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In a complex world and in challenging times, eventually, one is tempted to think things are getting better after all. At least we do, which is why we chose this mantra as the topic for our first issue of the CNS Newsletter in 2021! We are by now well into the new year with one very hard-and-demanding year is behind us. Finally, spring has sprung and nature is recharging. The weather becomes more pleasant each passing day. Days are considerably longer again. Far from ignoring the fact of the ongoing pandemic, novel vaccines continue to be approved and vaccination programs are scaling up consistently, causing a flickering of hope. Some may say that change and improvement is gradual and cannot be perceived except by comparison to previous states. So now we can look back at the time behind us and reflect on what got us through (p 18 and p 19) and how such times can shape our path forward (p 17). Everything about Corona has been odd. It arrived gradually until it came all at once, just like Mike Campbell, from Hemingway’s novel The Sun Also Rises, famously described how he became bankrupt: “Gradually and then suddenly”. Big changes sometimes come at a creeping pace until everything is different. And we now can hope for those changes to come again as we examine the practices that make us human, like gratitude or positivity (p 10 and p 11), or actually a little less human (p 7). We can allow ourselves to think that we are beating the odds (p 14), without feeling that we are fooling ourselves and escaping to ‘our special place’ (p 12). Even if still there is a long way to go, we’ve got to admit it is getting better!

So much for change, a big part of who we are and what we can accomplish is based on staying the same, as counting on our skills and habits (p 18). Particularly now, when they may be sometimes anchors that keep us on track. With that in mind, we looked into what’s behind sleep and growth (p 16, p 20 and p 21), our relationship with technology (p 7), and when it might be time to seek out a little more help (p 37 and p 40). Even though prudence told many of us to skip new year’s resolutions, it does not follow we are not optimistic. We certainly are! But what does it actually mean (p 4)? Maybe by slowing down, some of us may have gained perspective on what is important. Is it the case that more is truly better (p 6)? Sometimes it is, for example, when we stay true to the phrase “the more, the merrier” and welcome new authors and celebrate those that stood by the CNS Newsletter throughout the year (p 44). And, on a warm note, we would like to introduce you to Leandre Ravatt, who is joining us as a new generation of editor-in-chief! We’ve got to admit it’s getting better. A little better all the time.

Enjoy!

Leandre Ravatt
Lorena Sganzerla
Bettina Schmerl
Co-Editors in Chief
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“Optimism” comes from the Latin optimus that means “the best”. It is a state of mind leading us to perceive the positive in our present world and nourish hope for the future. Its opposite – the attitude to see the glass half empty – is the „pes-simism” (from pessimus, superlative of malus: “the bad”).

The optimism in philosophy
Interestingly, optimism did not have many followers in philosophy. One of the best-known optimists, the German scientist and philosopher Leibniz (1646-1716), described our world as the best of all we could possibly have where everything is in harmony [1]. One of the problems of this statement pointed out by the pessimists, was that it did not leave much room for improvement, as everything is already at its optimum. The optimists were seen by the pessimists as naïve and so faithful that they overlooked the evident truth: there is bad in our world (even if Leibniz never refuted the existence of evil). In his satire “Candide ou l’Optimisme”, Voltaire (French philosopher, 1694-1778) mocks Leibniz with his blissful Pangloss saying “Tout est au mieux dans le meilleur des mondes” - “All is best in the best of all worlds” [2]. In the common language, the definition one gives to optimism is definitely not as fatalist as Leibniz’s view. Humanity in its whole is probably an example of optimism, aiming at progress and improvement, hoping for a brighter future.

Optimism is measurable
It can be difficult to objectively rate positive thoughts and feelings such as joy or happiness, but optimism can be measured in individuals using psychological tests. These tests are different depending on what one actually wants to measure. Indeed, on one hand, there is dispositional optimism – having positive expectations for the future; on the other hand, optimism in terms of explanatory or attributional style – the way we explain to ourselves situations we have experienced. The Life Orientation Test (LOT) for example, assesses both, dispositional optimism and pessimism, giving two separate scores. There is an updated version of the LOT that is now utilized; the Life Orientation Test-Revised (LOT-R). It was used in an extensive study called “the Health and Retirement” that directly correlated the level of dispositional optimism with the risk of developing a stroke. In their studied population of 6044 individuals over 50 years old, they found that the higher the rate for optimism in the LOT-R, the lower the risk for stroke [3]. Optimism also has an impact on the life of younger individuals. In a study of adolescents using a test for assessing optimistic thinking styles (designed for the specific research), it was shown that being optimistic had protective effects against depression [4].

Being optimistic, a life advantage
Somehow, it seems that being optimistic is an advantage. Could this trait make you live longer and happier? At least the amount of optimism in a person seems like a good predictor for life expectancy. In a recent study on two North American long-running observational cohorts; the Nurses’ Health Study 5 for the female part (n= 69,744) and the Veterans Affairs Normative Aging Study 6 for the male part (n=1,429), researchers showed that optimism is associated with up to 11% in male and 15% in female longer life expectancy - even accounting for potential confounders as socioeconomic background or health condition [7]. But can we optimize our optimism? Can we train it? Positive psychologists would answer yes; you can train to increase your positive thoughts about yourself and your future (a lot more about it in the article „The science of happiness” on page GB10). All of that, of course, up to a certain extent, as part of our optimism may be inherited [8]. How filled our gauge of optimism is also likely to fluctuate depending on what we experience at different stages of our lives.

The center of optimism in the brain
According to functional magnetic resonance imaging (fMRI) studies, the more optimistic you are, the stronger your anterior cingulate cortex is activated. The anterior cingulate cortex in humans is the frontal half of the cingulate cortex, which borders the anterior part of the thick white matter tract called the corpus callosum [9]. It is involved in a panel of emo-
tion-related functions and in decision-making. You can imagine the anterior cingulate cortex as a comfortable room where inputs from various areas of the brain are nicely relaxing and get that tinge of optimism that makes them positive thoughts. On the contrary, when we imagine negative scenarios, the anterior cingulate cortex together with the amygdala will see a rundown of their activity below average [9]. The orbitofrontal cortex is involved in decision-making and is connected to the anterior cingulate cortex. This prefrontal cortex region sitting just behind the eyebrows is also thought to be a center for optimism involved in fighting anxiety and protecting individuals against negative thoughts. It has been shown that the orbitofrontal cortex is over-activated during the resting-state of the brain in pessimistic-related mental disorders such as anxiety or depression. It is likely to be more activated to compensate for poor communication with other areas of the brain. Indeed, in optimistic individuals, the orbitofrontal cortex is discussing a lot with the supplementary motor cortex during the resting-state of the brain [10].

Is optimism purely human?
Since humans belong to the animal realm, there’s no reason that our animal cousins shouldn’t also experience optimism. However, as animals do not fill questionnaires, studying them is more challenging. Their effort made to achieve goals is often considered a measure of their optimism. More precisely, the behavioral studies observing animals such as rats, macaques or honeybees try to associate their decision-making in a trained task to their state of mind at that moment (for example having been previously exposed to stress or not). And as it is somewhat more feasible to induce negative feelings in an animal, there are more studies evaluating pessimism. For example, one can stress a bee by shaking it (which is a way used by honey badgers to steal honey). Then this agitated bee will tend to classify learned stimuli as predicting a punishment: the bee has thus a pessimistic cognitive bias [11]. On the other hand, it is now known that we can induce a positive emotion similar to human joy in rats by tickling them. Accordingly, Rygula et al. 2012 gave their work the title that these “laughing rats are optimistic”. The laughing rats are indeed more likely to expect a reward after ambiguous stimuli, as opposed to the behavior of the agitated honeybees [12].

In conclusion? Do not shake the bees, work on increasing positive thoughts about yourself by getting tickles and you will live a long and happy life!

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[1] Leibniz, Essais de Théodicée, 1710
[2] Voltaire, Candide ou l’Optimisme, 1759
[7] Lee et al, PNAS, 2019
[10] Wang et al, Hum Brain Mapp, 2018
Is „More” Truly Better?

A critical view on consumption and happiness

How does buying a new phone, laptop or tablet make you feel? What about new clothes or video games? We have all experienced some kind of happiness when purchasing and consuming goods, but is it the case that the more we buy, the happier we become? In this article, I will discuss the relationship between consumption and happiness and try to see if (spending) money can buy happiness or not.

What is happiness?
Philosophers have been asking themselves for centuries what happiness is and how we can live a happy life. In their pursuit, they have come up with plenty of theories such as hedonism (to maximize pleasure and minimize pain) or eudemonism (to live a life of virtue) as possible paths to happiness. In modern psychology and social science research, the term “happiness” is usually used to refer to people’s self-reported well-being, highlighting its subjective character. Nevertheless, different studies are using different ways to measure happiness.

How does happiness relate to consumption – The stats
The New Economics Foundation (NEF) looked into the relationship between consumption and happiness indirectly, using income as a measure (Fig. 1 [1,2]). Here, we see that between US$5,000 and US$30,000 there is a trend for more happy life years (life satisfaction x life expectancy) with a higher GDP per capita. However, the happy life years for GDP below US$ 5,000 are extremely diverse, ranging roughly between 10 and 50 years. Additionally, when the GDP goes beyond US$30,000, further increases no longer seem to affect the number of happy life-years. This suggests that, although there is a correlation between income and happiness, once it reaches enough to provide a comfortable life, income does not have such a big impact on happiness. Therefore, more is not necessarily better.

A similar effect (or lack thereof) of income growth on happiness is generally referred to as the Easterlin paradox [3]: In the short run, or when a specific point in time is investigated (cross-section data), higher-income is always related to higher happiness levels across individuals and nations. But when we look at their relationship over time (time-series data), this relationship disappears [4], an effect claimed to be due to social comparison effect. While the Easterlin Paradox has been challenged in other studies, it has influenced research on wellbeing and poses numerous questions for policymaking. If social welfare does not directly increase with economic growth, then instead of aiming for higher GDP, “gross national happiness” should become the new target.

Western culture and levels of consumption
After the industrial revolution, the mass production of goods resulted in increased consumption. This, together with more advertising and false needs created by people with a low or high environmental footprint, and hence low or high material consumption respectively, tend to report similar life satisfaction, around 7 out of 10 [2,5]. This suggests no correlation between happiness and levels of consumption.

Figure 1: Scatter plot of happy life years vs. GDP per capita, by country. Abdallah et al. 2009 [1].

Figure 2: Life satisfaction compared to levels of material consumption in Europe. Thompson et al., 2007 [7].
Can’t Live with It, Can’t Live Without It

How to renegotiate your relationship to digital technology

A relationship in crisis
Are you going through a hard time at the moment? Stuck together, at home, nothing to do but to watch the frustrations rise and fissures widen and deepen? Are things just not what they used to be? Do you miss the days of shiny novelty, days full of hope and optimism and innocent expectation? Maybe it’s time for an intervention.

The above could just as easily be applied to personal relationships with digital technologies as they could to a bitter and troubled romantic relationship. Be it devices such as mobile phones, social media platforms or habits which are reliant on the Big Tech industry (such as your Amazon order addiction), we are digitally coupled - locked in a partnership that has started to feel less like a choice and more like a burden. Especially in times of pandemic-related isolation, where we are extremely reliant on digital technologies to connect us to friends and family, it has become even more important to examine exactly how we are being shaped by the technologies through which we experience the world. The promises of early techno-utopianism have left a sour taste today when everyday life has become saturated by cyberspace. Troubles ranging from reducing screen time to Youtube rabbit holes, all contribute to strained, even septic, relationships with digital technologies.

This article is in extremely good company with the hundreds and thousands of others, studies and opeds published about the technological precipice we are on the brink of. A common reaction has been to try and find a way to dispose of these things which supposedly enslave us, to reject their impact by trying to go back to a time when their grasp on us wasn’t as strong. Tactics such as downgrading devices and taking “digital detoxes” are among these attempts to reverse the damage that has already been done, normally based in negative arguments against the perils of modern technology. Less work has been promoted which makes a positive case for what can be done to renegotiate our tempestuous relationship with tech. Unless you really commit to living like a mountain hermit, the effects of online space is going to seep into daily life. The world is an irrevocably different place to how it was 30 to 40 years ago. This may be a trivial fact, but what it indicates is that there is a need for a new subjective positioning towards technology, a perspective which is properly adapted for the digital sphere.

Why the sad face? Diagnosing the problem...
Helplessness and dissatisfaction with the current order can be rooted in this sense of lost agency. Philosopher Byung Chul Han claims that we are in the midst of a “crisis of freedom”[1]. In this current age of ‘psychopolitics’ we have lost all control and agency due to the fact that human beings have become data sets to be mined, predictable and calculable entities defined in terms of data. As data steadily becomes the most valuable commodity, individuals are not only exploited for it, but made to exploit themselves. Under the guise of making life easier and seamless, a fatal exchange must be made. Typically, this is characterized as trading in of certain fundamental privileges, such as privacy and autonomy, for convenience. As Shoshana Zuboff points out, on top of the state of ‘surveillance capitalism’ accorded by advanced tech, individuals are also treated as lab rats to be modified and experimented upon (such as PokémonGO being used as a tool of mass behaviour modification) [2]. Never have the personal tools onto which we offload some of our cognitive processes been so blantly used in order to adapt our psychology for the ends of those wanting to sell products. Platforms such as Facebook, Twitter, etc were meant to signal a new age of connection and collaboration. In reality, the tools which now mediate so many aspects of our psychological, personal and social lives seem to be working less and less in our favour.

When we have enough
The data indicate that having more money and buying more products does not always lead to an increased level of happiness. While it can give a momentary satisfaction, accumulating wealth and possessions does not seem like the best path to happiness. Such consumerism has also a great environmental impact, as resources are needlessly spent. Hence, it looks like we should refrain from aggressive consumption and try to focus on meaningful social and personal relationships, fulfilling careers and/or hobbies – both for our own well-being, as well as the planet’s.

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DZNE
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the media, slowly led to a consumption-oriented society [6]. Nowadays, it has been argued that individual success is measured using a material perspective, where the more you own, the more successful you are regarded to be [6]. Therefore, people end up consuming much more than what they need, never being able to achieve their unattainable and always growing goals.
On top of this many choices are now delegated to algorithms, everything from deciding what recipe to cook tonight to which jobs to apply to (and who to hire). Algorithmic processing has become the middleman between many of our perceptions and interpretations of the outside world. The YouTube algorithm has come under fire for creating echo chambers where people are only shown content which they already like and agree with. This business strategy was devised in order to make sure that users remain on the platform as long as possible. However, the result of this is that it exacerbates confirmation bias and pushes people to the extremes, leading to increasing polarization when it comes to political views. While the digital realm has opened up innumerable avenues for interpretation of the world, the algorithms which govern this exploration have funnelled people into very specific (and often extreme) ideologies.

It is important to consider the structure of digital spaces to be as real and as impactful as physical structures. The very topography of online spaces leaves us inert, fueled by software which PURPOSELY encourages passivity and dependency. Just like the design of a city will impact the way we move around in space, leading to more or less interpersonal connection and collective opportunities, the architecture of the online world can equally impact the way we think. Closed-source, proprietary software is now almost ubiquitous, and people are no longer encouraged to collectively tinker and improve the software that they use— as was the norm at the dawn of the internet. The black boxes of the digital sphere actively discourage us from participating in the creation of our own digital spaces leading to this feeling of frustration and alienation.

As the extent of control and surveillance exerted through the digital sphere is increasingly uncovered, it can be tempting to throw our hands up and claim that all is lost for humanity. We are destined to become, or have already become, mindless slaves to algorithms and (eventually) to all-powerful artificial intelligence systems. Is the situation really this dire? I would argue that there is still room to act and resist the logic of surveillance capitalism without buying into techno-utopianism and going full Elon Musk.
more ethical technologies. However, changing the status of one’s personal relationship to technology and reasserting a sense of agency is an equally important starting point. This does not need to be as stressful or as serious as going to a marriage counselor. In her expansive and prescient essay ‘The Cyborg Manifesto’, Donna Harraway provides us with some important considerations for moving past this standstill in techno-personal relations. The integration of machines into our bodies, minds and conceptions of self have thoroughly blurred the formerly pronounced line between natural and artificial. While embracing this may seem counterintuitive, digital technologies force us to confront the fact that this distinction has always been somewhat of a fiction. The dichotomies around which we construct ourselves should be questioned; thanks to our status as cyborg beings, it no longer makes sense to contrast self/other and mind/body. Embracing the contradictory nature of messy and complex systems such as ourselves, instead of forcing them into easy-to-make-sense-of boxes, is the first step to changing the status of relationships to technology.

Following Haraway, playfulness and pleasure should be at the center of agential negotiations. She ironically urges us to “seize the tools to mark the world” and treat machines as “prosthetic devices, intimate components, friendly selves”. But what does this all mean? Some tactics for resistance could be to purposefully inject randomness and dysfunction into your digital interactions. Use maps apps to get lost instead of to find your way or start up a completely unrelated conversation in the comments of a Youtube video. Another potential route could be to focus on the opportunities for fascination and marvels that the digital world has the potential to provide. This could be as simple as building habits which leave time for pause and reflection instead of constantly hurrying forward at breakneck speed. Instead of shooting hundreds of digital photos, limit yourself to a few per day as if it were analogue. Instead of being overwhelmed by all the music available on Spotify or Youtube, build a music library with purpose by actually buying the records of artists you love. One thing is for certain, there is no going backwards from this stage of technological development. The only question left to ask is, where can we go from here?

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Credit: Fritz Kahn via Ky on flickr
A classical experiment
The exercise you just did was a task from a landmark study by Martin Seligman investigating the long-term benefits of positive psychology exercises [1]. In this study, subjects were asked to perform one of two tasks for a week: “Three good things” or “Using your signature strengths in a new way”. For the second task, participants first completed an online survey identifying five character strengths. Then, they had to use one of these strengths in a new way every day. Both of these tasks lead to an increase in happiness and a decrease in depressive symptoms for six months compared to a placebo task. Importantly, these results have also been replicated in another study [2].

What is positive psychology?
Positive psychology as a discipline is defined as the study of positive experiences and character traits along with ways to cultivate them [2,3]. As such, positive psychology can show effective ways to improve functioning and well-being. Just as in the previous exercise, much research is focused on tasks that can be applied by the general population or people that are generally considered healthy. The focus is specifically on nurturing strengths; however, research also investigates the integration of positive psychology into therapy for mental illness [4].

Future directions
Once these limitations are taken into account, positive psychology interventions might be promising add-on therapies for many physical diseases. Medicine has shifted its focus to patient-centered interventions to include mental and emotional health impacts in addition to the physical health problems that result from medical conditions. Positive psychology interventions might be a promising tool here [7]. However, positive psychology is not limited to actual therapy, but also can be incorporated in your everyday life with brief exercises like the one at the beginning of this article. Are you ready to give it a try?

Limitations
Studies investigating positive psychology interventions have been criticized for a lack of methodological quality [4]. For instance, the previously mentioned study by Huffman et al. did not include a psychometrically sound measure for gratitude or positive effect, although the intervention was designed to increase those two outcomes [6]. Further, potential confounding variables such as life events, effects of treatments for physical conditions, or general stress levels need to be taken into account. Finally, although the amount of randomized, placebo-controlled trials is increasing in the field, not all studies are yet involving a reasonable control-condition [4].

References
Gratitude is one of those concepts we are taught when we are kids. If you are like me, it went something like this: One of your relatives gave you a gift and your parents taught you to say thank you; but after that, gratitude as a concept didn’t receive much more attention. I can’t really blame my parents for that, after all, there were a whole lot of other things they had to teach a toddler. It was only later in life that I discovered there was a whole lot more about gratitude than just saying thank you.

So what exactly is gratitude? Depending on the context, gratitude can have more than one definition. Except for just a way to express appreciation toward someone who has given you a gift, it can also be an attitude or an emotion [1]. A state of being, so to say. In this general state of thankfulness, a person feels a deep appreciation for what is valuable and meaningful to them [2]. As an emotion, gratitude is an attribution-dependent state that results from a two-step cognitive process: (a) recognizing that one has obtained a positive outcome, and (b) recognizing that there is an external source for this positive outcome [1].

Why should I practice gratitude?

Research shows that practicing a more active form of gratitude increases people’s quality of life. Especially during a pandemic, some extra positivity can do wonders.

In a study conducted by two psychologists, Michael McCollough and Robert Emmons, participants were assigned to three groups. All participants were asked to keep a journal, but the focus of the things they wrote down was different. The first group was not given any particular focus for the kind of things to write down. The second group was asked to record negative experiences. And the third group was asked to write down things they were grateful for [1].

This research showed that people who keep a gratitude journal are more likely to exercise regularly, have fewer physical symptoms, feel better about their lives, are more likely to attain personal goals, and are more optimistic about the future [1]. Not only did people who practiced gratitude feel better about their lives, but they also reported higher levels of alertness, enthusiasm, determination, attentiveness, and energy and experienced reduced levels of depression and stress [1].

This study shows that practicing gratitude can increase happiness by 25%. It works by increasing your happiness set-point. The happiness set-point refers to your basic level of happiness. When something good happens to you, your happiness might temporarily increase from the set-point but over time it will return to its natural state. When something negative occurs, the opposite happens.

How to practice gratitude

So all these positive effects are great, but how do you practice gratitude more actively? One of the most well-known ways to strengthen your gratitude muscle is through journaling. The easiest way to do this is to write down three things you are grateful for at the end of each day. If this seems like a lot, you can also start out by doing this exercise once a week. If you are afraid that sitting down and writing about a few things you are grateful for will be too stringent and boring, you can use a less strict format. For example, a more free-form version of this exercise is to think about all the things you are grateful for when you have your morning coffee. Basically, any moment of the day that is relatively calm will do.

The most important thing is that you take a few minutes out of your day to count your blessings.

Conclusion

Once you start to actively look for things in your life that you are grateful for, it sets in motion a cascade of positive effects. The more you actively practice gratitude, the more it will become a habit. Once the habit is established, you will notice that you feel grateful for things you previously took for granted. On top of that, you will become a more positive and optimistic person, and that in turn leads to better health and better relationships.

All of this is great news in times of a pandemic when from time to time everything can look rather hopeless. When we focus on all the things we still have rather than all the things we lost, life will start looking better. After all, there are still a lot of things to be grateful for. We can even take this a step further and express gratitude for some of the pandemic-related constraints forced upon us. Maybe we can be grateful for being compelled to slow down and look more inward. Or maybe we are grateful for the countless new things we discovered in our own neighborhood on one of the many walks we have taken.

In other words, appreciate the little things, the rest will follow.
Toxic Positivity: Can You Be Just Too Happy?

Too much of anything is bad, including positive vibes

What is it and how to avoid toxic positivity.
In today’s era of social media, a place where most people want to present their best selves, it is not surprising that a culture of toxic positivity has arisen. While keeping an optimistic mindset is shown to have many benefits on mental and physical well-being [1], avoiding and suppressing negative emotions can have destructive consequences.

What is toxic positivity and how to identify it?
Toxic positivity is often understood as an overgeneralized optimistic mindset or as an inauthentic happiness and can be conscious or subconscious. It is usually expressed with phrases such as “Just smile”, “You will be fine”, “Always look on the bright side” and “Cheer up.” This encourages denial, invalidation, rejection or even shame of negative feelings. However, life is not always blissful and we have to face hard and painful situations. If we want to grow as people, we should openly identify and address the emotions elicited by such experiences instead of repressing them and pretending that nothing is wrong. After all, learning requires honest reflection on ourselves. Here are some signs of toxic positivity:

- Dismissing uncomfortable situations rather than facing them.
- Silencing negative feelings.
- Minimizing other people’s negative experiences and invalidating their emotional states.
- Feeling guilty when in a bad mood.
- Shaming others for expressing negative thoughts.

Why does it happen?
Toxic positivity can be inflicted both on ourselves and on others. An example of self-inflicted toxic positivity is when people pretend to be happy in order to avoid being a burden to other people. It could start as a coping mechanism for life’s difficulties. Even though oversharing our problems can also be problematic, it is very important to recognize them and have a few people, friends and/or family, we can turn to for help and advice. This is also part of being authentic and allows for personal growth. Another reason toxic positivity arises is trying to stay true to a fake persona, probably one that lives the perfect life (if such a thing exists), or wanting people to be jealous of us. These motives are seen more and more in today’s social media culture [2], where sometimes it feels like we are competing for who is the happiest and lives the most amazing life.

On the other hand, when we become toxic to others by being “too positive”, it is usually when trying to be supportive and encouraging. There is a fine line between the two and one must be careful not to cross the boundaries. Alternatively, people might turn to toxic positivity when they want to brush off someone else’s problem, instead of spending the time and effort of listening and helping out the other person.

Negative consequences of toxic positivity

Shame and guilt
We often tend to judge ourselves for having negative emotions. Researchers at the University of California, Berkeley looked into “habitual acceptance” [3], the degree to which people accept their thoughts and emotions without criticizing them, and its relation to health. Not so surprisingly, they found that it is healthier to accept our emotions because the guilt that comes with the self-criticism of negative thoughts will make things worse. Our understanding of what others expect us to feel also affects the management of our feelings, as another study has shown that if we think that others expect us to have no negative emotions, we experience more of them [4]. This is likely due to self-blaming and believing that others will judge us for not being constantly happy. In this way, toxic positivity can lead to both guilt and shame, which can be crippling for the human mind.

Suppressed emotions
Many studies indicate that suppressing our emotions can increase mental and physical stress. Researchers from Stanford University and the University of California, Berkeley have shown that instructions to inhibit expressing behavior while watching a sad, neutral or amusing film leads to a decrease in self-reports of enjoyment together with increased sympathetic nervous system activity [5]. Similarly, the same researchers showed that emotional inhibition while watching a disgust-eliciting film didn’t change the emotional experience but had a large physiological impact such as decreased heart rate, increased blinking, and increased sympathetic nervous system activity [6]. This does not only indicate a higher physical toll but could also lead to decreased cognitive performance [6]. Moreover, a 10-year follow-up study demonstrated that avoiding negative feelings as a coping mechanism is linked to depressive symptoms [7]. As humans, we are supposed to have a wide range of emotions and being able to express them is itself relieving.

Relationship problems and isolation
When we deny our feelings, we inevitably put a wall that makes it harder to connect to other people. We do not allow others to get to know our real selves. In addition, it also becomes harder for other people to feel comfortable enough to honestly express themselves in front of others, as they may believe that their viewpoint will not be understood or that there is no interest in anything that is not positive. It is therefore expected that toxic positivity can lead to isolation and problems with creating meaningful relationships with other people. Even if there are not many studies on this, there is evidence that emotional suppression negatively affects social functioning [8].

Prevented growth
By avoiding painful and unpleasant feelings, we are preventing ourselves from facing new challenges, learning from them and growing as people. Negative
experiences are often more useful than positive ones, but we cannot take advantage of them if we pretend that we don’t have them. Facing difficult situations teaches us how to handle similar issues in the future, hence becoming a better version of ourselves. We should therefore embrace all of our emotions and put our effort into growing through them.

**How to avoid toxic positivity**

**Recognize and accept negative thoughts:**
First of all, hopefully, this article has helped you realize that you are not alone. T. Rodriguez, an American psychotherapist, wrote in 2013 that she has noticed an increased number of patients feeling guilt for having negative emotions, something she blames on our culture’s obsession with optimism [9]. Instead of getting anxious about our feelings and rushing to change them, she suggests acknowledging them and using techniques as breathing, writing, or simply talking about it as a way of dealing with them. Practicing meditation and mindfulness could also help with recognizing and accepting our feelings. Also, we should try to have realistic expectations of ourselves and how we should feel. It can be helpful to remind ourselves that negative feelings are not permanent and often they are just part of the process. When going through changes or trying to improve ourselves, challenges will undoubtedly appear; hence, negative emotions are expected and should be accepted. Different methods work for different individuals, so we will have to try some out for ourselves and see. The goal is to manage our emotions effectively, but without denying them.

**Focus on meaning rather than happiness**
Studies indicate that the more we search for happiness, the less likely we are to find it [10]. This, they say, is because the more we value happiness, the more likely it is to be disappointed by our own feelings. On the other hand, the presence of meaning in life is positively correlated with both mental and physical well-being [11]. Even though the search for meaning in life can be hard, it may be a better goal than the fleeting feeling of happiness. A practice towards this goal would be to focus on more meaningful activities. By spending our time more productively, for example by volunteering for a cause that is important for us or by practicing our creative skills, we can get satisfaction through developing deeper relationships and getting gratification through helping others and giving back to society.

**Improve our vocabulary**
Instead of passing positive phrases like those above or saying “you’ll get over it”, “just think positive” and “never give up”, we should try to use a more inclusive and understanding vocabulary. For example: “It’s normal to feel bad”, “This is a terrible situation, I am sorry you have to go through this”, “This is hard, but you’ve done hard things before so I believe in you”, or “Failure is part of the process”.

**Conclusion**
This article has hopefully made it clear how important it is to acknowledge and face your feelings, as well as understanding and accepting other’s emotions. By being able to recognize toxic positivity, knowing why it’s bad and what you can do to improve the situation, you should be able to rid yourself from any toxic traits and set boundaries when other’s toxic positivity is influencing you. This should make your life and the life of everyone you care about, imperfect as it may be, better and more authentic!

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**References**

Does Persistence Beat the Odds?

What’s behind never giving up?
Have you ever started off well on a new goal, such as losing weight or saving more money, only to find that motivation fizzes after a period of time? From a psychological point of view, during the early stages of pursuing a goal people are motivated by hopes, aspirations, and positive aspects of reaching their desired outcome. For example, people who want to lose 20 pounds might imagine their appearance at a desired weight, buying new clothes and feeling more energetic. This is known as a promotion motivation, and people in this mindset are motivated by the positive things they can do to make progress, such as exercising more and eating more fruit and vegetables. There is a strategic emphasis on „making good things happen“. However, as people draw closer to reaching their goals, researchers predict they would switch to a prevention motivation mindset. Now, they would be motivated by their responsibilities, duties and the desire to avoid something negative or the looming possibility of failing. People trying to lose 20 pounds might think about the disappointment of possibly falling short of the weight loss goal or not fitting into a coveted piece of clothing. They would then start focusing on avoiding the wrong things, such as steering clear of desserts and a sedentary lifestyle [1]. These two cognitive motivational systems that essentially regulate pleasure and pain fall under the term „Regulatory Focus Therapy“, have been studied extensively in personal goal pursuit [2]. Contemplation of personal goals has been observed to elicit activation in brain regions linked to self-reflection and/or encompassed by the default mode network. [3]. The default mode network, which includes the medial PFC, posterior cingulate cortex, precuneus, lateral and medial temporal lobes, and posterior inferior parietal lobule, is a network of brain regions thought to be preferentially active during internally focused cognition [4]. Most people have a dominant focus dependent on the situation or social history of the person. There are a few hybrids who can wear both hats at the same time. Hybrids adopt one focus or the other, often as a function of which motivation is best suited to the task at hand. Although there have been investigations, no scientific study has identified the neural correlates of each combinations of goal domain and goal attainment status [5].

The brain chemistry of human persistence.
Human persistence is linked to motivation. From a neuroscientific aspect, dopamine is one such magic brain chemical that keeps people disciplined enough to persevere towards a goal or completion of a task. There is a wide range of factors that come into play when someone decides to persevere, but dopamine is considered a major force in the process. This reward molecule is implicated in forming lifelong habits. Positive reinforcement in behavior can be described by certain receptors that are essential for such a pattern formation. In a mouse brain, nociceptin neurons get activated before a mouse is least interested in seeking reward or on the verge of giving up, and they emit a molecule known as nociceptin that suppresses dopamine [6]. These nociceptin neurons are located near a brain area known to be important for reward behavior called the ventral tegmental area. So, if the activity of such neurons and receptors is altered, a way to modulate motivation and persistence through them can be found. This discovery could have potential benefits for people with depression by increasing their energy and motivation or people with addiction by decreasing motivation for drug search and consumption.

“Discipline is the bridge between goals and accomplishment”.
- Jim Rohn

Similar to dopamine’s big role in motivation and reward, serotonin is another neurotransmitter that promotes perseverance. Previous data have suggested that increased serotonin levels make animals (including people) more willing to wait longer for a reward to arrive – in other words, it makes them more patient.

At the point of giving up, neurons in green get very active and suppress dopamine (Credit: Max Huffman).
[7]. However, this idea has now been challenged by an international team led by neuroscientists from the Champalimaud Centre for the Unknown (CCU), in Lisbon, Portugal [8]. Their results show that serotonin promotes more than just passive waiting, more than simple patience. It enhances active persistence in a task, even in the face of uncertain reward. This means actively following through on a task even if it’s unpleasant, like completing your homework, whereas many other forms of patience simply require sitting tight and doing nothing.

So how do I beat the odds?

Begin small, but have some discipline and do something today. To get this to work, create routines, and don’t leave it to chance. When you discipline yourself, it’s like programming a robot. There’s no more emotion involved. It’s simply ‘if this... then that’ – that’s why a plan of attack is so crucial. You don’t have to decide what you want to do every single day when you wake up. To produce more dopamine, get in the habit of setting deadlines and completing goals promptly. Create a daily schedule that includes self-imposed deadlines and stick to it. Self-assess but at the same time do not be overly critical of yourself.

Tap into your internal dopamine reserves on demand.

Use timers and calendars to keep you on track and condition yourself. Consistent regular activity is a way to hardwire the habit of persistence. Partner with a like-minded friend who has similar goals and makes a pact that you will hold one another accountable to stay on track. Structure your challenges to have smaller and well-defined self-imposed deadlines. Tasks involving safety and accuracy should be handled via prevention feedbacks, whereas promotion strategies can be used for tasks involving creativity or advancement. Be methodical and stop leaving things till the last minute. You want to keep the flow of dopamine constant and break the roller-coaster pattern of procrastination followed by panic.

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[6] Parker et al, Cell, 2019
[8] Lottem et al, Nat comm., 2018

“Dopamine is the main neurotransmitter driving perseverance”
The terms fixed and growth mindset were first coined by Carol Dweck, a researcher at Stanford University [1]. Carol Dweck studies human motivation and with her research is trying to determine why some people succeed and others do not. She found that people fell into one of these two mindsets, and which one you fall into is one of the determining factors for success [2].

So what are the characteristics of both mindsets? Dweck identified the two groups in 1995 by asking students to score their agreement from 1 (strongly agree) to 6 (strongly disagree) to the following statements:

(a) “You have a certain amount of intelligence and you really can’t do much to change it”;
(b) “Your intelligence is something about you that you can’t change very much”;
(c) “You can learn new things, but you can’t really change your basic intelligence.”

The group that mostly agreed with these statements viewed their intelligence or skills as fixed traits [3]. In other words, these students did not believe that they could significantly improve their skills. This mindset led them to try to look as smart as possible by trying to never make a mistake. For those in this group, every challenge became a confirmation of whether they were intelligent or not. Eventually, they began to avoid situations in which they predicted they would fail. Dr. Dweck called this type of mindset a fixed mindset [2].

In the second group, students believed that talents and abilities can be developed over time. This does not mean that everyone will start out with the same capabilities. Some might be better at math, for example, than others. However, these students believed that anyone can improve a skill with proper training. In this case, failure simply becomes a learning opportunity and not something to be avoided at all costs. This kind of mindset is called the growth mindset [2].

**Applying the growth mindset**

One example of an area where people often apply a fixed mindset is when they want to start working out more regularly. To try to keep themselves motivated they will set a goal. The goal could be losing a certain amount of weight, running a 5k race, or running a marathon. What often happens in these cases is that people do very well before they reach their goal but once they reach it, all motivation is lost and they stop completely.

A more growth-oriented way to stay motivated would be to try to never go three days without working out. In this case, the focus isn’t entirely on the result or intensity of the workout, but more on building a habit that allows you to reach the results that you want.

**Growth mindset in times of a pandemic**

Interestingly, this mindset shift cannot only help in reaching your goals, but it can also help you cope better during this pandemic. Instead of focusing on the end of the pandemic, which always seems so close but remains out of reach, you can decide to focus on the process. In this case, it could look like focusing on the small victories science has won. But it could also be developing new skill sets that help you cope with changes in society, be that by finding new things to do in your free time or by honing skills that help you take care of yourself when the future seems bleak.

After all, skills are not something you are merely born with but can be strengthened when you nurture them. Instead of dismissing yourself as someone who is simply not good at being alone, try to find ways to improve your skill set to help you navigate these circumstances. Focus on the process rather than the goal.

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Strength Through Hardship

“When the day comes we ask ourselves, where can we find light in this never-ending shade?”

So began National Youth Poet Laureate Amanda Gorman’s poem at the inauguration of Joe Biden, the 46th president of the United States. In 2020, a shadow fell over the globe. To investigate just how different people have coped over the last year, I prepared a set of questions and sent them via email to our Charite Neuroscience community. I asked 19 master’s students, Ph.D. students, and post-docs to do something difficult: to find that light, no matter how small. Here, I will try to report back not only the commonalities, but also the breadth of their responses.

As one respondent said, “necessity is the mother of invention.” In the face of so many hardships, we responded with strength:

**When we confined ourselves to home office, we found new ways to collaborate.**

We began to understand better our relationships with traditional offices and working hours. Some were at peace in their homes, away from crowds and distractions. Others suffered from the lack of structure and social support that accompanied physical and temporal flexibility.

**We faced a virus that spreads from person to person and became acutely aware that public health is just that – public.**

Hand-washing and mask-wearing became ways in which you take care not only of yourself but also of your neighbor. Many came to recognize the value in protecting each other even from colds and flus beyond the context of the pandemic.

**Zoom classes and meetings became windows into each other’s lives.**

We bore witness to others’ burdens, both new and old. We gained a particular appreciation for parents, whose burdens suddenly became heavier.

**The virus spread across the globe, and the globe came together to fight it.**

Suddenly, the pursuit of science became center stage in a worldwide discussion. Science communicators stressed that science does not happen in a bubble, but is something built on decades of work for the betterment of society. The public had the opportunity to observe as science splashed across the media and scientists shared their data as quickly and openly as possible. For the first time, it was shown how many small contributions are necessary to push the field forward at a meaningful scale.

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“When day comes we step out of the shade, aflame and unafraid
The new dawn blooms as we free it
For there is always light,
If only we’re brave enough to see it
If only we’re brave enough to be it”

- National Youth Poet Laureate Amanda Gorman

Leandre M. Ravatt
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How Mindfulness Meditation Can Help Build Resilience

What is resilience?
The term “resilience” comes from the Latin “resillo, ire” which means literally “to jump back”. It is a term that first defined the property of some materials to absorb the energy of a shock by quickly deforming. “Resilience” was later used in psychology to describe the capacity of some mistreated children or some survivors of tragic events (such as the Shoah’s survivors*) to overcome the experience of enormous stress and to continue living with a certain level of peacefulness. Today, the term resilience is used to describe a variety of difficulties – from school difficulties to living with an illness or the illness of a loved one - that must be overcome for life to move on. Our capacity of being resilient is influenced by personal traits such as optimism, by our genetics or by the interaction with our environment. Resilience is also a dynamic concept that can be related to homeostasis, where coping mechanisms are put in place to address what challenges our mental balance [1].

The mindfulness meditation
Mindfulness meditation could be used as a substrate for developing coping mechanisms. Indeed, it is a kind of gymnastics of the mind that consists of being aware of the present moment by paying constant attention to what makes up this moment, without judgment. This mental training has various beneficial impacts on concentration, stress management and even aging by activating the amygdala is often encountered in stressful situations. Interestingly, a mindfulness meditation training program reduced its grey matter density. This was positively correlated with reduced self-perceived stress of the participants [5]. The meditation training directed to reduce stress actually has a name: mindfulness-based stress reduction (MBSR). With the MBSR we train to observe experiences or thoughts we have without judgment or reaction, accepting them as they come. The MBSR was primarily designed for patients suffering chronic pain, physical or mental disorders and is now also used in nonclinical populations for stress management. A meta-analysis using MBSR shows that this approach indeed has an influence on stress reduction and improved quality of life. It also seems to have a moderately positive impact on patients suffering from anxiety or depression and may decrease the risk of relapse [6, 7]. Altogether, meditation could positively affect different aspects that make people resilient (stress management, optimism, self-confidence). Furthermore, being a non-invasive and non-pharmacological method, it sounds like a relatively safe tool to cultivate resilience.

Coline Lemale
Ph.D. student, AG Dreier

*The Shoah refers to the genocide of European Jews perpetrated by the Nazi regime during the Second World War.

Mindfulness meditation could reshape the brain
The before-and-after changes of mindfulness meditation practice have been observed in the brain using Magnetic Resonance Imaging (MRI). These changes appear as an increase or decrease in grey matter density, depending on the functional role of each brain region. It is commonly believed that a density increase corresponds to a function improvement of the brain region. After an 8-week mindfulness meditation course, Hölzel et al. closely examined the brain of 17 meditation beginners who reported being stressed before the study. They showed increased grey matter density of the hippocampus (involved in learning and memory), the cerebellum (involved in sensory perception and emotion regulation), the post cingulate cortex and the temporoparietal junction (both involved in self-awareness) [3]. Functional changes in the brain are also at work when meditating. After several days of intensive meditation training, certain areas communicate more effectively and strongly with each other during the brain’s resting state. For example, studying “resting-state functional connectivity”, Kwak et al. showed that the anterior cingulate cortex (involved in optimism, attention, or decision-making) had an enhanced connection with areas of the limbic system such as the medial prefrontal cortex. Reinforcement of communication between these areas thanks to meditation was associated with an improved level of resilience [4].

Reduction of stress perception with meditation
Even if the effect of meditation on cortisol reduction is still unclear, meditation can mediate structural changes in the brain, preparing it to cope with stress. For example, changes in the amygdala can be driven by meditation. The amygdala belongs to the limbic system and is located at the tail of the caudate nucleus. It is involved in emotions such as fear or anxiety. Hyperactive amygdala is often encountered in stressful situations. Interestingly, a mindfulness meditation training program reduced its grey matter density. This was positively correlated with reduced self-perceived stress of the participants [5]. The meditation training directed to reduce stress actually has a name: mindfulness-based stress reduction (MBSR). With the MBSR we train to observe experiences or thoughts we have without judgment or reaction, accepting them as they come. The MBSR was primarily designed for patients suffering chronic pain, physical or mental disorders and is now also used in nonclinical populations for stress management. A meta-analysis using MBSR shows that this approach indeed has an influence on stress reduction and improved quality of life. It also seems to have a moderately positive impact on patients suffering from anxiety or depression and may decrease the risk of relapse [6, 7]. Altogether, meditation could positively affect different aspects that make people resilient (stress management, optimism, self-confidence). Furthermore, being a non-invasive and non-pharmacological method, it sounds like a relatively safe tool to cultivate resilience.

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*The Shoah refers to the genocide of European Jews perpetrated by the Nazi regime during the Second World War.
One of the most useful skills I have acquired in life is meditation. While meditation is now an essential part of my daily life, it wasn’t always. My meditation journey started during my university years after seeing the David Lynch documentary entitled „Meditation, Creativity, Peace” and meeting a meditation teacher in the audience. It continued with daily practice and yoga, and it culminated with me booking my first 10-day silent retreat, after reading that one of my favorite authors and philosophers, Youval Noah Harari, had dedicated his book „Sapiens” to his meditation teacher. If it worked for him, I was all in!

In meditation, you learn mindfulness. Mindfulness means non-judgmental attention and observation achieved through training your focus and awareness to be objective. Turns out, this skill can help you a lot in daily life and is actually very close to the scientific method. I would even argue that it can make you a better scientist.

As my yoga and meditation teachers like to point out - you don’t do yoga to be good in yoga, but to be good in life. Meditation is a constant: you meditate with your eyes closed and with your eyes open. What matters is not only when you are sitting cross-legged, but what you are bringing with you off the mat and into everyday life.

Here are 3 lessons I learned in meditation that I bring to my everyday life and my Ph.D.:

1) Observe without attachment
Meditation is very much an experiment, or at least, that’s how I perceive it. I may be studying others’ brains and bodies as a researcher, but when I sit down to meditate I am studying my brain, my mind, and my own inner thoughts. I find that in doing so I am tossed into the wilderness of my own uncertainty, into the unknown. Often, there is a struggle not to get carried away by your thoughts, to observe without interfering and trying not to think. You have to learn to stand aside and watch your thoughts come and go, just as you would observe the recording of your experiment, and you accept them without judgment - no good or bad.

That is how we should observe our results in science as well, without any attachment. However, all too often we over-identify ourselves with our work and our results. If experiments are failing we are failures. If results are insignificant, so are we. It is important to remember to be objective, to have no attachments. Results are results, regardless of confirming your hypothesis or not. The calm and cold head is better for thinking about the problem and how you can solve it. Your work is your work, not you as a person, and you should never derive all your value from it.

When I said to my friends that I am going to a 10-day meditation retreat, they imagined I am blissfully spending my days in ultimate peace and harmony. Little do they know that those days were some of the most difficult and painful days of my life fighting with no one else but my own mind and my own body. One of the practices there is sitting for one hour without moving. Complete stillness. Sounds great, right? Try it. In doing so, you get to distinguish many layers of pain, and eventually, if you manage to overcome your mind and the urge to move, if you surrender, your pain disintegrates. You start feeling several different sensations but not pain as you used to. You learn that if you surrender to the uncomfortable, you accept reality without trying to escape it by finding quick fixes, you are able to deepen your experience and find better solutions. You learn not to impulsively react, but to mindfully act upon what is happening, embracing everything more fully.

3) Start again
No matter where you are and what you do, you can always start again. In meditation, your teacher will tell you to “just start again” every time you notice you drifted away with your thoughts. You started meditating but ended thinking. Itching, pain in the leg or in your back, or even boredom with observing your breath will urge you to move and escape the discomfort. However, your goal is to sit and accept all of it, endure it, and just observe. Be curious about your discomfort, surrender to it and you will see what it is really about.

As in meditation, in real life, we face a lot of discomforts. Be it a lab presentation, conference talks, poster session, challenging some assumed authorities, hierarchies and traditions, or standing up for yourself and your values. We are challenged out of our comfort zone very often. Change is always painful. Transformation is not just a flower blossoming but also a butterfly going through the larva’s disruptive phase.

2) Sitting with discomfort
No matter if you are sitting cross-legged, on the chair, or just laying down, sooner or later you will face discomfort in meditation. Itching, pain in the leg or in your back, or even boredom with observing your breath will urge you to move and escape the discomfort. However, your goal is to sit and accept all of it, endure it, and just observe. Be curious about your discomfort, surrender to it and you will see what it is really about.

Starting again is at the core of resilience. There will be many ups and downs in our lives and in our careers. Being able to start again gives us power over our own lives and gives us another chance to succeed each and every moment of every day.

JELENA BRASANAC
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Credit: Freepik
Humans are the masters of motor learning. Other species may trump us in their own specialised domains, but when it comes to heterogeneity of dexterous motor sequences, homo sapiens take the cake. What are the computational principles that enable us to learn how to play tennis, touch type, and tap dance? And how are those principles implemented in neural wetware?

Complex motor behaviours involve sequences of concatenated movement primitives. Performing these in real time requires a combination of planning, rapid deliberative decisions, and intelligent reflexes [1]. One prerequisite for attaining expert performance in a motor skill consists of automatizing as much of it as possible. This is often related to the transition from declarative to procedural memory in the skill acquisition literature [2]. At first, one only knows that they must bend the legs and rotate the body a certain way to hit a good tennis serve. After enough practice though, that becomes knowledge of how it feels to effectively transfer kinetic energy from the core of the body to the fluffy yellow ball.

When the circumstances demanding a particular sequence of motor actions repeat themselves frequently, it becomes computationally efficient to store those responses in a dedicated space, rather than computing the optimal motor sequence anew each time. The storage of previously computed motor representations is called caching, by analogy with the computer memory type. A computer's cache contains copies of oft-used data, stored specially to facilitate rapid retrieval. Adrian Haith and John Krakauer argue that the concept of caching explains a wide variety of motor learning data [3]. In particular, storing repeated motor computations in a rapidly accessible way explains three highly replicated effects of practice: increased response speed, reduced cognitive load, and habituation. When motor responses are cached, we react to cues more quickly, can maintain attention elsewhere, and often produce the same behaviour on autopilot, even when it ceases to be useful (consider reaching into your pocket and pulling out your phone even when you know it is out of battery).

At the level of system neuroscience, motor behaviours are initially learned through a rapid, supervised learning circuit running from the motor cortex to the striatum, but are later consolidated through a slower, associative learning circuit running from the thalamus to the striatum [4]. Crucially, the latter circuit is characterised as slow in reference to the speed of learning it supports, not to how rapidly stored information can be retrieved. When it comes to retrieval, motor representations stored in the subcortical circuit are the ones that can be accessed the fastest. In other words, the subcortical circuit implements the cache.

Once motor skills are thoroughly learned, they are remarkably resilient to decay. One longitudinal study had participants learn to swing two pendulums, one with each hand, in a 3:1 frequency ratio, before testing to see whether they had retained the skill 8 years later [5]. Incredibly, not only did the participants retain the ability to produce the target ratio, but they also reproduced their own idiosyncratic hand-movement trajectories. While more longitudinal work is required to ascertain the generalizability of this result, it suggests that subcortical circuits may be like elephants; they never forget.

Putting these pieces together, learning to master a motor skill depends upon the computational efficiency gained by caching relevant computations, implemented neurobiologically by the transfer of motor control from a cortical to a subcortical pathway. Once the process is complete, the stored computations are incredibly stable, preserving individuals' distinctive styles of movement across time. If this view is correct, attaining motor mastery is a matter of caching in on the subcorticalization of movements afforded by practice.

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[3] Haith & Krakauer, Curr Opin Behav Sci, 2018
Humans spend 24 years of their lives sleeping [1]. 24 years! A lot of time which we lose to a body state of unconsciousness and inactivity, one might think. A famous saying goes: ‘You can sleep when you’re dead!’ But compared to other animals, eight hours a day is nothing: Brown bats for example spend up to 20 hours a day sleeping, tigers come close with 15 hours. African elephants, on the other hand, sleep less than five hours per day [2]. Sleeping duration in the animal kingdom is very diverse and correlated to the animals’ diet and body weight: Carnivores need more sleep than herbivores and small herbivores need more sleep than big ones. Only the koala doesn’t seem to fit: eating nothing but toxic eucalyptus leaves, it spends 18 to 22 hours a day asleep [3]. But even considering lost in all the interesting sleeping behaviors of animals: Why do we sleep at all?

From self-experience, we know that sleep restores energy and boosts our performance. It is amazing what a good night of sleep can do for you: waking up, you feel refreshed and full of power, ready to start the day with new motivation and creative ideas – completely opposite to the status you were in when going to bed. I belong to the group of people who need their eight-to-nine hour’s sleep per night to be happy – which is why I was glad to hear in a podcast that nine hours are anyway [4]. This podcast (unfortunately only in German) is an interview with Prof. Dr. med. Ingo Fietze, head of the Sleep Medicine Center at Charité. Fietze claims that sleeping is equally important as good food and enough exercise to live a healthy life. Why? What happens during those magical hours every night?

We are sleeping for our brains

Even though functions of sleep are still under discussion, there are some principal ideas of what’s going on during the night. Besides the aforementioned refilling of energy stores, we also reduce caloric consumption through a lower metabolic rate, our immune system is regulated and cell tissue is repaired [5]. It is still unclear why we need to be unconscious while these processes occur. Evolutionarily, sleep might be helpful as smaller animals are hidden from potential predators and energy is saved by staying inactive during times when your food is not available anyway [2]. But even considering many more of such theories, the main reason why we need sleep is probably our brain [6].

Ingo Fietze explains: our brains are just full after 16 hours of activity and information inflow and need to sort this information and trash metabolic waste products [4]. Memory consolidation [7], emotional processing [8], and glymphatic function [9] are probably the main reasons for the unconscious state at night. Our kidneys can filter toxins all day long, but our brains need to “shut off” to remove neurotoxins, free radicals, and metabolic products like amyloid-ß [9]. Many studies indicate that our memory also depends on this “shutting off”, although there are controversies in the field [10].

Cells which were active during the day get reactivated during the night

A relation between sleep and memory has long been suggested. Experiments by Rosa Katz in 1914 (at this time still Rosa Heine) showed for the first time that retrieving newly learned syllables was more successful after sleeping than after staying awake. The shorter the time between learning and sleeping was, the better the memory was afterward [5]. More recent studies over all age groups show the same: sleeping supports learning. Babies who are allowed to nap after learning new word categories can remember more of them than babies who stay awake [11]. School children who were asked to rate their sleep quality and do memory tasks on smartphones every morning showed performances dependent on the quality and length of their last night’s sleep [12]. Students who were tested on word pairs they had learned showed significantly better results after a period of sleep compared to a period of wakefulness if they were told before learning that they would get tested, indicating that both sleep and the intention of memorizing something are important [13].

These data and many more show that we need sleep to learn and to improve. Seven to nine hours per night are recommended [14], which is also the time span that was shown to be best for memory consolidation. But also naps of one to two hours or even super short power naps of six minutes improve our memory [7]. Initial theories suggested that the sleeping time acts as a protection period for newly formed memories, which could be disturbed by external stimuli if we were awake. Nowadays, the idea of active memory consolidation is supported: cells in the hippocampus which are active during the day get reactivated during the night and do a replay of the encoded memory [5].

The shorter the time between learning and sleeping, the better the memory.
Sleep-deprived people lose the feeling of their tiredness
There is an urban myth of some successful people who claim they only need a few hours of sleep per night to be very productive. How is that possible? Probably, it isn’t! It was shown that less than six hours per night significantly decrease the performance in memory-related tasks [15]. While that remains true, sleep-deprived people lose the feeling of their tiredness and think they are still performing well [15]. In fact, if you’re chronically sleeping less than six hours a night, you will eventually get health problems and shorten your life expectancy [4]. This is supported by an animal study in which sleep-deprived rats show changes in their body temperature, suffer from weight loss and tissue lesions, and finally die after some weeks of sleep deprivation [16]. Furthermore, sleep deprivation inhibits neurogenesis in the dentate gyrus of the hippocampus [17]. Sleeplessness and insanity might only be a short distance away from each other: Vincent van Gogh suffered from insomnia, mental illness, and a bad temper. Eventually, he shot himself [18].

Sleep without dreams is good sleep
It is clear that the possible mental performance does not only arise from sleep duration, but also from its quality. School children from the aforementioned study showed worse results after a night which they rated as ‘not so well’. This leaves us with the major question: What is good sleep? Ingo Fietze says that the quality of sleep depends both on the sleep duration and the amount of deep sleep [4]. Deep sleep is also called slow-wave sleep when slow electric waves can be measured in our brains. It is one part of the human sleep cycle, which is approximately 90 minutes long. In addition to slow-wave sleep, there is also light REM (rapid eye movement) sleep, during which we dream [5]. Throughout the night, we go through several of those cycles; the first half of the night is composed of more deep sleep phases and the second half of the night of more REM sleep [5]. In Ingo Fietze’s opinion, you are a good sleeper if you cannot remember your dreams. It doesn’t mean that you’re really not dreaming - everyone dreams. It just means that you’re probably one of the gifted sleepers who are not easily waking up and hence forget their dreams. [4]. If you are a light sleeper, good sleeping hygiene is important for you to sleep well. Factors that you can influence in order to create a nice sleeping environment for yourself might be darkness, temperature, and bedtime routines (see tips in the box).

Nap like Albert Einstein
If we wake up from deep sleep instead of light sleep, we feel destroyed, as if we haven’t slept at all [4]. This is also why napping is only useful if we time it well: The first half an hour is composed of lighter REM sleep, afterwards we sink into deeper slow-wave sleep. If we set our timer to one hour, we will probably wake up from this deeper sleep phase and feel tired for the rest of the day. But if we give us in total 90 - 100 minutes of napping, we can go through the complete sleeping cycle to wake up well-rested. If you do not have that much time, napping is already useful if you just fall asleep for a few minutes. To avoid going into deep sleep without setting an alarm clock, you can hold a key in your hand while napping: once your body is moving into a deep sleep, it will relax completely and the key will fall down and wake you up. This is how Albert Einstein is reported to have timed his power nap every day [19].

Napping is also a good way to compensate for missed sleep. It is not surprising that there are companies supporting their employees to do power naps and also keep an eye on their total sleeping time [19]. In Taiwan, school children have a nap every day – there is time specifically dedicated to napping, for everyone, even in high school. And it’s mandatory. Taiwan is not the only country having this routine, but for me, it’s a nice example of how to avoid the famous food coma after lunch while increasing learning and productivity.
Polyphasic sleep is unsocial

If you can "fill up" your daily sleeping hours with a nap, why shouldn’t you split up the sleeping time completely? This idea is not new. In fact, already Leonardo da Vinci and Napoleon did it. Da Vinci is reported to have slept 20 minutes every four hours – which sums up to a total sleeping time of two hours per day [20]. The so-called polyphasic sleep is experiencing a revival, but not in such an extreme way. The soccer player Cristiano Ronaldo sleeps five times a day for 90 minutes. His sleeping coach is convinced that the 8-hour sleeping pattern is outdated and not for everyone. He also coaches other top athletes like cyclists from the Tour de France and is known to take meticulous care of all factors which could influence their sleep. This includes personal sleeping kits with mattress toppers, air ventilation filters as well as the body-side they are allowed to sleep on [21].

Ingo Fietze disagrees that polyphasic sleep is superior to sleeping at night. He would be happy to monitor a polyphasic sleeper over several years, to see what it does to the body and whether it has beneficial or harmful effects. In reality, Fietze is already convinced that sleeping eight hours during the night is the way to go: your body temperature goes down, and sleep factors are increasing to prepare your body for sleep. People who sleep at different times out of necessity (working in shifts or at night) usually develop health problems over time [4]. Polyphasic sleep can also be quite complicated (especially if you’re not a top athlete); you regularly need to pause your job, you won’t have time for family and friends at normal hours and it makes your daily routine in general very inflexible.

Vaccinations are more effective with enough sleep

Apart from all the benefits for your memory and brain in general, sleeping is also necessary for an intact immune system, especially for the adaptive part [22]. During the day, the immune system is busy fighting all the antigens coming in, but during the night, new immune cells can be created [4]. Everyone knows it: When you’re sick, you have to sleep to get better. And in periods where you sleep too little, you can easily get a cold. In fact, it was shown that vaccinations against Hepatitis A are more efficient if the vaccinated person slept the night after the injection [23]. Just another reason to not feel guilty about sleeping – your body needs it!

Altogether, there are many many factors influencing sleep and there is so much that can be influenced by it. Most of the scientific data is indicating that you need to sleep enough to improve your health, brain function, and happiness. Sleeping is, therefore, no waste of time, but rather an effective way of using it. You cannot sleep when you’re dead – in fact, you’ll probably die younger if you consistently sleep too little. I hope you feel encouraged by the koala’s relaxed lifestyle to sleep when you’re tired and especially sleep enough when your brain needs it (for example during your Ph.D.). Good night and sleep well.

**Tips for better sleeping [4,24]:**

- **Sleep when you’re tired!** Sounds easy, but many people don’t listen to their body and stretch the time before going to bed, although they’re already tired.
- **Stick to regular sleeping times:** Try to go to bed between 10 pm and midnight, if possible always around the same time. If you’re not tired yet, read a book or listen to an audiobook.
- **Sleep enough:** Seven to nine hours per night are recommended. If that is not possible, try to stock up with a nap in the afternoon or catch up on the seven to nine hours on the weekend.
- **Try to avoid artificial light before going to bed:** No computer or mobile phone screens, only with a blue light filter as the absolute minimum.
- **Especially if you are a light sleeper:** have your room dark and quiet.
- **Set the temperature in your bedroom:** to 16 – 19 °C.
- **Sleep comfortably:** Use a mattress and pillow which fit your needs (depending on your favorite sleeping position).
- **Create a bedtime routine:** If it is hard for you to calm down in the evening, try some yoga, meditation, or relaxation through self-hypnosis. In general, exercise regularly! This will improve your sleep automatically.
- **Do power naps up to 30 minutes or nap one complete sleep cycle for 90 to 100 minutes.**
- **Avoid large meals, caffeine, and alcohol before going to bed.**

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[8] Tempesta et al., Sleep Med Rev, 2018
[10] Vertes, Neuron, 2004
[16] Rechtschaffen & Bergmann, Behav Brain Res, 1995
The art of sustainable goal-setting

Personal Development Burnout

The healthiest approach to self-improvement is whatever works for you. And whatever the journey you decide to embark upon, there may come a point when you find yourself reaching for unreasonably lofty goals; or perhaps always moving the finishing line ever-forward. Everybody has the individual approach to self-improvement they love. But, after a time, it may become a constant goal pushing people to always feel the need to do or to be more. This can cause self-improvement burnout.

Learning how to optimize personal effectiveness by making clever use of personal resources (such as talents, skills, viable energy, and most of all, time) to ensure work and life goals are met can enhance setting healthy boundaries for goals. Do you ever find yourself wondering if you are really ever done? Or what is the finish line for you? When will it actually be enough to feel you achieved or are worthy and whole? Then it might be imperative you set well-defined and clear milestones. Be sure to take time and reflect upon the tasks you have achieved in order to rethink what actually and truly matters! Even if that means letting go of your calendar for a while and the structure we tend to impose on ourselves.

Burnout and the brain

According to the International classification of diseases (ICD-10), burnout is a state characterized by the loss of motivation, a growing sense of emotional depletion, and cynicism [1]. In addition, when an individual experiences burnout, they tend to become depleted due to a constant cognitive overload. Clinically, the symptoms present themselves with an overlap in what is associated with depression, including extensive fatigue and loss of passion and desire for previously enjoyable tasks. These symptoms are also often accompanied by a crisis of professional competence.

Much like depression, burnout was previously implicated in the asphyxiatiion of ambitions, idealism, and sense of worth [1]. According to Freudenberger, "most of what you do after your normal professional working hours, whether you start your second job or go home, you put a great deal of yourself in the work allotted and demand outputs from yourself; also the population that you are serving demands it of you. As usually happens, more and more demands are made upon fewer and fewer people. You gradually build up in those around you, and in yourself, the feeling that they need you. You feel a total sense of commitment. The whole atmosphere builds up to it, until you finally find yourself, as I did, in a state of exhaustion". Those features characterize burnout [1].

So, let’s have a look at the stages that precede exhaustion according to the 12 stage model of burnout [2]:

Stage 1: Ambition is an initial entry for the condition. The individual tends to set too high standards for themselves, often accompanied by exaggerated expectations [2]. Furthermore, the will to prove oneself transitions into an obligation.

Stage 2: The stage is then followed by an increased sense of self-imposed requirements, and the commitment to fulfill a task is enhanced.

Stage 3: The willingness to work declines, conflicts are repressed and one’s own needs tend to be postponed or denied to the core.

Stage 4: Professional growth is prioritized and personal relationships or indulging in downtime activities lose importance.

Stage 5: Non-professional needs continue to lose importance; no more time can be spent on them.

Stage 6: Intolerance grows and flexibility decreases.

Stage 7: Disorientation sets in, but can be covered up by a cynical, apparently unchanged attitude.

Stage 8: The individual develops a defensive attitude towards criticism and increasing emotional withdrawal is observed.

Stage 9: The consequences of the aforementioned emotional withdrawal are de-personalization and loss of self-awareness.

Stage 10: Individual feels an intense lack of self-worth.

Stage 11: Increased senselessness and disinterest characterize the last stages; initiative and motivation have often reached the brim.

Stage 12: The absolute endpoint is characterized by total physical, cognitive and emotional exhaustion.

“The reward is not always on the scoreboard. What is won is not nearly as important as who we become”

Augie Garrido
**Physiology of stress and burnout**

Burnout is a work-related syndrome that occurs in response to chronic stress. Interestingly, a number of factors contribute to burnout, including behavior, lifetime experiences, environment, and neurophysiology [2]. Let's dive deep into the neural basis of burnout. Previous studies suggest the role of cortisol in response to stress could serve as a biomarker for burnout. The hypothalamus-pituitary axis (HPA) is under chronic activation, which requires high energy consumption, and the inability to restore the balance can lead to exhaustion. Engagement, on the other hand, is a positive state of well-being characterized by vigor and dedication. The qualities of vigor are high levels of energy, cognitive resilience, and an innate desire to invest effort in the work, even in face of difficulties [3]. In other words, it is an attribute that ensures high work involvement along with enthusiasm, inspiration, and pride.

In a study exploring the relation between cortisol levels and HPA activity tackled burnout and work engagement by scaling the transition from one state to another: the exhaustion scale. On its positive side, a vigorous state was characterized by e.g., “at my work, I feel bursting with energy”, whereas dedication is represented “I am enthusiastic about my work”). Conversely, from an exhausted to a cynical state things go from “I feel emotionally drained from my work” to “I have become less enthusiastic about my work”). All items tapping the core burnout and work engagement dimensions were then rated on a 7-point frequency scale, ranging from 0 to 6 (regularly experience stress). To avoid response bias, burnout and work engagement items were randomly combined into one questionnaire. Thereafter, the study employed the scale into four groups - engaged, strained, cynical, and burnout - to observe the trajectory from engagement to exhaustion [3].

The differential cluster analysis of levels of cortisol, suggestive of differences in the HPA axis functioning, was revealing. The engaged group had significantly lower levels of cortisol, while the cynical group showed significantly higher levels than the burned-out group. The engaged group displayed high vigor and dedication with low exhaustion and cynicism, despite moderate increases in cortisol. On the other hand, the burned-out group displayed the opposite pattern of scores in dedication, cynicism, exhaustion levels, and vigor [3]. The strained and cynical groups were intermediate to the scores of engaged and burned-out. Furthermore, these studies were suggestive of a temporal sequence between engagement, strain, cynicism, and burnout. Therefore, an analysis of cortisol levels and HPA activity can be pivotal in identifying the phases of transition from engagement to exhaustion.

**Causes of Burnout: The sustained stress and the missing elements**

The biggest cause of burnout is extensive workload accompanied by a lack of inspiration. Finding a workload that matches your capacity can help you effectively get your work done. that includes having opportunities to rest and recover and find time for professional growth and development [5]. Therefore, effective planning of the workload entailed by tasks, proper delegation, and letting go of perfectionism can significantly reduce burnout and provide space to rest.

A study conducted by a team of researchers at the Karolinska Institute to understand the potential effects of occupational stress on the brain suggested that workplace burnout can alter neural circuits and, ultimately, affect neurological function. To assess reactions to stress, they recruited a group of 40 individuals previously diagnosed with burnout symptoms, participants reported 60 to 70 hours of work per week for several years [4] and a control group of healthy subjects with no previous association of chronic stress. Researchers compared a task-related design to measure their ability to regulate their negative emotions and compared to their resting-state brain connectivity (R-FMRI).

To assess reactions to stress, participants were shown a standardized series of neutral and negative emotional images. After looking at an image for 5 seconds, a set of instructions appeared on the screen, suggestive of suppression (down-regulation of responses), intensification (up-regulation of responses), or maintenance of the emotional responses to the stimulus [4]. Immediately following a cue, the same image was presented again, for another 5 seconds. Followed by that, a loud, startling burst of sound. The two groups showed similar startle responses when they were instructed to maintain or intensify their emotional reactions. However, when the groups were asked to suppress their emotional responses to negative images, clear differences emerged in the scan.

The differences observed in functional connectivity in terms of associated brain areas as represented by the MRI included activation of the amygdala, an area associated with processing emotional responses—including fear and aggression [4]. Those diagnosed with burnout reported more difficulty modulating their strong negative emotional responses compared with the healthy controls, which was confirmed by their physical responses: They had dramatically stronger reactions to the startling noise than did the control group. In addition, the burnout group reported an enlarged amygdala and weaker connections between the amygdala and the anterior cingulate cortex, an area associated with emotional distress. Interestingly, in comparison with the control group, the burnout group also showed weaker correlations between activity in the amygdala and the medial prefrontal
cortex (mPFC), a structure involved in executive function and higher-order thinking skills. These studies were suggestive that the brains of individuals suffering from burnout - or sustained stress - don’t just function differently, their structure may change.

Burnout can make you perpetually exhausted, annoyed, and feeling unappreciated. By understanding what is causing it in your life and considering what you can do to make changes, you can come to a more objective conclusion. While self-reflection is an important tool to help you make a positive shift, accepting that certain priorities will remain constant can be incremental in the maintenance of well-being. It may also reduce the perceived lack of autonomy or self-control associated with the condition. At a community level, fostering a close-knit group of people whom you can trust can be employed [5] as a safety net that provides relief. It could be nurtured as simple as taking the time to ask others how their day is going. Or sending an email to someone to let them know you appreciated their presentation. Identifying the missing elements in your daily life is pivotal to identify what is causing burnout.

So, is overworking really worth it?
Well, it is imperative to preserve precious cognitive energy and effectively identify the missing elements to combat burnout. For many people, lack of inspiration serves as the missing element leading to burnout. However, nurturing two other emotions, joy and appreciation, also plays a role in overcoming exhaustion and can reduce this deficit of inspiration. They are associated with an optimism boost. By indulging in practicing gratitude, you can increase personal and professional well-being and elevate happiness. It can help you enjoy the journey rather than focusing on the reward. Therefore, as Augie Garrido stated “The reward is not always on the scoreboard. What is won is not nearly as important as who we become.” Practicing positive self-talk, mindfulness, self-awareness are more likely to cultivate optimism and lead us to a healthier path of self-improvement [5]. However, a good reflection on past achievements and mistakes is essential; this enables you to evaluate what went well and what went wrong. how you can do things differently in the future, and where you still have room for growth.

To conclude, self-improvement is any movement in a positive direction which accounts for progress, irrespective of how small or large the time takes to reach that definitive goal is. So, focus on one change at a time and only move on to the next change when you’ve become comfortable with the earlier change in your life. Let the beautiful chaos that life is do the rest of the job.

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Cinematic Catharsis
A look at the feminist revenge

One thing that has tangibly and undeniably gotten better in the last five years has been the shift in general public sentiment towards the sexual harassment of women. Actions which were, until very recently, widely accepted as a fact of life, are now on the most part denounced thanks in large part to the #MeToo (or more specifically in Hollywood) #Time’sUp movement. That’s not to say that it has been a smooth road, nor that #MeToo itself is perfect, nevertheless its message has cemented itself into the fabric of society. Something we didn’t necessarily ask for has been the wave of Hollywood films attempting to capitalise on this societal progress. What comes to mind are films such as Hustlers (2019), which purported to be an empowering reclamation of women’s sexuality but in actuality ended up being another glorification of capitalist ideals and a glossing over of the grim realities of sex work – which is much more harmful than the hyper-romanticized movie sequences suggest. From the utterly superficial changes (think all female reboots such as 2018’s Ocean’s 8) to the more substantial (Cannes has committed to a gender balanced selection committee [1]), it’s been hard to ignore the effects of this simple and tiny hashtag that began to spread in 2017.

How does Promising Young Woman match up to other films which have come in the wake of this era of feminist hashtags? Director Emerald Fennell’s darkly comic revenge drama follows Cassie, a disillusioned med-school drop out trapped in the fluffy pink prison of her parents’ suburban home. By day, she works in a coffee shop. By night, she hangs around in bars pretending to be drunk and waiting for a ‘nice guy’ to take her home and try to have sex with her, despite her practically unconscious state. Every time, the revelation of her sobriety knocks them into thinking twice about ever trying that again – hopefully. Despite sternly tackling the issue of sexual assault, the film does not take itself too seriously. Its strengths lie in its mischievously dark comedy, wrapped up in an unsuspecting veneer of glitter and baby pink bows. The juxtaposition of these two elements; a sobering subject matter of rape ad suicide and the pastel dollhouse aesthetic; lays bare the absurdity of dehumanizing attitudes towards women. Where the film
comes up short is in its lack of commitment to all that is bright and bold, unfortunately forgoing some nuance. While Carey Mulligan’s central performance is both staggering and subtle, many of the surrounding characters come off as mere caricatures, somewhat weakening the sting of the film’s message. This leaves the conclusion less cathartic than the trailer leads us to expect.

Nevertheless, Promising Young Woman has garnered much critical acclaim. With Fen-nell’s best director nomination along with Chloé Zhao (Nomadland) [2], it seems appropriate to revisit some trailblazing feminist revenge films. This genre is a rich one, filled with catharsis and feminine rage – an important outlet for women frustrated with the rigid structures that often leave them struggling against a seemingly insurmountable tide of sexism and misogyny. While Promising Young Woman spins a pretty straightforward tale, despite the stylised worldbuilding, I would like to point attention towards some (what I consider) classics which manage to hit right on the mark. Will the films mentioned below be highly subjective choices and not really representative of the female-revenge movie genre? Yes. Does Meryl Streep star in 50% of them? Also yes.

First up:

9 to 5 (1980)

The iconic tale of three women who have had enough of their misogynistic boss and decide to take matters into their own hands. This film not only tackled the issues of sexual harassment in the workplace at a time when women were only just finding their place in the office, but also launched Dolly Parton’s universal tune of the same name into the airwaves.

She-Devil (1989)

Bubblegum pink and wacky as they come, She-Devil boasts a stellar performance from Streep as a romantic fiction writer who steals slumpy housewife Ruth’s husband (Roseanne Bar) away from her. Ruth subsequently decides to enact her revenge, complete with superimposed red devil eyes visual effects.

Death Becomes Her (1992)

The second in the Meryl Streep ridiculous revenge cinematic universe, Death Becomes Her is where Streep perfects her campy aloofness, first seen in She-Devil. Here, the visual effects are even more preposterous as the plot examines the perils of unattainable expectations of beauty and quarreling over a man.

The First Wives Club (1996)

To round off with the most feel-good of them all (it even ends on an all-in-white sing-along to You Don’t Own Me), The First Wives Club stars Goldie Hawn, Bette Midler and Diane Keaton as three women united against their crooked ex-husbands who left them all for younger ‘models’. This is a heartening story about taking the man for all he’s worth. As Ivana Trump proclaims in her cameo: “Don’t get mad, get everything.”

What unites all these gems of revenge cinema are their joyful and absurdist approaches to a weighty topic. They shine the spotlight on some pretty flawed women, who risk everything to enact their fantasies of finally getting one in on the trash men in their lives. In the face of a problem which can seem impossible to tackle, the women in these films forego the upkeep of gracious appearances in favour of unleashing their inner rage. While some of this anger is misdirected towards other women (such as in She-Devil and Death Becomes Her), the ironic and self-parodying tones of both productions ensure that both maintain their critical edge. Regardless of my reservations, I will happily welcome Promising Young Woman into this exclusive canon. At the same time, if any studios are reading this, another addition to the ridiculous-revenge-Meryl-Streep cinematic universe would not go amiss.

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BRAINPALACE: An experiment on togetherness

If there is one claim that is largely accepted in the cognitive sciences, it is that we are social animals. It is a ubiquitous assumption that renders the bitter-sweet adjective “eccentric” for those less comfortable among their peers. True or not, it is easy to understand why [1], since we live in groups, we are natural imitators, or, at least, we learn and practice culture somehow mirroring each other and thrive in larger communities. Scientists even hypothesize that this is how homo sapiens obliterated the Neandertals and became the only hominid surviving species on the planet: by being together [2]. Now, more than ever, the catchphrase “we are stronger together” is being replicated to exhaustion across cultures. After the steep learning curve of the Covid pandemic, the grieving and loss of loved ones, social and cultural lives, we seem to be even more inclined towards the claim that we are inherently social. As if social distancing would slowly erase our social bonds until we would be left alone and isolated to complete oblivion [1,3].

But what does it actually mean to socially bond? Attachment to family members, commitment to socially accepted norms and institutions, and shared beliefs seem not to be enough to explain our collective attachment. The more social distancing shrinks our social circles, the more we crave to see and be seen, to feel understood. Empathy is generally defined as “the ability to sense other people’s emotions, coupled with the ability to imagine what someone else might be thinking or feeling”. If it is cognitive, emotional, or purely biological is an ongoing debate. Looking back, however, we find that every studied ancient culture created different ways and rituals to cultivate their collectiveness. Perhaps to preserve their empathic traits as the glue that keeps them through troubled waters or maybe as a way to vent and feel safe [4]. And we, thousands of years after, the descendants of forgotten traditions, may not be much different. So, welcome to Brain Palace. What if they could experimentally create the condition to promote togetherness in our modern, urban, and (ego- or) neurocentric way of being?

That was what came to my mind after participating in the data collection for the project BRAINPALACE. Created as an interdisciplinary effort, blurring the categorical boundaries of science, art, and phenomenology, the BRAINPALACE Project tests the enhancement of empathy through emotional synchronization, bringing science and art together to create an experience that feeds back on itself [5]. But what is it they are trying to replicate? Bear with me a bit further and it will come together.

Can neuroscientific research, math, technology, and art be used to generate (thus understand) togetherness?

First, a light sculpture developed by the installation artist Tatjana Busch generates the stimulus around which the data collection happens. A complex and convoluted shape hangs over the ceiling like a pendulum, and when it is hit by light, it reflects a myriad of colors and textures as it rotates around itself.

Then the sound comes into play. Developed by the sound artist Christian Losert, a soundscape resonates with the light experiment connecting the third dot: their interaction is paced by the outcomes of an EEG mobile device that captures brain alpha, beta, and theta waves. Participants’ brain waves affect the scenario by which the changes come about in light and sound. “Light, sound, color, shape, and movement are made tangible by a group within a shared feeling,” says Busch. In her words, “a social sculpture is created in neurofeedback”.

I met her for the first time as I arrived for the data collection, amidst a pandemic, wearing masks, an EEG cap, and washing hands 3 or 4 times. Surprisingly, it was her first experience too.
with the full-functioning brain-computer-artwork interface, developed by Daniel Dalfovo in a partnership with the neuroscientist Laura Kaltwasser a team of neuroscientists from the Fraunhofer Institute for Industrial Mathematics ITWM and Institute for Industrial Engineering IAO. The whole apparatus works in a way the more you engage in the experience, the more the experience becomes engaging. And we would be doing it together. For that, a specific type of technology called hyperscanning is required. It allows for simultaneous measurement of brain signals from several people. That means it makes it possible to record simultaneous reactions and synchronization processes while people communicate or are exposed to the same stimuli. And, as it is mobile, (however, you are told not to move too much), allows for people to scatter and observe different perspectives of the same event - for today, keeps social distancing in check.

Dalvolo and Losert are both responsible for the soundscape, rhythm, and rate of change implemented in Busch’s work by developing the interface in such a way the soundscape and light sculpture reacted to the synchronous response of the alpha, beta, and theta waves in our brains, interpreting them as if we were in the same state. The result is different feedback experiences are generated for different states. The more asynchronous our responses, the more colorful and dissonant the experience becomes. Conversely, when we grow together in the same state of attention, a synchronous red landscape of awe takes over, changing not only the color of the roundabouts of Tatjana Busch’s work but also the texture of that strange massive object in front of us; until merging in eye contact through the now invisible sculpture. Then darkness takes over. A few minutes later, it starts again. It goes on four times to create a type of meditative state and a space of resonance, inviting us to disconnect from any mental task and delve into the experience.

**Technicalities: Brain–Computer–Artwork Interface or BCAI**

Ok. Now, if you have ever worked with EEG, you should be wondering how does it work? If people are sitting around, slightly moving their heads, you are begging the question: Was it really getting measured? If people are moving too much, the data becomes too noisy and impossible to disentangle. If the participants are not beautifully insulated from interference in a Faraday’s cage, what is it they are recording? All that to arrive at the synchronous signaling that allows people to literally be part of the installation ecosystem. Well, about that... the duo told me it’s been an adventure [6].

Overcoming the obstacles was time-consuming and demanded multiple (and sometimes frustrating) tests as they had to solve several technical issues. From connectivity to signal interference to noisy data. And yes, it is not perfect. But it is a start. From there, an interaction between artwork, space, science, and people is generated both sonically and visually. That creates a generative ecosystem in which the participants contribute as much as they are influenced by their environment [7].

But creating a small ecology isn’t simple, not to mention experimenting with social cognition. There are many levels of complexity to be captured. There are many boundaries to be blurred. From the phenomenal effect of an aesthetic piece of art to the Fourier transform of an EEG alpha, beta or theta wavelength. Their answer was to focus on the covariance - and that is what hyperscanning is attempting to do: pick up: brain states that vary in the same rate. The more their variance match, the more the art experience becomes synchronous, or asynchronous if it is the other way around [8]. So, the more alike the participants' brain waves are mapped, the more similar they become because the stimuli becomes more synchronous as well. This phenomenon maps back into the concept of mirroring. As we are diving into the experience, we are seeing each other, letting go of all the noise and our states are matching. And that makes sense since mirroring abilities form the physiological foundations of multiple human behaviors: from the motor cortex that becomes active in the right places just enough to inform you that someone is reaching for a cup in a cupboard by lifting their arm, not an attempt to hit you in the face (so you don’t need to duck) to the irresistible feeling of yawning when you see someone else’s yawn. Empathy is believed to exert a similar mirroring effect [9].

**Togetherness**

But bear in mind empathy is a tricky thing to assess. Mirroring alone will not be enough to tackle the depth of its complexities. It is
defined as the ability to feel and understand someone else’s not by imagining how you might feel in the place of another, but imagining and trying to understand what the other person feels as being other [10]. How can you tell those states apart, if you can only know your own state of mind? The short answer is by training. Well, if we learn from an early age by imitating and being reminded by parents, teachers (other people) how to do things, it should not be different with empathy. In a meta-analysis, Berkhout & Malouff (2016) show that yes, it can be taught and learned, at any age. So, in theory, you can learn empathy. However, it seems to be a trait that accompanies us throughout a lifetime from an early age. Children show empathy traits by the time they are toddlers distinguishing and selecting cooperators over non-cooperators [11]; and if we develop empathy through a lifetime of learning and acting upon it, because of mirroring, empathy begets empathy.

So, is it a cognitive task? There is a colorful debate claiming 3 types of empathy (cognitive, affective, and compassionate). On the other side, some claim for a more deflationary account [12]. Either way, cognitive load is believed to play a role in how we experience empathy. When we are engaged in a task, more resources are allocated towards the task itself, and the worse we become at adjusting our egocentric views to fit someone else’s [12,13]. We scale our perspective down to our own epicenter and distribute our resources just enough to accomplish a goal. We do just enough work to adjust our perspectives to another’s point of view that minimizes whatever effort our neural networks are doing to mirror and predict another’s suffering, for example. [13] When controlling the cognitive load by downregulating the environment or disengaging from any tasks, the cognitive load should also decrease and allow us to engage in different experiences. Anthropologists have recently hypothesized that some ancient rites around the fire or specific chants and dances are designed to do exactly that: Disengage and promote a collective experience of being together. To promote empathy and a collective experience of being together. To promote empathy.

And what about my own brain palace?

As I experienced the BRAINPALACE installation along with Tatjana, I can honestly say I had no clue how she was feeling, it was the first time we’ve met. I can also say I didn’t fully take her perspective, which should be very different from mine. I was seeing her beautiful work for the first time, she was observing my reactions to it. I wondered, though, how it would be for her to watch someone watching her watching her own work. We, however, entered the same state of mind throughout that time, as the rather noisy yet readable data could show in the end - and we could observe ourselves by the evolution of the light and sound in which we were immersed.

So what is it that our communal experience was about? Is it that we just want to share the world we see, and to know that we are sharing the world with other people, as a sanity check? Like children, when they point at things and look at you, asking with their little eyes “can you see that too”? Perhaps it is when we share experiences, we are closer to each other than we can ever be. It made me think of the Italian physicist Carlo Rovelli, sitting by the fire in East Africa alongside the remaining Hadza survivors, the last hunter-gatherers of the African tribes, allegedly our pre-neolithic ancestors. [15] Rovelli was asking himself how much distance there was among them. How many things did one know that the other could ever know? How different can they really be from each other, and yet they are the same? As by being together, feeling comfortable alongside strangers, sitting by the fire, or as Tatjana and I, sitting by her work, and having this peculiar impression we are understanding of each other, without saying a word.

About BRAINPALACE

The project “BRAINPALACE - BRAINPATTERNS Power and Patterns of Thought” is part of the exhibition series “Art meets Science” and the network “Science, Art and Design” of the Fraunhofer-Gesellschaft. It is realized together with the Fraunhofer Institute for Industrial Engineering IAO and the Fraunhofer Institute for Industrial Mathematics ITWM and is a collaboration between the artists Tatjana Busch, Christian Losert and Daniel Dalfovo (Atelier E), the researchers Mathias Vukelić, Ravi Kanth Kosuru, Hans Trinkaus, Alex Sarishvili, Laura Kaltwasser, Dorothée Höfter and STATE Studio.

Find out more:
www.state-studio.com/brainpalacetwo
www.fraunhofer.de/events

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BERLIN SCHOOL OF MIND AND BRAIN
M.A STUDENT

[1] https://go.nature.com/39xOAiW
SPARK-BIH Call for translational proposals open until May 31, 2021 (14:00 CET)

Why not get support from the SPARK-BIH program to enhance the translatability of your innovative technology?

Scientists and clinicians of all career levels from the Charité including BIH are invited to submit their translational project proposals until May 31, 2021 (14:00 CET) in English via the BIH online application portal. SPARK-BIH is part of BIH-Innovations, the joint technology transfer of BIH and Charité. SPARK-BIH supports translational projects from all medical fields that aim at developing novel therapeutics (small molecule, biologics, ATMP, gene therapy), medical devices and diagnostics, as well as the repurposing of existing drugs for new indications.

All chosen projects participate in the SPARK-BIH mentoring program which empowers project teams to overcome translational hurdles through Education, Mentoring & Funding and Entrepreneurship support. The aim of SPARK-BIH is the transfer of basic research to clinical practice/market to benefit patients and society.

> Please find more details on the Call: https://www.bihealth.org/de/spark-call

> Please find details on the SPARK-BIH program: https://www.spark-bih.de/

> Applications will be submitted via the BIH online application portal: https://portal.bihealth.de/portal/Site-Pages/Home.aspx
The Other Crisis if Science

Why knowledge should be free and how academic publishing hinders that endeavor.

As you probably know, science – especially psychology and the life sciences – is in a big transition. I probably only need to write “reproducibility” here and you know what I mean. But besides this still largely unattended crisis, which is of central importance to the integrity of science, there is yet another crisis or problem – one which is even more neglected and often falls under the radar of most aspiring scientists. This problem has to do with scientific publishing, is strongly related to the reproducibility crisis and to foreshadow a bit, may even be connected to your mental health.

If you are like me a few weeks ago, you may have never really given much thought to scientific journals explicitly, except for perhaps catching yourself occasionally thinking about how cool publishing something in Nature (or your journal of choice) would be. But besides such daydreams, who cares about scientific journals in themselves? After all, these are nothing but sometimes shiny yet neutral carriers of the interesting stuff you actually care about, right!? Let me take the chance here to tell you why they are way more than that, what an extremely weird world scientific publishing is in fact, and how it, far from being neutral, influences science in several, mostly negative ways. I think this is a blind spot for many of us at heart idealistic aspiring scientists.

The harsh reality

Let’s take a dive into the world of academic publishing and get some big picture facts about it. Buckle up! This is a grim picture.

To start, the industry of academic publishing has become a huge market. With total global revenues of more than 22bn € [1]. To give some perspective: this is just as big as the worldwide music industry [2]! However, 22bn € is a rather low estimate as it only includes publishing in the STM global trade association (an abbreviation for International Association of Scientific, Technical and Medical Publishers), which describe themselves as collectively publishing over 66% of all journal articles and tens of thousands of monographs and reference works. Thus, the 22bn € are quite a bit off from covering the whole market of academic publishing and the real extent remains unknown. Although the sheer size in revenues may well be quite surprising, the real surprise (in economic numbers) lies in the profit margins this industry bears. In 2010, Elsevier’s academic publishing had a staggering 36% profit margin – substantially higher than what Apple, Google, or Amazon reported that year [3]. This giant profit margin, which makes academic publishing one of the most profitable industries in the world [4], is neither a coincidence nor an exception. It is the product of a remarkably weird (to avoid saying unfair or exploitative) business model, which I hope you agree by the end of the article, should in this form have no future.

A peculiar monopoly

The oddity of this business model starts with the remarkable fact that scientific publishers don’t create the products they sell. In contrast to basically any other business, scientific publishers receive their product for free from other people who create it for them – namely other scientists. This may already sound like exploitation that goes unnoticed by the exploited scientists, who are too caught up in the scientific endeavor. Admittedly, publishers don’t see their jobs in creating the end product, but in refining it by improving its rigor and design [5]. However, most of the indeed important review process (that is the peer-review process) is done on a volunteer basis by other scientists. Scientists are working for free for publishers once again. Thus, academic publishers’ business model is way closer to selling the (shallow) visuals & brand name-add-ons of a free product for inflated prices. Of course, it’s not just some random consumer item, but contains information that is either individually or societal very fertile.

But who is paying for these end products? After all, a single article can easily cost 40-50€. How can this be the basis for such a big market? Here, it goes from odd and somewhat unfair towards sickening: Scientists are not only creating and controlling the quality of journal articles for free, they (or the institutions they work in) are also the ones buying them back! So, while you may disagree with the part of academic journals’ business model in that scientists don’t get any reimbursement for the product they create, this is not yet the most distressing part. The full picture emerges only when you realize that in this market, publishers receive „their“ products from their actual customers (for free), have the customers carry out quality control (for free), and finally have those customers buy the products back at vastly inflated prices [3]. For publishers, it is a perpetual financing machine as one of its founding figures, Robert Maxwell – one of Britain’s most famous and infamous tycoons – built and described it [3].

Simply put, scientists and scientific institutions work, struggle, and pay, while academic publishers make money from the work.
done by the former. Scientific institutions keep on playing this unfair and exploitative game because not buying the journals and the articles would mean that they couldn’t do their job. Not knowing the current state of the art of your field of research effectively impedes you from contributing to it. Because of that, publishers can establish and keep their huge profit margins as scientists need to know about all important developments in their fields, scientific institutions have no real choice in subscribing to journals.

**Further perspectives**

Now, this picture appears repulsive, doesn’t it? Perhaps, you have also fallen into a state of stunned disbelief [3] to which – perhaps somewhat ironically – a Deutsche Bank report attests best. They write: "We believe the publisher adds relatively little value to the publishing process" and further “if the process really were as complex, costly and value-added as the publishers protest that it is, 40% margins wouldn’t be available" [6]. Most poignantly, it describes the system of academic publishing as a "bizarre [...] triple-pay" system, in which “the state funds most research, pays the salaries of most of those checking the quality of research, and then buys most of the published product” [3].

This also gives a new perspective on the problematic business model of academic publishing: As a state, needing to buy back the work from publishers is a complete detour and unnecessary waste of the resources you invested and as a taxpayer, these irrational expenses are enraging indeed. So, the “friction” of Maxwell’s so-called perpetual financing machine simply re-emerges on side of the consumers and the institutions they work in. Actually, the friction was there all along, but academic publishers found a way to externalize it – to use some economic jargon.

Importantly, while most journals follow a business model as described above, there are non-commercial journals run by for example by university presses or charities which reinvest their profits in science. Needless to say, if you do have the option, definitely consider publishing in one of those!

You may now see that there is a preventable misalignment of interests between scientists and the institutions they work in. Scientists are compelled to publish – and indeed publish as much as possible in journals – because the institutions at which they seek employment consider publications as their main employment criterion. However, it’s not in the interest of scientific institutions that scientists give away their mental work to journals as long as journals sell them back at inflated prices. It is entirely unnecessary for institutions to buy back a product which scientists give away for free and which they funded to create. It’s high time for institutions to realize this. Luckily, at least some of them have and are starting to take action. I will focus on this in the last section. But first, let me focus on why knowledge should be free.

**Free knowledge? Free knowledge!**

Why should knowledge be free? I have already mentioned several reasons, ranging from wasted money of states over the interests of taxpayers to the injustice within the process. Let me put some more emphasis on the first point.

Obviously, the money that is spent on the subscription of journals each year could be spent way better. It could and should be spent to actually serve the purpose for which governments and other institutions invest in science: To foster scientific progress and understanding. For instance, it could be spent to employ more scientists, fund more promising scientific projects, or improve the education of science. And all these goals could well be pursued simultaneously by simply cutting the expenses on journal subscriptions in each university.

To see this point more fully, let’s get some perspective on how much universities (have to) pay for journals. It’s really no coincidence if you once again had problems accessing papers from Elsevier or perhaps some other publishers, and to be frank, writing this article was no exception*. The prices for journal subscriptions have risen dramatically and substantially above inflation rates [7] and with them the number of journals. Consequently, many universities had to cut down expenses by cancelling subscriptions. This includes French, German, and Swedish universities [8], as well as The University of California – the United States’s largest public university system [9]. The average expense for journal subscriptions in US Universities has come close to 4 Million US-$**, and over 70% of the overall budget for academic libraries is used for journal subscriptions [7].

Unfortunately, no numbers are available for the average or total global expenses of universities on journal subscription – probably in large part due to confidentially clauses insisted on by many publishers in their contracts with libraries [10]. Huge quantities of money are spent in academia in this way, as every individual university has to pay journals. Meanwhile many universities outside the US probably spend less, as

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* Inflation-adjusted by the Consumer Price Index (CPI) and expressed using the constant 1986 U.S. dollar.

** Among the ironies of writing an article arguing that knowledge should be free, is facing barriers to free knowledge about this very subject to research the information that should go into the article. While Statista was great in providing bar charts without either marks or numbers for the relevant statistics for this article (these would require an expensive subscription), a personal favorite is that a report of around 100 pages on the current status of the market of academic publishing, including a projection up until 2023, requires at least a single user license which costs a mere 2381€ [16].
they cannot afford that amount of expenses for journal subscriptions. In addition, at least in the case of American universities and many universities outside of Europe, a considerable proportion of student expenses and debts are the result of universities needing to buy journal subscriptions. It seems impossible to argue that students should get indebted to indirectly guarantee the extraordinarily high-profit margins of academic publishers. I guess this is enough to give you a sense of the expenses that are paid for journals, the resulting urgency of the problem, and thereupon the amount of money potentially available for science when this problem is solved.

Trust, better arguments, and global inequality

Still, this isn’t yet the whole story. Let me add to this incomplete list another important point. One which is on a first glance more abstract and idealistic and concerns transparency and the societal role of science. The way in which scientific publishing works substantially damping transparency in science by effectively making articles (and thereby the most common output of scientific work) inaccessible to most people. Instead, this lays the grounds for mistrust to grow. Probably, the current global pandemic like no other event before is demonstrating the danger in such mistrust. It’s scientific progress that enables tests, vaccines and models to predict pathogen spread, to name a few. Yet, if trust in science is generally undermined or lacking, in this case, this leads to unnecessary suffering by people becoming a threat to the wellbeing of others in failing to worry about the risks of pathogen spread.

The role of science in society should at least partially lie in its ability to help people coming to informed and well-reasoned opinions – regardless of the topic. In that sense, science extends the idea of the enlightenment: to form opinions based on better arguments instead of authorities. Yet, science can only provide better arguments, instead of serving as a new authority, if scientific articles are freely accessible.

Finally, as with many other things, the economy of academic publishing is a case in which the worst off also lose the most: as an institution that is unable to buy subscriptions to the current state of the art of research in a given field, you have grim chances to produce interesting results, attract good researchers, or just translate scientific progress into practical real-world changes. For institutes, already struggling financially to acquire state-of-the-art devices, such as an MRI machine, increasing costs for journal subscriptions are yet another burden and competing for expense that hinders scientific progress.

I probably do not have to go into details about the global distribution of institutions that are or are not able to buy subscriptions to all the relevant journals. Given the increasing role of science in the development of industries, markets, and countries as a whole, this is also an impediment to global development and global equality.

Why the two crises of science go hand in hand

On top of the issues raised above, this also poses a challenge for scientific standards and open science. The problems in the business of academic publishing described in this article and the reproducibility crisis are tightly intertwined.

Let’s start by talking about power – in the statistical sense, of course. Most experiments you have read about – at least in psychology and neuroscience – are well underpowered, thus fuelling the reproducibility crisis [11]. What does low power mean? If an experiment is underpowered, it is less likely to catch any effect, while simultaneously increasing chances of false-negative results [11]. This has immediate consequences for reproducibility because it leads to more false and thus not reproducible findings. In addition to that journals are biased in publishing positive results or negative findings. Together this
may lead to a higher percentage of such underpowered but statistically significant studies being published.

Why are so many studies underpowered? Here, we come back to the issue of academic publishing. In most journals, novelty, positive results, and a “clean” narrative are valued predominantly [12]. This, in conjunction with the tight link between publications and job security, adds to incentivizing scientists towards methodological laxity. Current selection criteria of journals compel scientists, who need publications for their career prospects, to run many quick and methodologically dirty studies aiming at outstanding positive results instead of validation studies or fewer long-term studies. This means the conflict of aims for scientists between methodological and statistical rigor and their academic employability is a consequence of incentives set by publishers and scientific institutions. Scientists following these incentives create more articles with more novel findings, which in turn allows publishers to expand the number of journals and demand higher charges for them. And to remind you, this is exactly what academic publishers did and do because it raises their profits.

I should add that, while I claim that there is a link between the novelty-seeking of journals and the amount of money academic publishers can generate in science, it is not quite clear to what extent publishers intentionally aim at exploiting this link, or whether their seeking for novelty, positive results, and simple narratives are results of normal human biases. However, the core of what publishers say in defense of their business is that they add to the rigor of science and its results. Therefore, either way, publishers should have long fixed this, and sticking to this way of running their enterprises, if anything, undermines science.

Thus, the reproducibility crisis rests on how actors in science - including publishers - behave. Without good reason, the reproducibility crisis is too often short-sightedly considered a problem of scientists, who don’t value scientific integrity sufficiently in the way they conduct science, sometimes adding that incentives given by scientific institutions add to the problem. Instead, incentives are given by both, academic publishers and scientific institutions, provide reasons for scientists being drawn towards behaving this way.

From sloppiness to scientific misconduct

Academic publishers set a strong incentive towards novel positive results that fit with “clean” narratives. Thus, practices such as HARKing (Hypothesizing After Results are Known) and P-value hacking, come in handy to increase the chances of publication. HARKing, or presenting postdiction as predictions, increases attractiveness and publishability – which are incentives set by academic publishers – and thereby decreases reproducibility [12]. The same goes for P-value hacking, a practice that increases the chances of finding significant results by making the analysis contingent on the obtained results.

As the previous section emphasized the amount of money that universities (have to) spend for journal subscriptions, a further connection should be mentioned here: as scientific institutions have to spend shocking amounts of money on journal subscriptions, longer timeframes and bigger studies (i.e. higher power) become less feasible in terms of funding. This has once again the implication that scientists are incentivized towards P-hacking and HARKing and the resource constraints also push them towards conducting experiments with low power.

Of course, the incentives from scientific institutions equally add to the problem. As scientists need to publish as much as possible to increase the chances of employment, they are drawn towards quick and dirty studies. The lure of bad practices on scientists by both, scientific institutions and academic publishers, is mostly balanced by scientist’s idealism, believes, and commitment towards good scientific practice. As described above, the behavior of scientists and scientific institutions is in the interest of publishers, as it allows them to increase the number of journals and their prices. Publishers, therefore, have reason to maintain the set incentives. Thus, this is a complex Gordian knot or intertwined network with actors (in part) keeping each other in their semi-fixed points. In a landscape of interests and money, these points are local minima for both, scientists and scientific institutions, while publishers enjoy their local maxima.

Your mental health in a world of publish-or-perish

The weird market of academic publishing has brought science and academia in a position in which the number of papers and citations are by far the most important proxy measure for a scientist’s employability. A single number, the h-index, which is a proxy for a scientist’s article output and impact in terms of citations, matters the most for you as a scientist, while the impact factor – another single number – matters the most for journals. The problem is that these numbers’ influence often surpasses a lot of what you have learned to be most crucial for scientific practice in whatever scientific methods or statistics class you have attended.

I have previously focused on systematic problems, unfairness, ineffectiveness, and scientific quality, but there is another, more personal implication. The fact that you’re reading this makes it likely that you are either an aspiring scientist or already working in science. If this is the case, your chances of having mental health problems are sub-
stantially higher than in the general population. Graduate students have a staggering six times higher prevalence of depression and anxiety compared to the general population [13]. As addressed by the recent open letter of early career researchers to the presidents of the Berlin University Alliance [14], this is connected to pressures to meet publication requirements. Consequently, it is connected to the problem addressed above: the world of scientific publishing, its complicated relations to scientific institutions, and what it incentivizes in scientific practice. Without the given context, this conclusion may sound odd, but if you’re struggling from mental health problems and you are currently an early career scientist, your mental health problems may have surprisingly much to do with the business of scientific publishers. Especially in how this process shapes the way science is conducted and the pressures of the publish or perish environment.

The library of Alexandra

By now you may be truly disenchanted, but there are positive developments happening surprisingly fast and significant.

You might be familiar with the name Alexandra Elbakyan already. In 2011, she created Sci-Hub, the first open library of scientific papers that now contains more than 80 million articles. It is perhaps no exaggeration to say that Alexandra, who has not even finished her Ph.D. yet, is among the most important contributors to the scientific enterprise, while only a few people know her name.

I do not write this intending to create new heroism but rather would like to invite you to reconsider the role of Sci-Hub and traditional scientific journals. For many people, Sci-Hub intuitively feels wrong for the simple reason that it is illegal. Meanwhile, academic publishers seem to have a clean slate, since their business is legal. But, hopefully, needless to say, neither is illegal synonymous with morally bad nor legal synonymous with morally good.

Open access on the rise

With that being said, let’s talk about the movements towards open access. Open access publications, as the name says, allows everybody to read scientific articles. In late 2018, the European Science Foundation released „Plan S“ (where the “S” stands for a shock against the current status quo) as noteworthy development regarding the public availability of research results. This is an open-access initiative, which requires that scientific publications that result from research funded by public grants must be fully and immediately open and cannot be monetised in any way [15]. It’s remarkable which organisations have already joined or support this initiative: Among others, these include WHO, Wellcome Trust, Gates Foundation, DFG (Deutsche Forschungsgemeinschaft, German Research Council), Netherlands Organisation for Scientific Research, Swiss National Science Foundation, several Swedish Science Organizations, the Austrian (FWF, Fonds zur Förderung der wissenschaftlichen Forschung) and the French national science foundations (ANR, Agence Nationale de la Recherche) as well as several Chinese science foundations.

Although the exact impact of the initiative is unclear as of now, this seems to be a global and strong commitment to open access. It remains to be seen how journals react or adapt to this, nonetheless, it is a clear sign of hope.

A new hope?

Generally speaking, the open access movement is a clear step forward in academic publishing. Finally, there are journals in which you can simply publish your article as open access, however, the picture is again more complicated, especially regarding high impact factor journals. In many journals, the open access publication of research articles has to be paid for by the scientists, or rather their scientific institutions. Scientists having to pay to get their papers published may sound like the ultimate perversion of the system. Yet, as long as institutions are able to pay for it, this still means progress in a few respects. It attenuates global inequality regarding the access of scientific papers, reduces the need for journal subscriptions that especially drain the budget of poorer institutions and countries, and contributes to the overall transparency of science.

Open access might even loosen up the entanglement of academic publishing with the reproducibility crisis. Following this model, the profits of an academic publisher would no longer depend on journal subscriptions and thus the number of journals that they offer. Instead, revenues would depend on the research articles themselves. This might reduce the journals’ prioritization towards novel findings and enhance incentives to publish e.g. a replication study, which earns them just as much money, short and long term.

No Utopia – yet?

Nevertheless, this model of open access publishing also means that institutions and labs with less money aren’t able to publish as much as others. Of course, there are potential solutions to this problem. Depending on your political and economic taste, some may seem obvious: A) States need to pay and host scientific publishing in the first place so that there’s no party in the game that creates injustices because it needs to make profits. If you think that this solution involves too much central control, then B) more competition between different journals (perhaps in combination with

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Courtesy of Sci-Hub (sci-hub.de, March 2021)
What Have We Learned, Dr. Brown?

#11 – Personal Growth and Development

Max Hellriegel-Holderbaum
Berlin School of Mind and Brain
M.Sc. Student

Academia is becoming increasingly aware of the fact that only a minority of doctoral candidates will succeed in pursuing an academic career. The rest of us, therefore, need to face the question of what else to do with our lives and how to make a living out of it. This series aims to direct your attention to all the useful skills you have, seemingly trivial, that were acquired as prerequisites to perform your research, but which are incredibly precious outside the lab!

Whenever spring has sprung, moods are lifting and people look forward to warmer evenings, lots of sunshine, and nature growing again. But it's not only flora and fauna that have a desire to grow – people do too! Growth and development are fundamental desires! This involves not just physical growth, like when you were a child, but also (formal) education, emotional maturation and self-reflection to identify personal potential as well as dreams and aspirations. It means improving your self-awareness and your self-esteem, and realizing which actions need to be taken to reach your goal. Personal growth and development are stimulated by plenty of things, like opportunities and challenges.

Of course, all of this is not limited to grad school but spans the entire lifetime. However, grad school is where you are right now, and growth is happening – a lot! There is the phrase: “You’ll never meet a strong person who had an easy path.” And let’s be real: grad school is not easy! Not. At. All! This does not mean that other peoples’ paths are easy either. It just means that the way you chose is not easy. It demands your attention, energy, dedication and focus for a very long time. And there you are, persevering! Or perhaps leaving the system, because you reflected on yourself and realized that you and academia are not a good fit. Both are a good thing! Both mean growth, as you are challenged and develop! Ironically, a lot of personal development does not happen consciously, but reflecting on your past will surely reveal how much you have grown: whenever you facepalm at your ugly data because you know you can do better and whenever you cringe about an old text, what you should see is not your younger self who failed, but how much you have grown since then! How much you have developed your abilities to do better! That’s great! Don’t be cynical and critical of yourself. Instead, be kind and encouraging! You did great, you developed your skills and abilities. Personal growth and development are also a feature of a good employer and worth looking out for when looking for jobs. It means that an employer isn’t just committed to making you fit their needs, but rather is involved in your interests and potential, and supports you to develop accordingly (of course, not gonna lie, the company ultimately benefits from you building up your competencies, but still…).

Personnel development is also a feature of an academic career. The rest of us, therefore, need to face the question of what else to do with our lives and how to make a living out of it. This series aims to direct your attention to all the useful skills you have, seemingly trivial, that were acquired as prerequisites to perform your research, but which are incredibly precious outside the lab!

[7] Shu et al, C&RL, 2018
[12] Nosek et al, PNAS, 2018
In 2012, the Royal Academy of Science International Trust founded the first global collective movement for expanding the definition of Women’s health beyond largely reproductive health, the World Women’s Health and Development Forum [1]. Three years later, the Forum issued a declaration of desired outcomes for Women in Science, including that the United Nations declare February 11th as a commemoration of the International Day of Women and Girls in Science [2].

A Celebration with the BIH and MDC: „Picture a Scientist” screening and Keynote by Dr. Marieke van den Brink

In honor of this day, the Berlin Institute of Health (BIH) and the Max Delbrück Center for Molecular Medicine (MDC) hosted a film screening of “Picture a Scientist” accompanied by a keynote speech by Dr. Marieke van den Brink, professor of Gender & Diversity at Radboud University Nijmegen in the Netherlands. In this article, I will specifically cover the keynote presentation and aspects of the documentary.

“Up to now, women are still underrepresented in science, especially in leadership positions. Women make up half of the Ph.D. students on average, but only every fourth professor in Germany is a woman,” states the BIH event page [3].

We know that women continue to enter science (take the 2020 MedNeuro cohort for example, which is 89% women!), but we continue to see a decrease in female representation at every step of the academic ladder. As the documentary film “Picture a Scientist,” and many speakers at the BIH event emphasized, losing women scientists is losing scientists.

Why is this happening? In her keynote, Dr. Marieke van den Brink describes inequality as a symptom of institutional organization, perpetuated in how work is structured, talks assigned, achievements rewarded, leadership defined, and harassment addressed. Specifically, her keynote addressed the structures and climate that uphold gender discrimination [4].

Van den Brink began by defining inclusion as the combination of both belongingness and valued uniqueness. Belongingness without valuing uniqueness breeds assimilation of women into spaces designed for men, with no support for the stress accompanying motherhood or accountability for harassment. The flip side to assimilation is differentiation, wherein an individual is valued for the role they bring, in the sense that a female representative might make more sales to women but are shown that they will remain an outsider in the institution [4].

Structures of Academia

“It’s about decision-making power,” says van den Brink. Women are underrepresented in the positions that make the decisions on research directions, funding appropriations, educational content [5].

Studies show that women have disproportionately higher teaching loads, spend more time on committees and other academic service and outreach work, and continue to earn less than their male colleagues [3].

“When I do my research, very often people say, Marieke do you know what the problem is? Women do not make themselves visible enough” [4].

Visibility, in many ways, is something that must be granted by others, particularly for female scientists, states van den Brink [4]. When women copy the self-promotion of men, they lose their label as “nice”, and therefore their shot at an opening for a “personable” and “approachable” assistant professor [6,7]. Early career researchers rely on their mentors and other more senior collaborators to introduce them at conferences as promising young researchers. They rely on their supervisors to delegate them visible and challenging tasks that will later serve as important and impressive resume-builders. They rely on their mentors to guide and encourage them to apply for fellowships and grants - and to write them stellar letters of reference. In each of these areas, research has shown that women are failed by this system, and to this day are hindered in their careers [8,9].

Finally, science today is a gendered space, as shown in 29 photos of white male photo galleries, statues, buildings and street names at the Radboud University campus [4].
that one of the prerequisites of success in science is maleness.

**Climate of Academia**

More insidious are the ways in which the academic climate perpetuates discrimination. Van den Brink boils this down to a few things: competitive and greedy institutions, subtle discrimination and exclusion, sexual harassment and micro-aggressions, and the symbolism of an ideal scientist. We have all encountered institutions that demand all of our time and effort. Together with the social demands on mothers, these standards force women out by providing unyielding harsh environments [4]. Furthermore, many studies show that women are still valued less and excluded from science. Moss-Racusin’s resume study, conducted only six years ago, showed that “Jennifer” was deemed less competent, less worthy of mentorship, and deserving of a smaller starting salary than “John”, even when their resumes were otherwise identical [10]. Our hierarchical, competitive culture also continues to provide a breeding ground for harassment while inadequate responses to reports tell women they are worth less than the more powerful harassers [4].

Much of this is reflected in the concept of the ideal scientist. In her examination of how full professors were selected in the Netherlands, Dr. van den Brink deconstructed the criteria for “academic excellence”. The resulting description was reminiscent of the Dutch proverb “a sheep with five legs”, meaning something of unreasonable excellence or versatility. In this case, a five-legged sheep is an excellent researcher, an inspiring teacher for all levels from undergraduates to postdocs, a born leader, and sometimes even a good medical practitioner, depending on the field [4]. Most male professors in Dr. van den Brink’s studies are not sheep with five legs. In fact, many men only had two or three legs at the time of their hiring. According to hiring committees, these candidates are hired with the belief that they have the potential to grow into their remaining legs. However, even women with four legs were often passed over, a symptom of embedded gender stereotypes in our conceptualization of the ideal scientist [4].

**Where we go from here**

To increase inclusion at higher levels of academia, van den Brink stipulates that three things must change. First, women must be equally represented at every level of academia. Secondly, the institutions must change to support, rather than drive out female scientists. Finally, the gender dimension must become an essential aspect of education and research. In her keynote, van den Brink focused only on the institutional approach but recommended the report “Gendered Innovations 2” by the European Commission [11]. This is not just a matter of gender equality.

As mentioned above, this is about creating innovative scientists, incorporating diverse perspectives, and above all else, doing good science.

“Innovative capacity and responsible governance, for the patients and society – these are the central tenets behind all of Charité research endeavors.” [12]

“The mission of the BfH is medical translation […] The aim is to deliver relevant medical benefits for patients - turning research into health.” [13]

“The MDC’s research has a long-time goal: to advance medicine today and in the future.” [14]

When we are losing not only female scientists, but also scientists from other racial, gender, and LGBTQ minorities, we are failing to do the best science we can. Had MIT professor Nancy Hopkins left science after facing sexual harassment, she would not have mapped RNA tumor virus genes in mice, including the infamous p30 capsid protein [15]. Had Stanford Associate Professor Jane Willenbring left academia, she would not have investigated how tectonics and changing climates impact evolution and biodiversity [16]. Had American University Associate Professor and popular science communicator Raychelle Burkes never returned to academia, she would never have developed more portable analytical forensic tools or inspired a whole new generation of scientists [17]. All three of these women told their stories of harassment, strength, and resilience in the documentary “Picture a Scientist.” But science should not be selecting only for the women strong enough to survive the assault, discrimination, and exclusion in academia. Imagine the science they could have done by now.

**Leandre M. Ravatt**

**MedNeuro M.Sc. Student**

**ECN Fast-Track Ph.D. Fellow**

[1] [https://bit.ly/3m9WmmP](https://bit.ly/3m9WmmP)
[9] van den Brink & Stobbe 2014
[14] [https://bit.ly/3qT5dNO](https://bit.ly/3qT5dNO)
A Nature survey of Ph.D. students in many different scientific fields across the globe found that 75% of respondents were satisfied with their decision to do a Ph.D. [1]. However, 1 in 4 students reported imposter syndrome and concerns about mental health directly related to their Ph.D. [1]. In Nature’s 2019 study, 45% of respondents stated that their level of satisfaction had worsened since the beginning of their graduate school experience, and over a third stated that they had sought help for anxiety or depression related to their Ph.D. studies [2].

The sources of decreasing mental wellbeing are not universal. Reported stressors ranged from difficulties securing funding, work-life balance, harassment, long hours, discrimination, publishing pressures, and uncertain career prospects [2].

How do you know when to seek help? This isn’t always as easy as it seems. Humboldt University, the Free University, and Studentenwerk all list possible reasons for seeking help. Do any of them look familiar? [3,4,5]

- "I’m not sure if I’m on the right course."
- "I can’t seem to motivate myself. Again and again, I get distracted from my work."
- "I’m just not as successful as my classmates. I don’t understand how effortless it seems for them to do the things that are so difficult for me."
- "I seem to be sick all of the time, and I think it’s psychosomatic."
- "Which learning and working techniques do you recommend? I don’t think I can cope with the piles of work."

Even if your first thought is not to seek therapy, these are all struggles that could benefit from the psychological counseling services offered at the universities in Berlin. To access therapy, you might visit the counseling page of your university’s website. The ECN Scholar Minds have a guide to psychotherapy as well as self-help resources on their webpage [6]. Otherwise, you might also consider some preventative measures: have regular meetings with your supervisor about progress and foreseeable difficulties, define realistic milestones and publication plans, and always have a plan B.

But what if the problems you are struggling with are institutional? If you are experiencing scientific or professional misconduct, you can consider speaking to an ombudsperson (Vertrauensperson). An ombudsperson is a neutral party who exists outside of institutional structure. A meeting with an ombudsperson is confidential and designed to help you access resources to resolve your situation [7].

If you are struggling with any of these things, know that you are not alone. If you haven’t yet or are no longer struggling with these things, then please look out for your fellow early career researchers. The best time to begin engaging with your mental wellbeing is now, not in times of crisis.

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**Leandre M. Ravatt**  
MedNeuro  
M.Sc. Student  
ECN Fast-Track Ph.D. Fellow

[1] https://go.nature.com/39u7VQD  
[2] https://go.nature.com/39pBzX9  

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*Students studying at the Charité should contact the Charité Medicoach, regardless of whether they are also associated with HU or FU.*
Humboldt Graduate School Conflict Consultation:

email: hgs-consultation@hu-berlin.de
 proprietor: +49 30 2093 89710

FU Psychological Counseling (for FU* students)

email: psychologische-beratung@fu-berlin.de
 proprietor: +49 30 838 70008

Dahlem Research School Support and Advice
during your doctorate:

email: beratung@drs.fu-berlin.de

StudierendenWERK Counseling

Charite Ombuds for Doctoral Affairs:
https://promotion.charite.de/en/counsel/ombuds-persons/

email: vertrauenspersonen-promotion@charite.de

Charite Ombuds for Good Scientific Practice
https://www.charite.de/en/research/research_support_services/good_scientific_practice/ombuds-persons/

email: vertrauenspersonen-promotion@charite.de

As networking is one of the biggest necessities of career development, the goal of the Women’s Careers and Networks symposium is to bring together established scientists and students or early-career researchers. By creating a stimulating environment, people from different backgrounds can interact and learn from each other. Besides networking, we want to raise awareness about the role of gender in career development and ways to increase diversity in science. This year’s focus is on transformation, from a personal, professional, and societal perspective. We hope that people can find support in blazing their own professional trails and help in tackling issues such as work-life balance.

**When and where**

WoCaNet2021 will take place on the 27th and 28th of May 2021. Adapting to the times and staying true to our topic, we have transformed WoCaNet into a virtual event. By utilizing the advances of today’s online platforms, we promise to preserve the interactive atmosphere that characterizes this symposium. Participation is free of charge.

**Events**

From marine biogeochemistry to social demography and from neuroscience to science policy, a diverse set of speakers will be present, sharing their views and tips for professional success and a healthy work-life balance. Besides these inspiring talks, WoCaNet2021 offers a variety of other events. During the Career Fair, professionals from the fields of industry, education, scientific communication, and mentoring will talk about their career paths and working life. In addition, participants can have personal interactions or small group discussions with the invited speakers, after their talks and public Q&A session. There will also be a Panel Discussion. The topic this year will be “Science through the lens of Society”. We aim to evaluate the interaction of science and society and see the implications of factors such as education and policies. Lastly, if you register early enough, you can get a spot in the available workshops: Entrepreneurship in STEM (10 euro participation fee), Negotiation and Conflict management (10 euro participation fee) and Visual Science communication (15 euro participation fee).

**Don’t forget to register!**

*CHRISTALLENI VASSILIOU*

*Ph.D. student, AG Dean*

On behalf of the WoCaNet 2021 organizing team

Registration is already open and has been prolonged until May 10, so don’t miss the chance to register now! To stay updated with everything that is to come, follow us on Twitter (@WoCaNet), Facebook (@WoCaNet21) and LinkedIn.

For more information, check out our website:

http://www.wocanet.uni-goettingen.de/
Virtual Women's 2021: Careers and Networks

Transformation: Blaze Your Own Trail
27-28 May, 2021

Keynotes
Prof. Erin Schuman
Prof. Eva Pellicer

Sessions
Perseverance
Resilience
Versatility

Panel Discussion
Science through the Lens of Society

Workshops
Entrepreneurship
Visual Science Communication
Negotiation & Conflict Management

Career Fair

Virtual Networking

Free Registration online
01 March - 30 April @ www.wocanet.unigoettingen.de

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Göttingen Graduate Center for Neurosciences, Biophysics, and Molecular Biosciences
Especially in times of lockdown and home-office its is hard to get to know new people on campus.

Here we would like to introduce to you some of the wonderful people who create the CNS newsletter.

**Bettina Schmerl**
Bettina studied Biology and Medical Neuroscience and is currently doing her PhD in Molecular Neuroscience at the Neuroscience Research Center. She is fascinated by the fact that a bunch of proteins and ions enable us to think and tries to understand how that is working. Since 2013 she is a member of the CNS Newsletter team, serving as editor-in-chief since 2018 and already struggling to let it go upon finishing the PhD. Bettina is always suffering from fitting way too many interests into much too little day. ;-) 

**Melina Engelhardt**
Melina studied Psychology and Medical Neuroscience and is currently doing her PhD at the Department of Neurosurgery and Einstein Center for Neurosciences. Her research aims to reduce the risk of developing motor deficits after surgical removal of a tumor using non-invasive brain stimulation. She has been a writer for the CNS Newsletter team since 2018. Melina also loves baking and sometimes connects this with her research by making brain cakes or cookies.

**Jasmine Onstad**
Jasmine studied philosophy in her BA and has just started her master’s at the Berlin School of Mind and Brain. Her research interests are wide-ranging and include philosophy of cognitive science, political philosophy and aesthetics. She is new to Berlin and a first-time CNS writer. She can’t wait for the cinemas to reopen!

**Leandre Ravatt**
Leandre is in her first year of the Medical Neurosciences master’s program and has a bachelor’s degree in Biochemistry. She has always been fascinated with protein function and is excited to connect it with the processes that sustain consciousness. In her spare time, she loves to read any genre except horror and is anxiously awaiting the day that she can return to choir. She is new to the CNS newsletter and looking forward to serving (and learning!) as editor-in-chief.

**Lorena Sganzerla**
Lorena has always been fascinated by how flexible and yet specialized our brain is. She is interested in how we learn things and the role our body plays in learning. Possibly, she spends much too much time thinking about how our ecologies shape our behavior or how things self-organize. In 2019, she started writing for CNS and joined the team of editors-in-chief in early 2020. She misses the ocean, going to (quite questionable) concerts, and more-than-planning long bike trips.
If you see them in person say hi!

Shereen Abdelnabi
Shereen Abdelnabi, a neuroscience and psychology researcher, just finished her master's degree in psychology from the international psychoanalytic university, and currently, she is writing her second master's thesis in neuroscience about Alzheimer’s disease at Humboldt University and the Charité. Her current ambition is to continue with a Ph.D. and conduct more future research about psychological therapy methods and brain disease prevention.

Max Hellrigel-Holderbaum
Max is in his second year of the master’s of the Berlin School of Mind and Brain and studied Philosophy in his BA. By receiving the title "Master of Mind and Brain" he expects to immediately transcend all worldly pain and suffering and advance his Jedi qualifications. Having switched to the empirical side of things, he is now studying if daytime sleepiness in sleep disorders can be dampened through regular meditation. His interests range from psychopathology over AI to meditation and consciousness. Although he contributed to a previous issue in 2020 and seems to have a tendency towards long articles, he considers himself new to the newsletter. He is looking forward to getting back to bouldering and climbing.

Chrystalleni Vassiliou
Chrys studied Biomedical Sciences and is currently doing her Ph.D. in Neuroscience at the German center for neurodegenerative diseases (DZNE). She always wondered how memories are formed and consolidated, so she decided to study this in her Ph.D. project. This is the first issue of the CNS Newsletter that she is taking part in as author and editor. In her free time, she is either playing music or annoying her cat.

Felicitas Brüntgens
Feli studied Biology with a focus on (neuro)physiology and is currently doing her Ph.D. in neuroscience at the Charité. She is interested in how learning and memory are working within our brains but also in how to communicate the nerdy science world to the outside world. She is writing articles for the CNS Newsletter every now and then since 2018. She loves to be outside and moving, for example, biking or hiking (even before the pandemic) and is looking forward to traveling again in a world, where everyone is vaccinated.

Sirjan Chhatwal
Sirjan studied Neuroscience in her Bachelor’s and is in her second year of the Medical Neurosciences master’s program. She is fascinated by the aging brain. She has been a writer for the CNS newsletter since 2019. Outside of research and academia, she is an avid reader, likes memorizing quotes, and is always inquisitive about learning something new.
Applications Master’s Students 2021
We received 104 applications from all over the world, of which 60 were pre-selected in the first round of evaluations. Of these 60 applications - female: 47, male: 13, divers: 0 - 30 have been shortlisted for interviews which are happening in March 2021. Interestingly, the ratio of female/male/divers applicants remained roughly the same (female: 72%) as in previous years. Compared to 2020, the program was able to slightly increase the numbers of applications (2021: 104, 2020: 93), about 12%.

After the interviews are completed as well as the admission symposium of the Einstein Center for Neurosciences has taken place, we will offer 10 spots to each, Medical Neurosciences and the ECN integrated MSc/Ph.D. fellows.

Additionally, five international students from the Neurasmus program will spend their first year in Berlin, before leaving for Bordeaux or Amsterdam for their second year.

Master’s Thesis Defenses (cont’d)
Starting with the 2017 regulations, defenses of Master’s thesis make up 20% of the final grade of the thesis. We are happy to announce that now all 21 students - including 2nd-year Neurasmus students - successfully defended their theses. The final two students had their brilliant defenses on 12 March 2021. Congratulations to Natalie and Orestis and a big Thank You for your interesting presentations!

Update: Evaluation of our Master’s Program
On December 2nd - postponed from March to December - our Master’s program was officially evaluated by external reviewers with several discussion rounds: management (administrative and scientific personnel), heads of the modules together with the office, current and former students and lecturers.

The verbal feedback was well received - and the overall impression of our program has been considered very good, administratively and scientifically - in particular, combined with the Neuroscience community in Berlin. The written report is as of now under review with three requirements and ten recommendations.

The requirements are feasible to achieve as well as all recommendations. The final report will be published publicly.

A big Thank You goes to the Quality Assurance Office, led by the Vice Dean for Teaching and Learning!
April

07. | Breaking the Stigma: Neuroscientists Prioritizing Our Own Mental Health as a Community - Society for Neuroscience
12.-15. | British Neuroscience Association Festival of Neuroscience
20. | Berlin Brains 2021: Memory and fatigue - why should we be interested in a fly? Dr. David Oswald and Carlotta Pribbenow (Charité – Universitätsmedizin Berlin)
29. | Scholar Minds: Growing up in Science – Berlin with Dr. Nicolas Schuck

May

25.-26. | European Society for Neurochemistry 1st ESN Virtual Young Scientists Conference
26.-27. | Human Brain Project: Young Researchers Event

June

09.-12. | Life Improvement Science Conference, Tübingen
10.-11. | 17th NeuroPsychoEconomics Conference

July

12.-14. | Curious2021 – Future Insight Conference, Darmstadt, Germany
26.-29. | COGSCI 2021 - Comparative Cognition - Animal Minds - Vienna
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Wir übernehmen bei privaten Auslandsreisen die Kosten für **alle empfohlenen Impfungen** sowie für eine Malaria prophylaxe, gegebenenfalls abzüglich der gesetzlichen Zuzahlung.

Ich berate Sie gern:
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