

## CODE RED

**This paper takes a critical look at stress in lockdown and explains some simple science-backed steps to regain control when your brain orders a Code Red.**



The initial adaptation shock may be over, but baseline levels of stress across the planet have been kicked up a notch by the daily challenges of the coronavirus (Covid-19) pandemic. We all know what we need to do (and why) to reduce the spread of the virus. What we're less well versed in is how to protect ourselves from catching anxiety. What is the psychological equivalent of washing your hands while singing happy birthday twice?

The first step to recalibrating our anxiety-meter is to understand exactly what stress is and what it does to our system. Armed with this knowledge, it's far easier to deploy strategies to regain calm during a crisis. This paper starts with the psychology of stress and the science behind fear, before explaining some simple steps to help when your brain orders a Code Red.

## ALL UNDER CONTROL

Escaping stress amid a global pandemic is almost impossible and you can't stockpile to solve it. You may get away with a mild form of low-level background stress that pops up now and again. If you're less lucky (and particularly if you've dealt with anxiety before), you may be hit with full-blown panic. For those unfamiliar with the features and realities of stress and anxiety, here is a quick starter guide.

**Stress** is a normal physiological response (see **Box 1** for some biology).

Evolutionarily, it's a good thing and it's meant to feel uncomfortable. In the same way we want to eat when we're hungry, feeling stressed is the body's way of telling us that something about our situation needs to change. Just like hunger, the idea is that it shouldn't last for long. A little bit is good because it helps us perform. Too much though, leads to anxiety.

**Anxiety** is not so helpful. It's when we stay stuck in a stress response, even when the original trigger has gone. Anxiety expresses itself in myriad mental and behavioural ways. Some are fairly obvious; others less so. Common symptoms include: worrying about worst-case scenarios, with unhelpful thoughts looping round and round in our head; being irritated by little things that wouldn't ordinarily be a bother; feeling unduly angry or hostile towards people or things; having trouble sleeping (either getting to sleep or staying asleep); and just a general sense of dread. So we can function, but sub-optimally.

Fundamentally, anxiety is about coping and control. At its core is a compromised ability to tolerate uncertainty and a belief that we won't be able to cope. It's no surprise that the mountain of uncertainty Covid-19 brings, combined with the loss of control we have in lockdown, tip us in the direction of anxiety.

**Panic attacks** are basically anxiety off the charts. They are sudden and intense, and often happen when there's no trigger at all. In the midst of panic, thinking is completely paralysed (which can feel like a complete loss of control) and physical fear responses go wild (they're often mistaken for heart attacks).

**Hypervigilance** is a related mental state and one that's very relevant right now. This is our system on high alert. Our senses are heightened and we constantly scan the environment (news websites, the stock market, passers-by on the street) for possible threat. Being in this state is exhausting and can itself lead to anxiety.

### BOX 1. The brain-body interface

Fear is very basic. The amygdala doesn't distinguish between a lion walking inches from your jeep on safari and an alarming headline about the latest coronavirus figures. Biological and psychological stressors therefore affect your system in exactly the same way. All stressors act through the **amygdala > hypothalamus > autonomic nervous system pathway**, and stress reduction strategies work by hacking these systems.

- The **hypothalamus** is a tiny structure in the brain's limbic system, about the size of a kidney bean. It communicates with the rest of the body through the autonomic nervous system.
- As the name suggests, the **autonomic nervous system** automatically regulates many basic physical functions like breathing, blood pressure, heart rate, pupillary response, digestion – usually below the level of conscious awareness. The autonomic nervous system has two complementary components, both critical in the regulation of stress.



- The **sympathetic nervous system** is a quick response mobilising system, which effectively acts like an accelerator. It controls our famous **fight-or-flight** (-or-freeze) reflex. On orders from the amygdala, the hypothalamus activates the sympathetic nervous system by triggering the release of **adrenalin**. This then brings about a host of corresponding physiological effects: increased heart rate, pulse rate and blood pressure (which make us breathe faster), alertness and senses are heightened, glucose is released and flooded into the bloodstream and many more. All of these physical responses are designed to prepare us for the threat. As the immediate adrenalin rush wears off, **cortisol** takes over to make sure we keep our foot on the accelerator.



- The **parasympathetic nervous system** operates like a brake. It takes longer to act and has a dampening effect on our system. Described as the body's **rest-and-digest** response, the parasympathetic nervous system calms our nerves and returns us to regular function when the threat has disappeared.

## SHIELDS UP! RED ALERT!

All of these stressed mental states relate to the way we process and handle fear. Fear is one of the universal basic emotions<sup>1</sup> and has a unique cognitive, physiological and behavioural profile. It begins in the brain, where the three key players are the amygdala, the prefrontal cortex and the hypothalamus.



The **amygdala** is the brain's fear centre (technically *amygdalae* because we have one in each hemisphere of the brain). Its job is to scan the environment for threat and to make a big noise when it finds one. Think Chekov – the security officer in Star Trek. In evolutionary terms, the amygdala is a classic. It belongs to part of the brain we share with all complex vertebrates (the limbic system, which is heavily involved in emotion, attention and memory<sup>2</sup>) and its goal is to keep us safe. Like any good security guard, the amygdala is always on and its response is immediate and powerful. The amygdala has strong links to brain circuits that control attention, very helpful for effective threat detection.



The **prefrontal cortex** is a (relatively) new innovation. Located at the very front part of the brain (right behind our forehead), it's what makes us unique among species. The seat of rationality, it allows us to plan, make decisions, resist temptation, and direct our attention ('executive control' functions). Basically, our inner Spock.



The third character in the brain's stress response is the **hypothalamus** (another limbic system component). This is the brain's command centre; it's Captain Kirk. It communicates with the rest of the body through the autonomic nervous system (which is more exciting than it sounds and absolutely fundamental to a proper understanding of stress and anxiety; see **Box 1** for more).

### Threat analysis

The balance of power between Chekov and Spock dictates how far stress knocks us off our game and how well we can control our emotions. There are dynamic, reciprocal connections running between the amygdala and the prefrontal cortex that function like a two-way street. When the amygdala detects something it *thinks* is a threat (a lion, an oncoming Domino's moped), it sends an urgent telegram to the prefrontal cortex. The prefrontal cortex critically examines the threat message, comparing it with similar situations we have experienced in the past that can guide us on how to respond. If the threat is deemed benign, the prefrontal cortex sends a return telegram standing the amygdala down. The other functions of the prefrontal cortex (impulse control, decision-making, attentional control etc)

are deprioritised during threat assessment. This is why it's so hard to keep your focus away from the fridge and on your work when you're stressed.

### Fight-or-flight

While Spock is mulling things over, Kirk takes immediate action in readiness for battle as soon as Chekov raises the alarm. Activity in the amygdala triggers the hypothalamus, which in turn sets off a cascade of chemical and physical reactions designed to help us deal with the threat (adrenalin floods our body, our heart beats faster, our blood pressure goes up, we breathe more rapidly, our mouth goes dry; see **Box 1**). When the prefrontal cortex sees that the potential threat has passed (or declares it friendly), our systems return to normal.

### No OFF switch

The problem with the pandemic is that there's no obvious on or off point for our threat switch. It's not like a lion walking inches from your jeep on safari. We can't see the virus so it's not clear when we should be scared. Walking along the street, everyone's the enemy. We have no comparable situation to help us evaluate this one so we don't know when to relax. And on top of everything, we have access to perpetual news and social media – which stress our system the same way encountering Mufasa would. Considering all of this, stress and anxiety are an entirely natural response to a very unnatural set of circumstances.

## A GLASS HALF EMPTY

There's another feature of the way our system is configured, which contributes rather unhelpfully to our stress reaction to the pandemic. Because staying alive is more important than, say, playing Canasta, our brain is innately biased to the negative. This explains why, of the 668 words we have to describe emotions in the English language, 62% are bad. Or why our attention is pulled like a magnet to the D among a sea of As and Bs on a school report card. Essentially, our brain is like Teflon for good and velcro for bad. This is why it's so easy to lose hours panic scrolling through updates on social media and constantly refreshing the newsfeed for the latest stats. During Covid-19, hypervigilance and our innate negativity bias team up to make the headlines even more tantalising than usual.

## THE TAIL WAGGING THE DOG

In better news, it's not just emotions that influence our bodies. Evidence from all directions shows that the relationship between the mind and body is two-way: one can influence the other. (Actually, the latest thinking argues that there is no separation between mind and body because nothing happens in the mind without a corresponding physical change in the brain.)



One recent study in this area asked volunteers to hold a (horizontal) chopstick between their teeth, forcing their mouth into a smile, as they carried out different stressful tasks (plunging their hand into a bucket of ice water, using their non-dominant hand to trace the path of a little light reflected in a mirror). Those forced to smile had lower recovery heart rates compared to volunteers who had neutral facial expressions during the tasks.<sup>3</sup> Eliud Kipchoge's trademark smile during the final stages of a marathon is a great demonstration of this 'grin and bear it' method in action. Several other studies report that people find things funnier if they're forced to smile (using a version of

the chopstick technique) while they rate them.<sup>4</sup> In short, we don't just smile because we're happy, we are happy because we smile.

Amy Cuddy's famous power poses are another example of this simple body-mind hack. After a few minutes sitting or standing in a classic alpha-male pose, participants recorded more testosterone, less cortisol and greater feelings of power and confidence.<sup>5</sup> (There have been replication issues with some of Cuddy's original findings, but this 'fake it til you make it' technique still holds appeal and her TED Talk remains one of the most popular of all time.)






These examples of 'somatic feedback' or 'biofeedback' effectively use changes in physiological activity in order to improve health and performance. Truly understanding the relationship between brain and body (emotions and behaviour) can give you much greater power over the way you feel. Put simply, change your body, and you can change your mind.

## HOW TO CONTROL THE STRESS RESPONSE

Most people want to change the way they feel, but they don't know how. Here, we explain a number of **emergency protocols** you can use to deal with moments of acute stress. These are a mixture of cognitive and behavioural strategies, borrowed from ancient wisdom, modern medicine and extreme athletes. The next paper will cover tried and tested methods to adopt as regular practices to reduce baseline stress.

WHAT?	WHEN?	WHY?
 <p>→ <b>Autoregulation</b></p> <p>Navy SEALs are taught several powerful habits to survive the toughest experiences. One is a simple but effective breathing exercise. All you do is inhale for six counts, hold for two, then exhale for six – and repeat three times. There are lots of variations out there on this type of breathwork (e.g. breathe in for 7 and out for 11; slow your breathing to 6 breaths a minute), all with the same goal and effect of calming us down.</p>	<p>This technique can be used anytime, anywhere and is great for crunch moments.</p>	<p><b><i>This seems too easy. How can it possibly work?</i></b></p> <p>Breath is the master key to controlling the fight-or-flight response. Looking at the list of bodily functions the sympathetic nervous system controls (heart rate, digestion, breathing rate, pupillary response; see <b>Box 1</b>), breathing is the easiest – and possibly the only – one we can consciously influence. Using the magic of biofeedback, if you slow your breathing, the rest will follow. Breathing is the main component of any treatment for panic attacks for this reason, and it's no coincidence that many meditation practices focus on breath.</p> <p>As an added benefit, this method uses up our brain's limited RAM (working memory) with counting and focused attention, so there's no space in our head for worrying thoughts.</p>
 <p>→ <b>Put it down on paper</b></p> <p>Instead of having worries running constantly in the background, why not do a proper job of it? Another highly recommended stress reduction strategy is to sit down and write out all of the thoughts that are looping round in your head.</p>	<p>This strategy is handy when you find it hard to focus because worries keep hijacking your thoughts.</p>	<p><b><i>That sounds like a terrible idea! Why would I do that?!</i></b></p> <p>Intuitively, articulating your worst fears may not seem like the best way to get them under control. But research shows that it works, using the amygdala-prefrontal cortex circuitry.</p> <p>In a study looking at academic performance for example, students who wrote about their anxieties for 10 minutes before an exam scored significantly higher on the paper than those who prepared in the usual way.<sup>6</sup> Similarly, when arachnophobics verbalised their fears while they watched live spiders, their physiological measures of stress reduced.<sup>7</sup> Brain imaging studies show that labeling negative emotional experiences in this way activates the prefrontal cortex and reduces activity in the amygdala – with corresponding changes in physiology and self-reports of distress.<sup>8</sup></p> <p>Putting your worries down on paper forces you to finish the thought, which helps burn it out. Very often, it also reveals how extreme / unlikely / disproportionate your worries really are, which takes away their power – like shining a light on a shadow.</p>

WHAT?	WHEN?	WHY?
 <p>→ <b>The power of now</b></p> <p>Another Navy SEAL habit is to focus intently and exclusively on the task at hand. This means narrowing your attention to the one thing you are doing: reading this paragraph, writing the next sentence. No thoughts of what else you need to do today, what's for lunch, what someone might be thinking.</p>	<p>This is another good one when you're struggling to focus.</p>	<p><b>Why does this have any effect?</b></p> <p>Most anxious thoughts involve us playing out terrible (theoretical) scenarios in our head. Usually, it's thoughts about what might happen in the future; other times it may be agonising over things that have happened in the past.</p> <p>All of this effectively takes us away from the present. What's really so bad with reading this paragraph or writing that sentence? Ruthlessly narrowing your focus to the right here and right now puts a stop to catastrophising anxious thoughts and awful "what ifs?".</p> <p>It also means you focus on the things you can control rather than the things you can't, which is balm for the anxious mind</p>
 <p>→ <b>Aerobic activity</b></p> <p>When it comes to stress, exercise is a no-brainer. The best kind is aerobic – one that recruits large muscle groups rhythmically and repetitively (walking, jogging, cycling). A bit like muscular meditation.</p>	<p>If you find yourself stuck ruminating in anxious thoughts, exercise is a brilliant circuit-breaker.</p> <p>Regular exercise also works to lower background levels of stress over time.</p>	<p><b>I know there's loads of evidence that exercise is meant to be good for mental health. But why does physical stress relieve mental stress?</b></p> <p>Exercise works on several levels to tone up the mind as well as the body. It kicks the parasympathetic nervous system into gear, reducing those nasty stress hormones, adrenalin and cortisol (see <b>Box 1</b>). This is why you don't feel scared when you are running.</p> <p>It also stimulates natural pleasure chemicals like endorphins, which are great for boosting mood and help explain the otherwise unfathomable 'runner's high'.</p> <p>Exercise also helps us indirectly by improving sleep, which serves a vital function in improving emotion regulation and mood.</p>
 <p>→ <b>Control panic scrolling</b></p> <p>Making simple changes to the way you consume the news can have huge positive effects on mental health. For example, only check the news two or three times a day; limit the amount of time you spend scrolling; only go to reliable news sources. Keep first thing in the morning news-free (cortisol is already spiking then anyway). Lose 10 points for reading the headlines last thing at night because of the detrimental impact on sleep.</p>	<p>Whenever you find yourself panic scrolling (plus first and last thing).</p>	<p><b>It's hard to be disciplined about this. Why should I do it?</b></p> <p>Well, as we've seen, our brains interpret the avalanche of pandemic-related information as a threat, so the news itself triggers the fear-stress pathway. If we control our behaviour by being very intentional about when and how we are exposed to stressful news sources, we limit the amount of time we are thrown involuntarily into fight-fright-freeze.</p> <p>There's a balance here in that news (from the right places) gives us some certainty about what's going on today. Very few of us need to hear about the news in real time though and, at the moment, there's arguably even less happening that actually impacts our day-to-day life. Taking news apps off your phone is an effective way to reduce ease of access to your supply.</p>

As with any complex system, there are lots of levers we can pull in the mind and body that will adjust our stress levels. Adopting a combination of these is likely to work best to boost our resilience during the pandemic.

The methods outlined above are well suited to use in an emergency – when ruminating thoughts loop round and round, and focus has gone out the window. The next paper will explore important foundational practices (like meditation and good sleep) we can use on a regular basis to shift our baseline stress down in the direction of normal.

## NOTES

- <sup>1</sup> There is some debate over exactly how many emotions are truly universal but the core include happiness, sadness, fear, anger, disgust and surprise. Dr Paul Ekman has dedicated his life's work to this field.
- <sup>2</sup> LeDoux, J. E. (1995). Emotion: clues from the brain. *Annual Review of Psychology*, 46, 209-235; LeDoux, J. E. (2000). Emotion circuits in the brain. *Annual Review of Neuroscience*, 23, 155-184.
- <sup>3</sup> Kraft, T. L. & Pressman, S. D. (2012). Grin and bear it: the influence of manipulated facial expressions on the stress response. *Psychological Science*, 23, 1372-8.
- <sup>4</sup> Strack, F., Martin, L. L. & Stepper, S. (1988). Inhibiting and facilitating conditions of the human smile: a nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology*, 54, 768–777.
- <sup>5</sup> Carney, D. R., Cuddy, A. J. C. & Yap, A. J. (2010). Power posing: Brief nonverbal displays affect neuroendocrine levels and risk tolerance. *Psychological Science*, 26, 1363-1368.
- <sup>6</sup> Ramirez, G. & Beilock, S. L. (2011). Writing about testing worries boosts exam performance in the classroom. *Science*, 331, 211-213.
- <sup>7</sup> Kircanski, K., Lieberman, M. D. & Craske, M. G. (2012). Feelings into words: contributions of language to exposure therapy. *Psychological Science*, 23, 1086-1091.
- <sup>8</sup> For example, Hariri, A. R., Bookheimer, S. Y. & Mazziotta, J. C. (2000). Modulating emotional responses: effects of a neocortical network on the limbic system. *Neuroreport*, 11, 43-48.



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**Cortex Capital is running training webinars on how to manage stress and mental health during lockdown. Get in touch to find out more at: [info@cortexcapital.org](mailto:info@cortexcapital.org)**