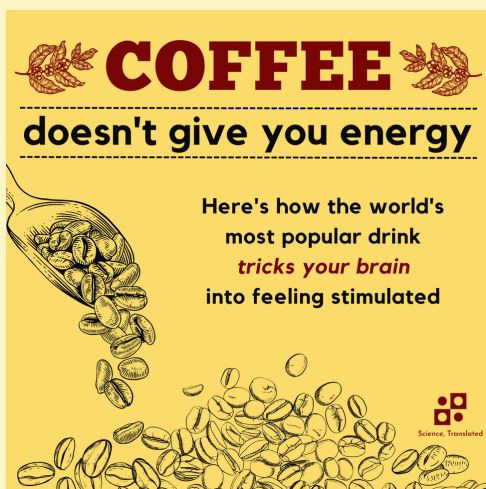
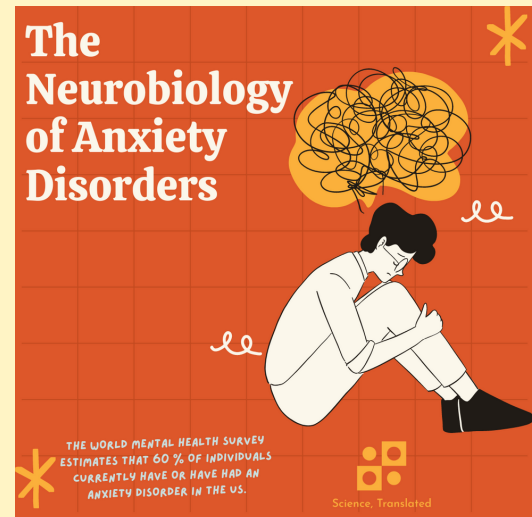
RECENT POSTS

Our social media team is hard at work creating short-form content for our various platforms, such as Instagram and LinkedIn. Here are the top 3 posts from this past cycle! If you would like to see more, head over to our Instagram (@science.translated) to check out these posts and everything else our social media team has created.



Love is not as simple as we think - in fact, there is a whole science behind how we fall in love. Research has shown that there are 3 distinct types of romantic love: lust, attraction, and attachment. Each type of love is also associated with different hormones. For example, lust is associated with testosterone and estrogen, while attachment is associated with oxytocin and vasopressin. Our five senses also contribute to falling in love, such as sight and touch.

Did you know that over 60% of individuals just in the US have anxiety disorder? Anxiety disorder is described as a condition where your threat detection system functions incorrectly and goes into overdrive with chronic release of higher levels of adrenaline and cortisol. This changes the way your brain processes different emotions. However, there are many ways to help combat this disorder and modulate your brain's responses to different emotions, such as practicing mindfulness, going to therapy, and taking care of your physical health.



Over 2.25 billion cups of coffee are consumed every day, but many of us don't really understand how caffeine works and affects our bodies. Caffeine itself does not contain energy, but it makes it so that our brain ignores signals of tiredness. Adenosine is an important molecule in our body that decreases the neural activity in our brain, making us tired and sleepy. Caffeine blocks adenosine receptors, which tells our brain to be more alert and focused.

NEW ARTICLES



The Orgasm Gap: What Is It and How Can We Overcome It?

By: Nyah Moliere

Turns out, there is some scientific merit to the belief that women leave sexual encounters less satisfied than their male counterparts. This idea is called the orgasm gap, or the finding that men tend to orgasm much more often than women during heterosexual sex. An interview with Ph.D. candidate and orgasm gap researcher Grace Wetzel reveals some of the most prominent causes of the gap, how people think about it, and how they can work on closing it.



The Mind and the Metaverse: Implications of Social VR on Human Psychology

By: Jessica Liu

Virtual reality is an unknown frontier, once explored only intricately in imagination. It has now been 55 years since the first virtual reality headset was invented. In this time, Sony developed Project Morpheus, Meta bought the Oculus VR company and launched its line of Oculus headsets (later rebranded Meta Quest), and Pico released the Pico Neo 3 headset. Though the technology behind virtual reality is continuously being advanced, its effects on human psychology remain unclear.

Some studies reveal benefits in social interactions, supporting the claim VR provides another space for human connection. However, other studies report increases in loneliness and disconnect from reality, providing troubling evidence VR can blur the lines between the ideal and real. As VR becomes more intertwined with everyday life, the need to study more deeply its effects on humans grows. Will the benefits of VR outweigh its consequences? And at what cost of the human mind?



The Weather's Mood Swings:

Climate Change's Impacts on Mental Health

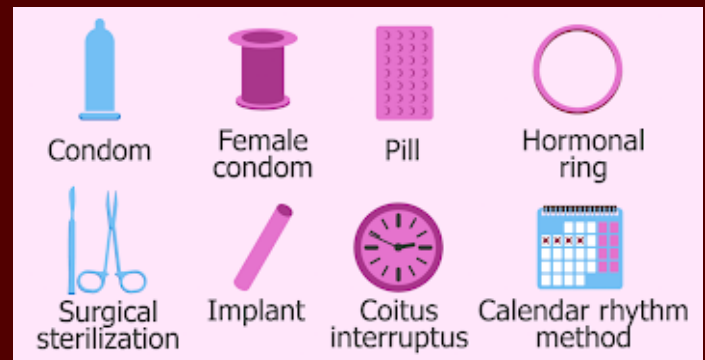
By: Nichelle Wong

As climate change increases, so too do its numerous harmful effects; the 2022 Intergovernmental Panel on Climate Change (IPCC) report has identified mental health as an area of concern. Climate change exacerbates natural disasters, which often bring with them a host of physical and mental impacts. The environmental changes that result, such as rising temperatures and air pollution, can compound the mental health effects of stress and anxiety. Minorities, first responders, and the elderly tend to be more vulnerable due to several factors, including lack of mental health infrastructure. Indirect effects are also possible: solastalgia, or grief over the loss of the environment, is associated with climate anxiety and worries about the future. To help people process their reactions, many online resources have been created. These range from community building to volunteering opportunities. Working actively to prevent climate change may be one way to both reduce its impacts and boost mental health.

Pregnancy Prevention Takes Two — So What About Men?

By: Leanne Ahra Menguito

The responsibility for preventing a pregnancy lies with both sexes. However, when examining available birth control options, there are far more methods for females than males. Fortunately, several studies are being conducted to introduce new male birth control methods.



Hormonal male contraception stops sperm production by interfering with the body's hormone production, while nonhormonal male contraception does not. Nonhormonal male contraception is especially promising due to the lack of interference in the body's hormonal balance. However, there has been more progress in male hormonal contraception since researchers are working off of what is known about female hormonal contraception. Having various options for birth control allows every person to make decisions about their body and equalizes the responsibility of birth control.

How Much Harm are Screens Really Causing Teens?

The Golden Rice Debate: Yay or Neigh?

By: Grace Scheg

By: Lior Boguslavski



Photograph: Erik de Castro/Reuters

Vitamin A deficiency (VAD) is a life-threatening issue and is a leading cause of childhood blindness in many third world countries. Golden Rice has been introduced as a possible solution; it is a genetically modified rice engineered to produce beta-carotene, a precursor to vitamin A. Some argue that this biofortified crop is key to ending VAD, while others argue it poses a great risk to human health and the environment. It is a proven safe alternative to white rice, and has the potential to alleviate micronutrient deficiencies all while maintaining no extra costs to farmers and consumers, in part, because the technology associated with it is provided free of charge to developing countries. Despite its benefits, there are disadvantages. Namely, there is potential risk of cross contamination with wildtype rice, which can disrupt ecosystems and agricultural practises. Furthermore, Golden Rice does not provide sufficient vitamin A when consumed and with its inability to retain beta-carotene levels in regular storage, it should be used as an addition, and not a replacement, to current initiatives in place to combat VAD in developing nations.

The average American teenager spends up to 9 hours a day on a screen. How does this affect adolescent health? Excessive exposure to blue light through screens commonly leads to chronic eye strain and dry eye. Around 30% of Americans reported experiencing eye strain symptoms after digital device use. However, while screen use presents clear risks to a teen's physical health through blue light exposure, the effects of excessive screen use on the developing brain are still somewhat of a mystery. During adolescence, the brain undergoes significant developmental changes in regions involving socializing; for instance, emotional regulation and behavioral control mature during adolescence. However, research in this relatively new field of study of teenagers and technology use has been greatly limited by low-quality data, making it difficult to establish the nature of the relationship between screen use and brain development. While some studies found cognitive deficiencies in Internet-addicted teens similar to those found in individuals with substance addictions, many other studies reported no significant associations between screen time and brain abnormalities in adolescents.



Brightest Gamma Ray Burst in History

By: Roha Muhammad

The gamma-ray burst most recently observed is a momentous event that is not hypothesised to reoccur for the next several lifetimes. It has inherited the nickname BOAT, brightest of all time, and rightfully so due to its evident intensity that has been observed by astronomers. A gamma-ray burst is an explosion that is composed of high energy that occurs in distant galaxies. This burst was much closer than other GRBs that have been studied over the years, allowing for details to be analysed that would otherwise be too faint to see.

Continuing to study the GRB over time is a key component that will challenge outdated theories. Analysing GRBs and their effects are important due to the vital role they play in gaining further knowledge about the universe. The new data and research that GRB 221009A introduces welcome a new perspective and school of thought that would otherwise be restricted.



When the Moon Cracked

By: Nouran Amin

The surface of the moon is cracked but the origins and history of these cracks remain a mystery. Researchers point to asteroid impacts as the likely culprit. These impacts also lead to the signature craters (or the megareolith). A quick jump into the literature, we can come across reasonable investigation made on crater formation but not on the lunar cracks which often reach 12 miles in depth. Recent studies suggest that early beginnings of lunar formation were exposed to fractures that led to many ancient cracks.

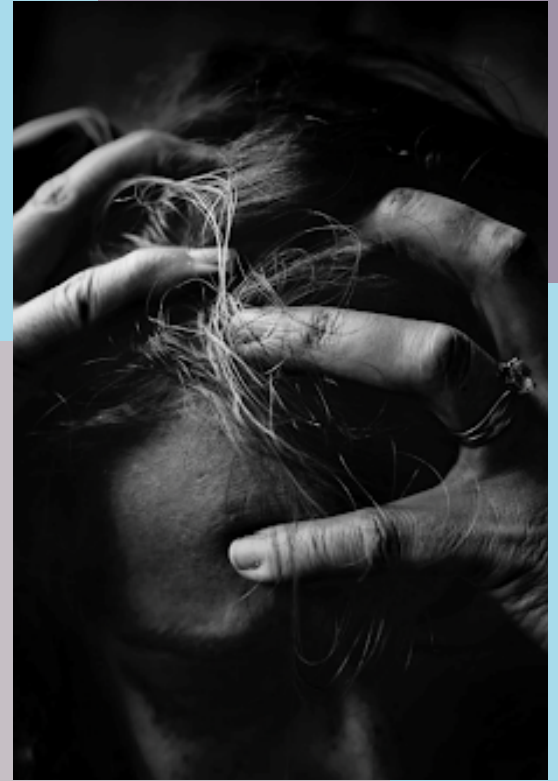


Researchers utilized simulations to compare the conditions of asteroid impacts on Earth with the moon—and perhaps come to an understanding of damage on the lunar surface. Findings indicate that low gravity can influence higher asteroid impact in comparison to areas of high gravity. These results could explain why the moon has cracked—its non-existent atmosphere translates to low gravitational waves that attracts asteroid bombardment.

Are you Eating More Cause You're Stressed?

By: Yejide Opeodu

Obesity in the general population has been increasing at a startling rate around the world while at the same time stress in individuals has also steadily been on the rise. Recent studies have shown the effects that stress can have on the eating behaviours of individuals and how it can eventually lead to food addiction in some. This article looks at the effects stress has on the human body (when it comes to food) and the reactions/responses the body has to stress.



School-Based Positive Psychology Interventions

By: Rayaan Ali

If psychology is the scientific study of mind and behavior, positive psychology is the branch of psychology that studies how individuals and communities thrive. Children and adolescents spend the majority of their time in school. Beyond markers of mental illness, school environments can either promote or inhibit a student's relationships, cognitive development, social skills, academic attainment, emotional, and behavioral control. This article provides an introduction to the field of positive psychology and discusses a recent positive psychology intervention implemented in schools.

EDITOR'S SPOTLIGHT

Healthcare is Burning Out

By: Rupreet Kaur



Growing up, children are educated and raised in a manner that will best set them up for entering the workforce. After completing high school, post-secondary, or advanced education, most begin careers that will lead them into retirement. However, decades of hours committed to a workplace can take a toll on a person's health and many employees will go through periods of burnout.

Burnout is the mental and physical exhaustion caused by stressors accumulated through the course of employment [2]. In the workplace, burnout can cause a negative perception of work and reduced job satisfaction, resulting in decreased role commitment and increased turnover. This is often followed by health problems and mental health issues, such as headaches, anxiety, and negative outlook on life [10]. Burnout is not a newly discovered concept and was brought into circulation in the 1970s by psychotherapist Herbert Freudenberger [4]. Yet, after 40 years since the term was popularized, the topic is still relatively unexplored in its development and effects.

Healthcare employees are a high-risk population for burnout due to the demanding and emotionally-taxing work [2]. This fact can be especially dangerous as it has been associated with decreased quality of care and increased caretaking errors [2]. Nurses exhibit increased rates of burnouts compared to other healthcare positions including

physicians and respiratory therapists [3]. This fact suggests some professions are at a disproportionate risk of adverse burnout effects [3].

As shown in an analysis conducted of the 2018 National Sample Survey of Registered Nurses data, 31% and 43% of nurses who had left their jobs or thought about leaving their jobs, respectively, had cited burnout as a factor in their decision. Additionally, as shown in Figure 1, after combining data from nurses who had stated that burnout was a reason for leaving or considering leaving their jobs, there was an overlap of 63% and 68.6% of nurses who also stated that stressful work environments played a role in their decision [11].

Reasons for leaving job (n = 418,769)		
	No.	Percentage
1	144,017	34%
2	141,764	34%
3	131,757	31%
4	125,836	30%
5	110,943	26%
Reasons for considering to leave job (n = 1,558,631)		
	No.	Percentage
1	785,679	50%
2	676,122	43%
3	663,469	43%
4	648,155	42%
5	617,368	40%

*Categories are not mutually exclusive

Table 1. Top 5 Reasons for Leaving Job and Considering Leaving Job by Respondents, 2018 National Sample Survey of Registered Nurses [11].

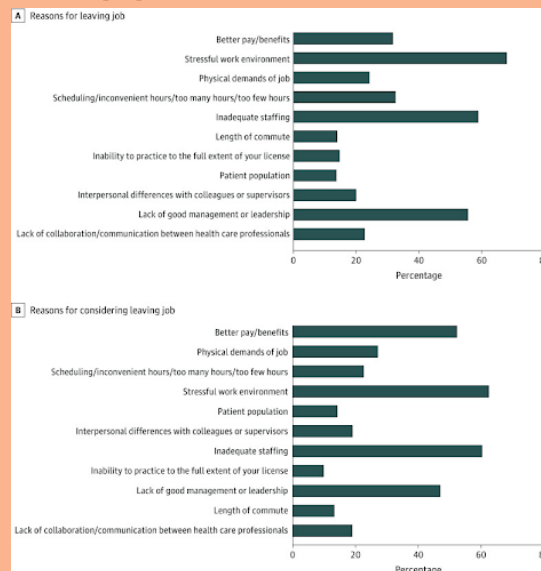


Figure 1. Overlap of Work Reasons for Nurses Who Left or Considered Leaving Their Jobs Owing to Burnout [11].

The onset of the COVID-19 pandemic was met with isolation. Patients experienced depression due to reduced social support and decreased mobility,

but it is also important to consider the negative impacts of the pandemic on critical care providers [8]. In a study conducted by Gualano et al. (2021) in the Department of Public Health Sciences at the University of Turin, burnout was seen in 49 to 58% of urgent care and ICU workers. Furthermore, these departments' nurses dealt with the rapidly changing environment of the pandemic in a critical care setting and provided emotional support for individuals that could not come into contact with their families, thereby taking on more emotional burden [3]. Additionally, nurses were faced with greater numbers of patients and understaffing issues, which increased stress and, consequently, greater burnout rates [3].

The pandemic saw a rise in the number of "travel nurses," which are nurses that hold short-term positions both nationally and internationally. Travel nurses are typically employed by independent organizations, such as Select Medical Connections and Aya Healthcare. Benefits that entice nurses to switch to the travel position include an increased salary and choice on work location. The American Association of Critical Care Nurses conducted a survey in 2021 in which 66% of nurses were thinking about quitting their jobs due to the pandemic. The switch from hospital to travel nurses depletes hospitals of workers, especially with constant turnovers, and increases pressure on the remaining staff [13].

Physician burnout has also been considered increasingly dangerous as it is correlated with increased medical errors and health systems costs [7]. An Austrian study conducted at the Medical University of Innsbruck found that 70% of general practitioners reported burnout during the pandemic. The physical and mental well-being of doctors is called into question when discussing the second-victim syndrome (SVS) in which physicians internalize the aftermath of a negative patient outcome [12].

EDITOR'S SPOTLIGHT

This phenomenon is often seen in emergency room doctors that have to cycle through patients with minimal time to process their feelings [12]. Being stretched thin between patients with inadequate resources for emotional support leads to mistakes that may increase patient suffering. These errors are strongly linked with physician depression [12]. This cycle of negativity can cause a deeper descent into mental health issues and has been correlated with the hundreds of physician suicides that take place yearly in the USA [5].

As shown in Figure 2, there were a variety of negative mental health outcomes faced by healthcare workers during the COVID-19 pandemic, as well as during other coronavirus outbreaks, such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) [9]. There is an increased need to care for the mental health of professionals in order to improve the quality of living for our workers and for ourselves. As many employees aim to find a life-long career, it is important to ensure job satisfaction and the appropriate resources to manage job-related stressors. It is acknowledged that stressors are ingrained in all jobs and thus, burnouts will occur regardless, so it is important to gather the appropriate resources for early management and prevention. By mitigating the causes of burnout, we can improve patient quality of care and ensure the well-being of healthcare providers.

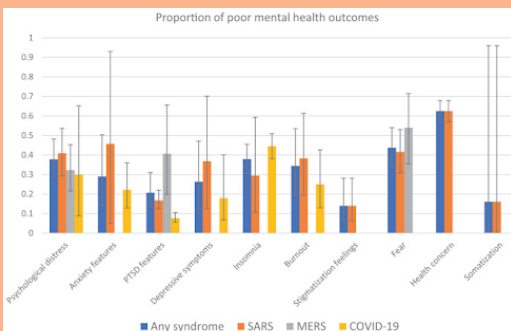


Figure 2. Top 10 Most frequently reported mental health outcomes in HCW exposed to SARS/MERS/COVID-19 [9].

Studies have found that a mindfulness program helped physicians manage their burnouts more effectively, further bolstering the need to explore similar programs across healthcare professions [6]. Additionally, multiple studies have shown that a social support system helps decrease rates of burnout, especially with positive spousal and workplace relationships [1]. Thus, it may be beneficial to educate those close to workers from high-risk populations on burnout signs and providing support. It is also important to focus on and target populations that are at higher risk for burnout, like nurses, in order to ensure that interventions are equitable [3].

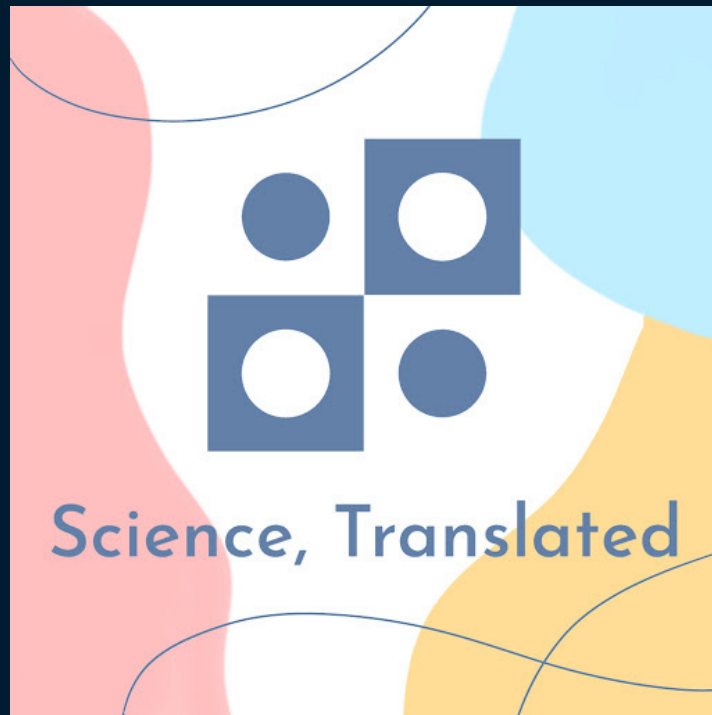
Although most of the following methods are already popular in working towards bettering your mental health, it is still important to highlight the obtainable resources that can be used to aid with burnout. If you are an individual who has burnout or is at risk of becoming burnt out, talking to your supervisor or workplace managers can be a good way to understand the resources that your job may offer as benefits. Furthermore, talking to loved ones is a great way of getting support from people that care about you. Additionally, exercising, getting proper sleep, and implementing mindfulness activities, such as meditation, can help with creating a routine that relieves stressors. Each region may also have its own program that is used to provide confidential support, such as the Ontario Medical Association (OMA) Physician Health Program helpline, 1-800-851-6606.

For American healthcare workers, the American Foundation for Suicide Prevention offers community programs that work on education and intervention. For individuals looking to get more information on burnout, the Stress and Resilience Institute offers guides and videos on overcoming burnout and finding coping strategies. Lastly, Checkpoint offers a quick reference page for global resources, such as websites and helplines.

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