

THE HEART(BEAT) *of* BUSINESS

*Positioning Heart Rate Variability
as a Competitive Advantage*



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Other Books by Matthew S. Bennett

Heart Rate Variability: Using Biometrics to Improve Outcomes in Trauma-Informed Organizations

Connecting Paradigms: A Trauma-Informed and Neurobiological Approach to Motivational Interviewing Implementation

Talking about Trauma and Change

Trauma-Sensitive Early Education: Helping Pre-School and Elementary Students Thrive!

Other Books by Inna Khazan

Biofeedback and Mindfulness in Everyday Life: Practical Solutions for Improving Your Health and Performance

The Clinical Handbook of Biofeedback: A Step-by-Step Guide for Training and Practice with Mindfulness

Mindfulness, Acceptance, and Compassion in Biofeedback: A Book of Readings

Evidence-Based Practice in Biofeedback and Neurofeedback

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We dedicate this book to all the HRV nerds and early adopters of innovative technology. For those we have met, we love you, and we cannot wait to meet the rest of you!

Foreword

“Hey Jeff, I have a crazy idea. You free for lunch tomorrow?”

On a beautiful and sunny day in Denver, Colorado, in July 2019, I first learned about heart rate variability or HRV. Matt Bennett had invited me to lunch to ask my opinion on a concept floating around in his brain.

As a tech-industry veteran who has helped numerous small software companies grow, I immediately started to see the potential in his description of HRV. Over three hours that day at “lunch,” Matt conveyed the undeniable science behind HRV; his frustration about the current application of HRV; his belief that everyone should care about HRV, not just athletes; and his vision to bring HRV into the helping professions. I had no idea the journey on which Matt and I were about to embark.

Almost exactly twenty years before this lunch, I first had the good fortune to become acquainted with Matt. We were both young, idealistic twenty-somethings who were long on ideas but short on experience. In our first few encounters, which were purely social in nature, I was impressed by several things about Matt. His passion and energy struck me first, as they are apparent from the very first conversation you

will have with the man. His energy is infectious and genuine, and frankly, a trait that still makes me a bit envious. So of course I said yes to his invitation to lunch, crazy idea or not. Lunch with Matt is never dull.

Beyond his passion for work and life, his intelligence and constant drive to learn struck me next. As the years of our friendship grew, I followed Matt's career as an executive in the social services, health care, and educational fields. Instead of being satisfied by his accomplishments at such a young age, he focused more on providing better care for clients and improving the culture of his programs. As his passion and interest grew, he figured out a way to fit an MBA program into his increasingly busy schedule.

It did not surprise me to find Matt early on in his HRV learning curve already thinking about how this science could help those struggling to heal from trauma. As a trauma therapist, Matt said that he always felt like a physician whose patient comes in complaining about severe pain in their leg, but he had no access to an X-ray to diagnose and treat the condition effectively. It bothered him that he had no way of measuring how someone's trauma affected their nervous system. Matt's greater frustration was that without such a tool, he could not measure the effectiveness of his interventions to help heal the neurobiological injuries left over from traumatic experiences.

Matt's frustration started to turn to excitement after a series of episodes on his *Trauma-Informed Lens Podcast*. His fellow podcaster, Curt Mower, brought up the idea of doing a series of shows on something called heart rate variability or HRV. As the person who organized most of the topics for the podcast, Matt was happy to hand over the reins for a few weeks. Even after reading hundreds of books on trauma, the

brain, and health, he had very little knowledge about HRV. As Curt, Matt, and their fellow trauma expert Jerry Yager progressed in the series, I could hear Matt starting to see the potential in this science, which uses the slight variation between heartbeats to provide powerful insight into the health of the brain and nervous system. It became clear that HRV provided Matt the X-ray-like tool he had desperately needed for the last twenty-five years.

As he explored with Jerry and Curt the possibilities of using HRV as a clinical tool, he also started to see its potential to quantify employee and business health. If interested, we republished these episodes in our *Heart Rate Variability Podcast*. Search for *Matt's Introduction to Heart Rate Variability* episode if you want to experience his growing passion firsthand.

As Matt does when something excites him, he became obsessed with reading everything he could about HRV and figuring out how to bring it to the helping professions. Although people discovered HRV centuries ago, its importance emerged in a handful of studies in the 1960s. Researchers began developing sophisticated algorithms to measure HRV from readouts of electrocardiograms, or EKGs. Each algorithm provided a unique way to capture the messages the heart is communicating about cognitive, medical, mental, and social health and wellness. In the decades since those original publications, interest and research in HRV have increased dramatically.

Quickly, I started to understand Matt's excitement for HRV as an incredibly powerful biometric. A question came up: if HRV is such a meaningful measure, why is it not utilized by every business, healthcare professional, and therapist? Even more so, why have so few people in these

fields even heard of HRV?

I quickly learned that this was why he had invited me to lunch. Historically, technological limitations prevented the widespread implementation of HRV as a daily biometric. Unfortunately, until recently, taking someone's HRV required them to use an expensive EKG with a computer designed to run the complex algorithms that turn the heartbeats on the EKG into an HRV score. Due to the complexity and cost of the machinery, HRV existed primarily in research laboratory settings, limiting its usefulness as a practical tool (Gentleman, Hornick, & Parmigiani, 2017).

In the past few years, smartphone technology, using the phone's camera or an inexpensive Bluetooth HRV reader, drastically reduced the cost of taking accurate HRV readings. These readers brought HRV out of the laboratory setting and into the hands of individuals, allowing people to take measurements whenever and wherever they wanted. In just a few years, HRV went from an expensive and challenging-to-access measure to a practical and inexpensive tool for individuals and professionals.

Next, Matt started exploring existing HRV smartphone apps. He was very impressed with some of the available applications. However, most existing apps focus on helping elite athletes maximize physical performance and recovery. Matt could not find any that met the confidentiality standards or functionality that would allow HRV to become a clinical or human-resources tool for those in the fields in which he worked.

Now we get to where Matt's passion for learning and making the world a better place brought him into my domain of technology. The opportunity to apply technology to

revolutionize an industry is rare and both exciting and daunting at the same time. When Matt initially approached me with the concept of using HRV for helping and healing organizations, I was taken aback by the potential. While I was new to the field, I quickly saw the ability to apply HRV within these organizations as a game-changer and a potentially lifesaving concept.

The more I learned about HRV, the more excited I got. As we finished lunch, I entirely bought into the prospect of helping organizations leverage HRV-based technology to provide better care, achieve improved outcomes, prevent self-harm and relapse, and support their employees' health along the way. It became apparent that we needed to develop the technology to bring HRV to the helping and healing arena.

Eight months after that fateful lunch, the Optimal HRV app launched in March 2020. While Matt and I ran the technology startup playbook step by step for a successful launch, no one predicted what happened next. The day we officially launched the app, the world shut down because of COVID-19. Organizations set up to implement the Optimal HRV app shifted funding quickly to surviving the public-health and financial crisis that hit the social-service and healthcare professions particularly hard.

Every start-up understands that even the best strategic plans will evolve and pivot over time. The pandemic forced us to take what we started to term a strategic pause. While few of our initial clients could focus on anything but survival, Matt and I took this opportunity to address the knowledge gap surrounding HRV. Due to historical, technological, and cost barriers, the few books written on HRV focus more on complex algorithms than practical day-to-day applications. Most of the science on HRV stayed in journals or technical

books few people ever read.

With time on our hands, Matt published his fourth book, *Heart Rate Variability: Using Biometrics to Improve Outcomes in Trauma-Informed Organizations*. We also launched the *Heart Rate Variability Podcast* in the Spring of 2020. These two efforts connected us to the world of our fellow self-proclaimed “HRV nerds,” who share our passion and see the possibility in HRV.

Besides working to fill the knowledge gap surrounding HRV, we also used the strategic pause to build a fantastic team. We asked a former colleague of mine, Ben Riley, to come on as our Chief Technology Officer toward the end of 2020. Ben immediately brought Vivian Lobo on board to help with further developing the technology and Amy Hanwell to assist with marketing. Their passion and drive continue to improve the app and help us reach a larger audience.

While we will never forget our March 2020 launch as halted by the most significant public-health crisis in recent history, another date has incredible importance for Optimal HRV. Matt had heard Dr. Inna Khazan’s interview on another podcast. Dr. Khazan had recently published her excellent book *Biofeedback and Mindfulness in Everyday Life: Practical Solutions for Improving Your Health and Performance*. Matt immediately ordered her book and reached out to Dr. Khazan before finishing Chapter 2. They scheduled their first call for January 6, 2021.

I will not soon forget my call with Matt later that day. A mob had taken over the United States Capitol Building; yet, in one of the craziest days in U.S. history, a new possibility emerged for Optimal HRV. “A faculty member at Harvard Medical School and one of the world’s foremost experts on

HRV biofeedback and mindfulness is interested in joining our team!”

One of Matt’s frustrations that led us to develop the HRV app is that few folks in the space returned his inquiries about helping get the technology for those experiencing homelessness, foster families, those struggling with addiction, or those with other social issues. On that day, we could not predict the future of our country, but we knew our ability to help people through HRV took a huge step forward.

As I started to read *Biofeedback and Mindfulness in Everyday Life*, I saw the reason behind Matt’s excitement. Initially, Optimal HRV focused solely on tracking HRV. You will read throughout this book why tracking is so crucial. Integrating Dr. Khazan’s work on HRV biofeedback and mindfulness allowed us to help our users to not only track but to improve their cognitive, medical, mental, and social health. Besides her brilliance, Dr. Khazan became an integral part of the Optimal family.

A few months later, Dr. David Hopper reached out to us after finding the *Heart Rate Variability Podcast*. I had heard from Matt several times that some of the best, most practical information on HRV came from chiropractors. Dr. Hopper’s interest in HRV evolved from his holistic and person-focused approach to health and wellness. It only took a few calls with Dr. Hopper to realize we needed to add him and his passion to our team. Dr. Khazan and Matt bring their strong expertise in mental health; Dr. Hopper brings the same expertise in medical and physical wellness.

After the publication of Matt’s book, we started to notice something unexpected. While most in the helping and healing professions struggled to survive the pandemic,

business leaders began reaching out. They read *Heart Rate Variability* and wanted to measure our interest in bringing the science into the corporate setting.

While the focus on helping organizations drives our passion, helping to improve the health of people and communities is our mission. When developing Optimal HRV for the medical and mental-health professions, we needed to create a HIPAA (Health Insurance Portability and Accountability Act)-compliant system to monitor their clients and patients and protect privacy. In doing so, we also created a perfect tool for leaders and managers to monitor the cognitive, medical, mental, and social health of their people.

I had to sit back and laugh as we started these conversations with business leaders. They all said they loved the book and tried to convince Matt that HRV could make a massive difference in the corporate world. I found this humorous because it is nearly impossible to find someone who has read more business and leadership books than Matt. It was great to find passionate folks in the business world who could quickly translate Matt's focus on helping and healing professions into their corporate environment.

We started joking with Matt that he needed to write an HRV book targeted toward business leaders. It did not take long before he sent us the Table of Contents for this book. As someone who has spent my career in the high-stress world of technology start-ups, I am so excited to get this book out into the world. The business world needs to wake up to the vast amount of research on the connection between stress, burnout, and outcomes.

In this book, you get Matt's expertise in stress and mental health that resulted in four previous books and a

career spent talking to and training thousands on how to help others. You also get to see how he translates this expertise into the corporate setting, showing companies how to improve people's wellness to maximize outcomes. I am also excited that Dr. Khazan and Dr. Hopper bring their knowledge to this book. They further our understanding of how the physical and mental health of our workforce is crucial in accomplishing a company's strategic goals.

Because of HRV, therapists like Matt and Dr. Khazan no longer need to feel like a physician without an X-ray. In the same way, those in the business world no longer need to guess about the health and wellness of their people. HRV and the understanding of how wellness and burnout affect our bottom line can help innovative leaders achieve a substantial competitive advantage.

Introduction

Take a minute to imagine the future of your business. What does it look like? How does it feel? What has changed? What are people doing to ensure success in this future?

For most businesses, envisioning the future means thinking about new ways to integrate and utilize technological advancements. Even with developments in artificial intelligence, deep learning, automation, and computing power, people still lie at the center of every business. Business success always has and will continue to rely heavily on their people's collective cognitive ability and interpersonal skills in order to meet customer and market demands. The problem for many leaders is that it is challenging to quantify cognitive and relational capacity and readiness to perform.

Recent technological advancements now allow leaders to include monitoring the cognitive capacity and mental health of their workforce as part of their future vision. Next time you are in an office building, on a bus or train, or in a restaurant at lunchtime, notice people's wrists. You will see smartwatches gathering and analyzing biometrical data, such as heart rate and movement.

Few doctors in the history of medicine have had more health information on their patients than these watches, the smartphones they synchronize with, and the companies that manage the data. These tech companies analyze data on every heartbeat, spoken word, and breath. As biometric hardware and software advances, people will gain increased insight into their health.

Most business leaders possess some notion that stressed or burned-out people struggle with efficiency and productivity. “How are your people doing right now?” Historically, this question was difficult, if not impossible, to answer. A survey can only give limited data at the specific point of time when someone fills it out. Business leaders have had to rely on anecdotal observations or gain insight through missed targets and unacceptable business outcomes. We now live in a world where an inexpensive device or a watch that many already wear on their wrist could provide business leaders with quantitative and accurate information about people’s intellectual and emotional health.

Think back to that vision for the future of your business. Are people in this future engaged and excited about their work? Do they possess the intellectual capacity to solve complex problems and overcome challenges facing the business in evolving future markets? Are they mentally healthy enough to engage effectively in a vibrant business culture and to support and engage customers?

Business leaders find themselves in a fascinating place in history. New and inexpensive technology provides users with incredible cognitive, mental, medical, and social health data. Business outcomes require healthy, engaged people. Yet few business leaders currently get access to this crucial data.

We wrote this book to address this issue and give our readers a chance to gain a competitive advantage. As technology and comfort with biometrics continue to advance, more businesses will utilize measures like heart rate variability as a business metric. Today's leaders find themselves in a unique position, with an opportunity to become early adopters and achieve an advantage over competitors by maximizing the potential of their people.

As many business leaders already know, healthy and engaged people achieve better business outcomes. Burnt-out people achieve less-than-optimal outcomes, cost the business money, and hurt its culture and morale, pulling other people's performance and motivation down with them. Biometrics helps leaders understand the health of their people, documents the positive or negative effects of human resources and other initiatives, and provides an early warning to more significant issues.

In this book, we focus on one specific biometric, heart rate variability or HRV. It will become apparent in Chapter 1 as to how this biometric provides leaders with a tremendous amount of crucial information on their business. Before jumping into this exciting science, let us address the elephant in the room right up front.

As with most technological innovations, biometrics comes with ethical dilemmas for early adaptors and innovators. By its very nature, biometrics is personal data. This data provides leaders with crucial information on the health and productivity of their people. However, do people trust leadership and the company enough to share this data? Those who get daily information on their people's cognitive and emotional health possess a clear strategic advantage over those who stay in the dark.

Our excitement for the power of biometrics and HRV led us to engage friends and other professionals we respect around the vision that resulted in this book. The most common response we heard from people, the majority of whom had never heard the term heart rate variability before the conversation, was “I would never share that information with my boss!” Many in leadership positions agree, “My people would never share that information with me.”

We look at their wrists and respond, “You know you are currently providing that information to the big tech company behind that device every second of the day and night.” At this point, some people sit back and think. A couple remove their watches and examine them. Others quickly respond that they trust their boss and business far less, even though they do not trust big tech very much.

Our follow-up question is equal parts entertaining and insightful. “Well, what if your boss gave you a \$50 gift card to your favorite coffee shop every month if you shared the information?” The person often smiles as they think about free coffee, “Then I would not have any problem.” Some others, those without a caffeine addiction, would share it for a hundred or two off their healthcare premiums. In our conversations, we find few people would give their biometric information to their employer for free, but almost all would provide it for a few cups of coffee or a hundred dollars a month off their healthcare costs.

These conversations put forth a challenge to implementing biometrics in a business environment. Some of these challenges should dissipate with time. We freely hand over our Social Security card, birth certificate, and all the other information needed to take out mortgages and credit cards in a person’s name upon starting employment. Few people

hesitate to share this very personal information.

Biometrics tracking will only increase in the next decade. In businesses where people do not feel comfortable sharing data, the strategies in this book can still create a competitive advantage. For those implementing the Optimal HRV app, we can deidentify user information or create reports for businesses without names. This small step helps address most of the concerns raised when implementing the science and research in this book.

As biometrics becomes a regular part of people's lives, we predict this hesitancy will dissipate. The technology currently exists to make the following possible. A decade or two from now, this example will describe a typical day for many people.

Someone wakes up and checks the biometric data generated by their bed on their quality of sleep and energy level to start the day. Throughout the night, the bed communicated with their thermostat, aromatherapy device, and humidifier to create an environment for an optimal night's sleep.

Their toilet analyzes their waste to gain insight into their daily dietary needs, detect disease, and scold them for drinking too much wine the night before. They put on their shirt with biometric sensors placed strategically to measure heart rate variability, galvanic skin response (a marker of stress), and the content of sweat. Before leaving the house, they put on a smartwatch that tracks movement, air quality, and stress levels.

During their commute to work, sensors in the car seat measure alertness and stress level, suggesting relaxing music

when stressed and more upbeat songs if they need to wake up. At work, they put on a headset that measures stress through vocal tones. Between calls, they get feedback and suggestions on being more effective on the next call.

Their smartphone collects data from all these sensors throughout the day and provides recommendations for lunch based on their current stress levels. Later at the gym, the phone offers a suggested workout to maximize remaining energy while minimizing the risk of injury. Each exercise machine adds data to their biometric record.

At home, biometrics quantifies the family's discussion on, "How was your day today?" as parents monitor their children's stress levels and physical activity. To unwind, they play a video game customized around their biometric states, challenging them to adjust heart rate or breathing to get through the game's challenges. Finally, their bed sends a reminder through their watch that they need to end screen time, put on blue-light-blocking glasses, and pick up a book if they want to maximize sleep quality.

The technology to make this future vision a reality already exists as of this writing in 2022. This reality might excite some and seem like a dystopia to others. Regardless, human history with technology usually starts with fear before widespread acceptance. There is no evidence that biometrics will be any different.

The message to business leaders is that biometric information will become more prevalent and normalized in people's lives. It will give people the health data needed to help them live longer and healthier lives

Let us now address another dilemma in how leaders use biometric data. HRV allows the leader to predict the cognitive, physical, and emotional capacity someone possesses to succeed in their work. So, what happens when a person has had too many drinks the night before, did not get any sleep because of a sick baby, or got into an intense fight with their spouse? The leader has data showing they will not perform at their best today, but they still need to show up for their job.

As you will read in this book, we suggest that, in most situations, leaders should not pay too much attention to daily readings. The main problem with daily readings is that there are too many variables potentially influencing each reading, providing misleading information. Healthy but challenging activities such as a long run, a fast bike ride, or an extended fast can lower short-term HRV as the body recovers from the physical stress, making it seem like the nervous system is struggling. However, once the recovery is complete, HRV is likely to bounce back to the original baseline or possibly go even higher, correctly indicating an improvement in overall health.

Similarly, a few days of poor sleep, a fight with a spouse, or a few too many drinks on a Saturday night can also lower short-term HRV. While these lower scores may indicate some difficulty with self-regulation, these decreases are often temporary. It is difficult to determine the accurate trajectory and meaning of HRV just from a few days' worth of data.

As long as people show up and perform to expectation, these personal events are not the concern of leadership, as long as weekly averages stay relatively stable. While a daily score can predict productivity and effectiveness on the job, most people manage to perform consistently through one or

two days of lower scores, as the authors of this book can attest. Longer-term HRV averages are much more indicative of overall health and wellness, as they are less affected by the short-term variability and therefore serve as more effective leadership tools.

While the general rule is to attend to longer-term averages, there are a few situations where daily HRV monitoring allows the leader to offer additional support. For example, when a business is going through a particularly stressful event or transition, it may be helpful to attend to shorter-term trends to catch people who are struggling early on and offer support and aid in recovery. HRV provides an objective measure of the recovery process and allows the leader to gauge the effectiveness of the support and resources.

With daily HRV monitoring, the leader needs to work with people to decide how and when data is shared. Involving people in decision making helps to position HRV as a supportive wellness tool and avoids being punitive.

Furthermore, in certain occupations where lives hang in the balance, such as surgeons, construction workers, pilots, first responders, and police officers, significant drops in daily HRV might indicate a reduction in the capacity for effective decision making, physical agility, and the ability to read critical social cues. Leaders and their people should proactively strategize different interventions when these significant drops occur. Everyone should understand that any action taken after a considerable reduction in someone's HRV is based solely on safety considerations.

We admit that we struggle with the above suggestion, as we know leaders need these critical workers to show up for work and do their jobs. Most people want to work and often

feel guilty when health and psychological issues prevent them from showing up for their teammates and business. Leaders need to balance these considerations with the significant improvements to safety realized through thoughtful HRV monitoring. Daily readings might save lives if reductions in mental, cognitive, or social functioning put people at risk.

When using HRV to mitigate risk, the leader needs to ensure they use the information in a supportive way that avoids shame and stigma and protects the person's confidentiality. Just as daily HRV tracking helps leadership make crucial decisions on how personal or professional stress impacts people's safety and readiness, daily readings also track recovery and show when the person is safe to return to work. We highly encourage leaders who manage these high-risk positions to develop specific wellness plans that promote a collaborative approach for recovery while prioritizing safety.

Finally, leaders should never use HRV or other biometrics in a punitive way. No person should ever receive punishment for a drop in HRV. Providing HRV data to a leader puts people in a vulnerable position. The only way HRV becomes a successful management tool is when implementation supports wellness. The minute that HRV is used to shame or punish people is the moment it becomes useless. Loss of trust between people and their leadership will make HRV data less trustworthy, as many will stop taking readings or have someone else take their reading for them.

Chapter 1: HRV and What It Is

Measuring

The word “heart” gets thrown around a lot in the business world. We use “heart” to describe a resilient person going above and beyond for the company. A team might refer to a critical member as their “heart and soul.” The marketing department will use “heart” language or symbols to convince potential customers of their commitment to the environment, people’s well-being, or other social efforts.

Since human beings first started writing, they positioned the heart as the seat of wisdom, strength, compassion, and love. The development of modern neuroscience shifted this focus as it sought to explain emotions and intelligence by studying complex chemical changes in the brain. The heart got relegated to a supportive role supplying the brain with blood so it can do its magic.

Research and technology now challenge the view of the heart as just a pump. It turns out that our ancestors’ focus on the heart as the seat for human connection, emotion, and

wisdom was not misplaced. There is, in fact, much more to a heartbeat than just a reassurance that the body is receiving the blood it needs to stay alive. As people learn to listen to the heart's messages, they find fascinating information on the health and resiliency of minds and bodies, the wellness and productivity of their workforce, and the effectiveness of business practices.

Why Is Variation Healthy?

The mathematical definition of HRV is the measurement of the differences in time between successive heartbeats over a set period. Many people believe that the heart beats consistently, like a musician's metronome helping to keep a steady beat. However, hundreds of years ago, people discovered slight variations in the rhythms of heartbeats, giving us the term heart rate variability.

Heart rate measures the average number of heartbeats per minute. While a low resting heart rate is usually a measure of positive health, a higher degree of variability between beats over time demonstrates a higher level of cognitive, medical, mental, and social health and wellness. Simple math indicates that fewer heartbeats per minute provide a greater opportunity for the variation to occur. In most situations, a lower resting heart rate will correlate with a higher HRV (Billman, 2011; Kamath, Watanabe, & Upton, 2012).

Initially, it might seem counterintuitive that variation or inconsistencies in human physiology correlate with health and wellness. In an age of machines and technology, people

usually connect quality and performance with consistency and predictability. When a car, computer, or airplane operates in unpredictable ways, it results in anything from frustration to loss of life. In contrast, biology and psychology need the flexibility to adapt to changes in the environment and within the body. Heart rate variation is an indicator of that flexibility.

No one exists in a vacuum. People's environments change throughout the day; challenging them to adjust to stress, social situations, intellectual challenges, and physical activities to survive and thrive. Similarly, biological systems adapt to digest food, fight viruses, and sleep. Physical, psychological, relational, and intellectual success depend on our ability to respond to changing demands and tasks throughout the day.

Stress, Homeostasis, and HRV

The greater capacity people have for flexibility, the better they maintain homeostasis. Homeostasis is the body's ability to adjust, matching internal states to the demands of the environment. Primarily an unconscious activity, the ability to maintain homeostasis provides the physical energy, emotional regulation, and cognitive ability to succeed at work and in life. HRV measures a person's ability to maintain homeostasis as external or internal demands change.

Stress results from disruptions of homeostasis, requiring a physical, emotional, or cognitive response. This response creates a new internal state to match the demands of the environment and reestablishes homeostasis. People too often view stress as inherently harmful. Much of the stress

experienced throughout a typical day is favorable, something termed eustress. While eustress also challenges homeostasis, people perceive eustress as a motivator and believe their response will lead to positive results. Eustress gets people out of bed in the morning, brings their best self to work, leads them to read a book about HRV, and calls for them to be the best parents for their children.

Eustress plays a central role in engaging people and getting the outcomes needed for a business to thrive. The goal of stress management is not to minimize stress. Instead, leaders need to create strategies to use the right amount of eustress to increase motivation but also to address the job demands that result in unproductive and potentially dangerous stress.

This negative stress, or distress, occurs when the person cannot see the potential positive outcomes in a situation or feel that they do not possess the mental, financial, social, time, or other resources necessary to meet the challenge. The perception of the problem or event will determine whether they experience it as eustress or distress. If they do not find a way to manage distress, it will knock them out of homeostasis, leading to stress's negative emotional and physical consequences (Moore & Elliott, 2020; Siebert, 2005).

Several variables profoundly influence the perception of distress. First, distress increases when the situation is unpredictable, and the person feels they have little power to influence the potential negative outcome. Second, the negative consequences of distress increase if it persists for a long duration of time without the ability to eliminate the source of the distress. Third, if the outcome is important to them, they experience a higher level of distress. Things that people don't care about do not cause much stress (Rock, 2009).

Every leader needs to pay close attention to these variables. Nothing characterizes the modern business environment more than uncertainty. Due to technology, people are working longer and longer hours without ever disconnecting. This connectivity increases the duration of time in the typical workday, week, and year. It also increases people's exposure to the distressful aspects of work. Importance is often the most challenging variable. Caring about the outcomes of work drives motivation; however, if there is a great deal of uncertainty and a long duration of stress, this same level of investment results in burnout. Throughout this book, we will discuss strategies to manage these variables to minimize distress and increase eustress and motivation.

As distress increases, heart rate usually increases and HRV decreases, demonstrating a declining ability to maintain homeostasis. Allostatic load refers to increasing distress and the resulting declines in emotional regulation, physical energy, and cognitive functioning. When the cumulative allostatic load exceeds the ability to cope, the person experiences allostatic overload. Under extreme distress, allostatic overload becomes intense enough to create a trauma response.

HRV also measures the body's ability to recover after a period of stress. Whether it is the stress put on the body from a hard workout, an argument with a loved one, or a tough day at work, HRV will show whether the stress continues to affect the body negatively or if it is bouncing back. The ability to handle the allostatic load, recover from hardship, or turn stress into motivation for success is a beautiful definition of resiliency. HRV provides a scientifically validated measure of resilience in the face of work and life challenges.

Remember, the mathematical definition of HRV is the measurement of the differences between successive heartbeats over a set period. The tens of thousands of articles and books on HRV allow us to translate this science into a working definition. Throughout this book, our definition of HRV is the person's ability to handle or recover from stress. While this might sound very basic, there is a surprising amount of research on using this biometric to measure cognitive, medical, mental, and social health and wellness. There is also a lot of research on practices that improve HRV and overall wellness and job performance (Moore & Elliott, 2020).

The Cause of Variation

When someone experiences distress, their body immediately jumps into action to maintain or reestablish homeostasis. The nervous system evolved to unconsciously react to stress, providing the energy necessary to respond effectively. The nervous system contains bundles of nerves and specialized cells called neurons that transmit information throughout the body. The nervous system starts in the brain and moves down the spinal cord, eventually branching out to every part of the body.

Most of the biological changes needed to maintain homeostasis occur unconsciously or automatically. The autonomic nervous system controls blood pressure, body temperature, heart rate, digestion, and heart rate variability; its goal is to maintain homeostasis within the body and with the environment. Encompassing over 80% of the body's processes, the autonomic nervous system can use nearly the entire body to maintain homeostasis.

The unconscious nature of the autonomic nervous system keeps the lungs breathing, heart beating, and body temperature regulated without any conscious effort. While this system's automatic and unconscious nature keeps people alive, it can also react to distress before they can thoughtfully consider the consequences of the resulting behaviors. The autonomic nervous system sacrifices contemplation for immediate action, especially when people feel threatened or experience allostatic overload.

One way the autonomic nervous system maintains homeostasis is through the cardiovascular system, in which the heart plays a central role. If the environment demands an active response, the autonomic nervous system increases the heart rate, providing the body with the blood and oxygen it needs to respond. Once the stress subsides, the autonomic nervous system slows the heart rate back to normal and allows the person to recover.

Building on the working definition above, HRV measures the person's autonomic nervous system's ability to handle or recover from stress. Variation in heart rate manifests in the interaction of two parts of the autonomic nervous system, the sympathetic and parasympathetic nervous systems. These parts work together to promote survival and manage stress.

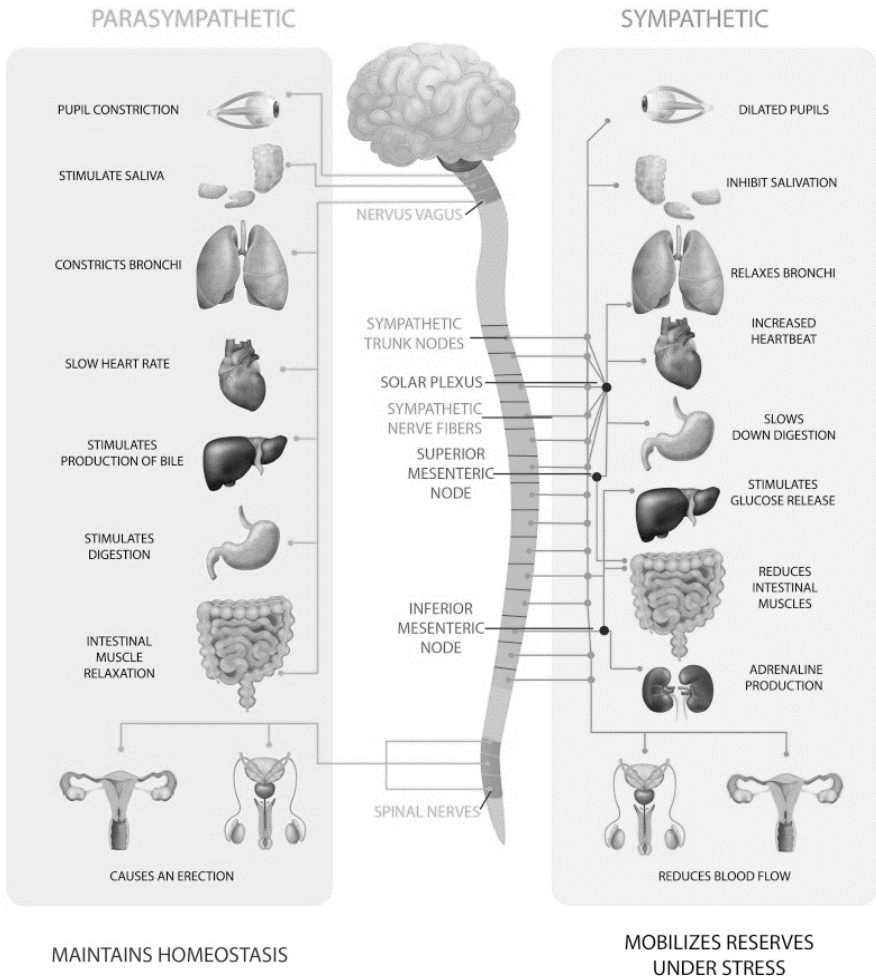


Figure 1: Autonomic Nervous System

Primarily located in the mid-spine region, the sympathetic nervous system mobilizes for action by providing energy through increased breathing and heart rate, as well as secreting hormones like adrenaline. When allostatic load is at a manageable level, the sympathetic system provides the energy needed to succeed throughout the day. During highly stressful events, the sympathetic nervous system takes over, allowing the person to escape the danger quickly, known as

the flight response, or to attack the source of the stress, known as the fight response. These intense reactions provide a short-term energy burst by shifting energy typically used for mental processes and digestion to maximize the ability to escape or fight a stressor (Ogden, Minton, & Pain, 2006; Seigel, 2011).

The parasympathetic nervous system conserves energy and decreases heart rate. This book will focus on the 10th cranial nerve or vagus nerve, central to the parasympathetic nervous system. “Vagus” comes from the Greek for wandering or vagabond. The vagus nerve winds its way from the neck to the face, through the upper chest and heart, and down to the gut. Central to the parasympathetic nervous system, the vagus nerve helps regulate heart rate, blood pressure, body temperature, digestion, immunity, respiration, and reproduction (Rosenberg, Porges, & Shield, 2017).

Cranial nerves start in the brain stem, located at the very bottom of the brain. The vagus nerve has two branches arising from separate brain-stem nuclei. The ventral vagus winds its way through the upper part of the body, specifically near the heart, lungs, throat, middle ear, and face. The ventral vagus is highly active when someone feels safe and in homeostasis. It promotes emotional regulation, calm, and the ability to engage with other people socially.

Under extreme stress, especially when the options of flight or fight are not available, the dorsal branch of the vagus nerve, or the dorsal vagus, takes over. Located primarily in the gut, the dorsal vagus starts to put the body in a low energy state, referred to as the freeze or shutdown response. During this response, heart rate, breathing, and mental processing all slow dramatically (Beauchaine, Gatzke-Kopp, & Mead, 2007; Breit, Kupferberg, Rogler, & Hasler, 2018; Porges, 2001; Porges, 2009).

The fight, flight, and freeze responses are extreme autonomic nervous system reactions to distress. The sympathetic nervous system and the vagus nerve are also active when someone is in homeostasis. The sympathetic/vagus dance, often termed vagal tone, creates the variation in heart rate measured by HRV.

In this dance, the ventral vagus slows sympathetic activation, which is known as the vagal brake. On the inhalation, the ventral vagus releases its brake on the sympathetic nervous system and allows the heart rate to go up. On the exhalation, the brake comes back on and the heart rate goes down.

Sympathetic activation is a normal reaction to short-term distress. Unfortunately, long-term chronic distress increases baseline sympathetic activation and weakens the vagal brake. Over time, an overreliance on the sympathetic response leads to anxiety-related disorders such as attention-deficit/hyperactivity disorder, post-traumatic stress disorder, phobias, and generalized anxiety.

Chronic stress and difficulty maintaining homeostasis might also lead to increased dorsal vagal activation. It is almost as if the nervous system recognizes the overload and, in the absence of conscious action to take a much-needed break, forces the body to slow down and take a break that way. As a result, the vagal nerve prevents adequate sympathetic activation, slowing the heart rate and decreasing the ability to take needed action. Long-term, increased dorsal vagal functioning can manifest as depression, feelings of stagnation, and relationship problems (Dana & Porges, 2018; Goldberger & Stein, 2017; Rosenberg et al., 2017).

A healthy autonomic nervous system relies upon a rhythmic dance between the sympathetic nervous system and the ventral vagus. When distress and burnout disrupt this harmony, the consequences are dire. As the autonomic nervous system struggles to maintain homeostasis, it begins to over-rely on either the sympathetic nervous system or the dorsal vagus. Over time, this imbalance increases the risk for mental, physical, social, and cognitive issues that can significantly impact health and productivity.

HRV and Medical Health

This book focuses primarily on the role of cognitive, emotional, and relational health on business outcomes. HRV provides a quantifiable measure of these aspects of success. While not the main focus of this book, HRV also measures medical health. A chronically sick person will struggle to perform at continuously high levels for the business, costing the business money when it comes to loss of productivity, insurance costs, and absenteeism. This section will review the science on the connection between the vagus nerve, HRV, and medical health.

A healthy autonomic nervous system and strong vagal brake promote a healthy immune system. One of the powerful weapons available to the immune system is a class of proteins called cytokines. If someone cuts themselves, cytokines are released and rush to the cut, creating inflammation, which helps stop the bleeding. Similarly, when a virus or infection is present in the body, cytokines go to work fighting off the disease.

Increased sympathetic activation as a reaction to distress or burnout also releases cytokines. The body releases cytokines to limit the impact of any injury that might result. While a sound survival strategy in the short term, over time, increased anxiety weakens the vagal brake, resulting in a constant release of cytokines. Too many cytokines in the body cause inflammation of the gut and brain.

Because the gut plays an essential role in immune function, inflammation inhibits an effective immune response. Inflammation in the gut also results in leaky gut syndrome. Leaky gut syndrome is an accurate description of this terrible condition. Inflammation causes cracks in the intestines. Waste in the intestines leaks into the body, creating various digestive and immune problems, including celiac disease, Crohn's disease, and irritable bowel syndrome (Nakazawa, 2016).

Besides the pain and discomfort caused by inflammation in the gut, the brain also inflames. Research is starting to demonstrate the connection of brain inflammation to a range of mental illnesses. Chronic distress and burnout can destroy psychological and medical health (Dantzer, O'Connor, Freund, Johnson, & Kelley, 2008).

Negative trends in HRV correlate with many disease risk factors, including hypertension, obesity, glucose intolerance, insulin sensitivity, and inflammation as a measure of immune functioning. Not surprisingly, significant drops in HRV correlate with nine out of the ten leading causes of death in the United States. These include heart disease, cancer, respiratory disease, stroke, Alzheimer's disease, diabetes, influenza and pneumonia, kidney disease, and intentional self-harm/suicide.

The only cause of death not correlated with a drop in HRV is automobile accidents. Some auto manufacturers started embedding HRV monitors in their seats. Since many accidents result from tired and stressed driving, this cause of death might soon get added to the list (Moore & Elliott, 2020).

The Brain, HRV, and Autonomic Nervous System

The brain physically and developmentally sits on top of the nervous system. While algorithms translate EKG information into a simple HRV score, this score reflects the cognitive capacity and emotional regulation of a complex brain. It is essential to understand how the brain and nervous system process information and distress and maintain homeostasis to better understand the information contained within an HRV score.

The human brain evolved to keep us alive and safe from danger. While some people are lucky enough to experience little threat to life or safety in a typical week, ancient people evolved in a much more dangerous time. Through millions of years of human evolution, humans got very good at neuroception, which refers to the primarily unconscious process of determining whether the environment is safe or dangerous.

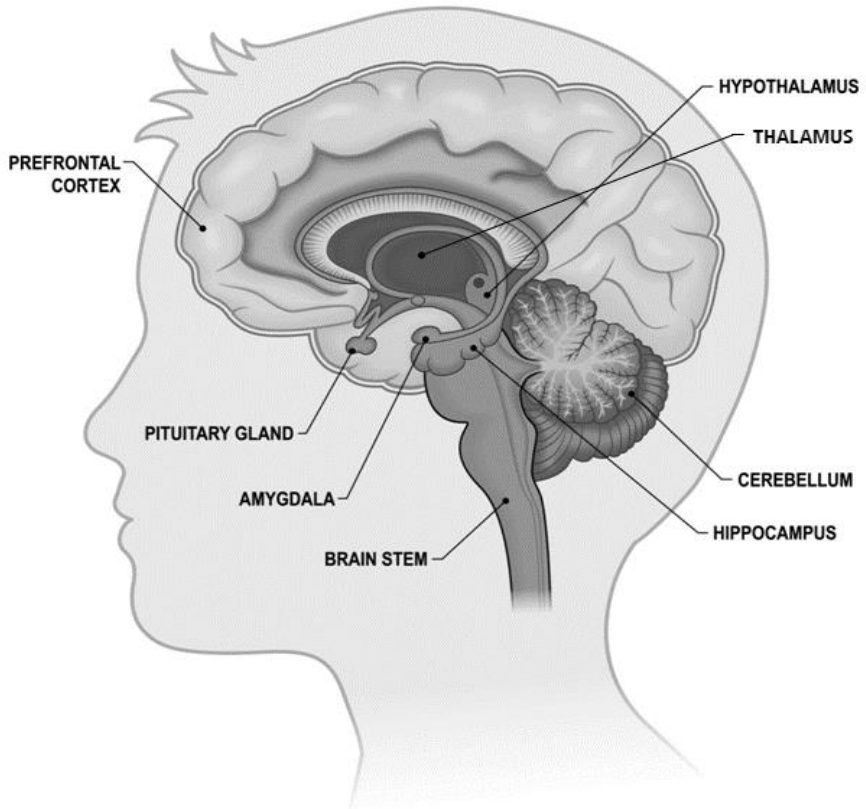


Figure 2: Brain

Neuroception incorporates the tremendous amounts of environmental information that the senses send to the brain. Around 80% of the nerve fibers connecting the brain to the rest of the body are afferent. Afferent nerves send information from the body to the brain, while efferent nerves send information from the brain to the rest of the body (Moore & Elliott, 2020; Porges, 2001; Porges, 2009).

The connection between the brain and the rest of the body occurs in the brain stem. The brain stem is often viewed as primitive and instinctual and gets animalistic labels like “reptilian brain.” However, like most other brain areas, the

more science learns about the brain stem, the more exciting and meaningful it becomes to our overall health and functioning.

The brain stem plays a central role in neuroception. As part of the autonomic nervous system and the origin point for the vagus nerve, the brain stem processes afferent information to maintain homeostasis. Much of the afferent sensory information passes through the brain stem to one of the central parts of the brain called the thalamus. The thalamus facilitates an interactive process among the brain's cognitive, emotional, and sensorimotor centers to decide which of two distinct systems, termed the “high road” and the “low road,” will handle the stimulus.

If the neuroception determines that the stimulus is not a threat and the environment is safe, the thalamus directs the information to the prefrontal cortex. The prefrontal cortex is part of the larger cortex, which is the wrinkled outer layer of the brain. It hosts a considerable number of essential functions and features. We will use the term “high road” to describe a stimulus processed by the cortex and prefrontal cortex, since they physically sit higher in the brain and manage more complex or higher functions (Goleman, 2006; Siegel, 2016; Wright, 2011).

The cortex provides meaning to stimuli by processing them through the lens of past experiences and related memories. If you have learned anything about the brain, your cortex is doing this right now. The information you are reading is being sent through your cortex and interpreted through the lens of your existing knowledge on the subject (Siegel, 2007).

Toward the front of the head lies the prefrontal cortex, which is primarily responsible for making humans great thinkers and planners. The prefrontal cortex is central to executive functioning, meaning it plays a significant role in managing reasoning, flexible problem-solving, planning, memory, and aspects of emotional regulation. The prefrontal cortex and vagal nerve operate as partners. Typically, increased prefrontal cortex activation corresponds to vagus nerve activation and a robust vagal brake (Khazan, 2019).

As a later stop on the high road, the amygdala, in collaboration with the hippocampus and brain stem, provides the emotional context for the stimulus. Emotions and feelings for things and people create a more profound experience of the world around us. High-road emotions play essential roles in motivation and mental health (Bennett, 2017).

A quick note about high-road functioning: The above description demonstrates the process in slow motion. In the time it took you to read the previous paragraphs, your high road has consistently been at work processing each word, as well as anything else going on in your environment. In this brief time, billions of high-road journeys occurred. Also, the high road takes up a tremendous amount of energy. While the brain only accounts for about 2% of overall body weight, it uses 20 to 25% of the oxygen and energy derived from food to maintain executive functioning (Rock, 2009).

The allostatic load can build gradually when the high road starts to experience distress in the environment. As allostatic load threatens homeostasis, the prefrontal cortex can recognize the distress and implement coping skills. These coping skills decrease distress, reestablish homeostasis, and maintain executive functioning. If increasing distress is not consciously managed or overwhelms available coping skills,

the amygdala starts to activate the hypothalamus, pituitary gland, and adrenal glands, also known as the HPA axis. The sympathetic nervous system kicks into action, with the HPA axis moving energy to the mid-spine area.

Under distress, the HPA axis and sympathetic nervous system release the stress hormone cortisol. If distress continues to build, the adrenal glands release adrenaline as well to even further intensify the stress response. Cortisol and adrenaline shorten the breath, increase blood pressure, and decrease HRV. The person is ready for action in this state, as energy shifts from executive functioning to the arms and legs. The drop in HRV demonstrates a decreasing capacity for cognitive functioning and social engagement (Dana & Porges, 2018).

Let's connect the above information on the high road in the brain with what we learned about the sympathetic nervous system and vagus nerve. The journey from the brain into the body begins at the brain stem. When neuroception senses safety, both the prefrontal cortex and ventral vagus become highly active. The brain applies executive functioning to the environmental situation, while the ventral vagus supports social engagement by activating facial muscles crucial to effectively communicating with others. The ventral vagus also applies the vagal brake to the sympathetic system, keeping the fight/flight response and anxiety at bay. The strong vagal brake on the high road manifests in higher HRV.

The high-road label also works for autonomic nervous system functions. The ventral vagus functions are primarily above the sympathetic nervous system in the mid-spine, and the dorsal vagus functions are mostly lower in the gut. As the allostatic load builds, the vagal brake weakens and activation moves from the prefrontal cortex and ventral vagus to the

mid-spine. The HPA axis and sympathetic activation prepare the person for a flight-then-fight response. If the sympathetic response does not return a neuroception of safety, the activation moves down to the gut for the shutdown or freeze response.

A simple analogy for the nervous system is a ladder. When neuroception perceives safety, the person is at the top of the ladder, corresponding with the prefrontal cortex and ventral vagal activation. As allostatic load builds, activation moves down the ladder, first to the flight rung, then to the fight rung, and finally to the freeze rung. As danger subsides, they move back up the ladder (Dana & Porges, 2018).

Distress is processed on the high road if not associated with an immediate danger through neuroception. While the high road can still activate flight, fight, and freeze responses, if the person experiences allostatic overload, it is slower. The high road provides opportunities for the prefrontal cortex to bring the growing distress into consciousness and apply coping skills to maintain executive and ventral vagal activation.

When neuroception detects extreme and immediate danger, the high road shuts down instantaneously, and a much shorter road activates to increase the chance for survival. While the amygdala sits toward the end of the high road, it plays a leading role on the low road. Instead of a gradual release of stress hormones, the amygdala immediately drops the person out of executive and ventral vagal activation. It moves down the ladder to the sympathetic nervous system. The sympathetic nervous system floods the body with cortisol and adrenaline, activating the flight and, if needed, fight response (Goleman, 2006; Ogden et al., 2006; Siegel, 2011).

In most situations, sympathetic activation will continue until the threat has passed and can lead to unusual strength and stamina levels. Sympathetic reactions lack executive functioning, as systems such as the prefrontal cortex cease to receive energy, thus maximizing the energy sent to the muscles and senses (Siegel, 2011).

If the flight-or-fight responses fail, the last option is to shut down. The dorsal vagus slows breathing and heart rate, and HRV decreases. During an intense shutdown or freeze response, the person can dissociate or lose connection to reality. This response limits the amount of physical or psychological pain felt during traumatic events but makes recalling or making sense of the experience afterward tricky or impossible.

The third survival response, shutting down, might become the default response of people who feel trapped and struggle to escape the danger. They have little physical, social, or economic opportunity or power to flee or fight back in these situations. The only way they endure is by shutting down, and in extreme cases, dissociating from the situation to survive physically and psychologically (Ogden et al., 2006).

Let's examine one last part of the brain that is essential in both high and low roads. On the low road, the hippocampus takes on a calming role. Once neuroception senses that the threat no longer exists, the hippocampus helps quiet the amygdala, allowing the high road to reactivate, and cognitive and social functioning return. A well-functioning hippocampus makes it possible to have a brief low-short road response, including fear or anger, but it does not allow these emotions to continue well into the future. As part of the high road, the hippocampus works with the amygdala to provide an emotional context to the stimulus. Also, the hippocampus

plays a significant role in creating new memories.

The nervous system and the mind it supports are complex. HRV measures all this complexity and summarizes it in a simple score. High HRV means people are doing a good job handling stress and are ready to bring their best emotional and cognitive selves to work. A low score means they are performing suboptimally within relationships and on intellectual challenges.

Window of Tolerance

The science of the brain and autonomic nervous system helps people grasp what HRV measures. The complexity of these systems sometimes makes it challenging to translate the science into everyday practical conversations about wellness and burnout. The cup analogy is another way to view the interaction between the high road and the low road and introduces the concept of the window of tolerance.

When people are on the high road in their brain and autonomic nervous system, they effectively manage their allostatic load. They are said to be inside their window of tolerance. They will exhibit behaviors related to the executive functions of the prefrontal cortex and the social engagement and emotional regulation of the ventral vagus. To simplify the complexity of neuroscience and bring the window of tolerance to life, we developed a simple cup analogy to help people understand how distress affects thoughts, feelings, and behaviors (Bennett, 2018; Ogden et al., 2006; Siegel, 2011, Stanley, 2021).

The cup analogy has two parts; the first is the size of the cup. The bigger the size of the cup, the more resilient someone is to the effects of distress, and the more stress it takes to go into allostatic overload. Factors such as healthy work culture, self-confidence, strong personal relationships, practicing mindfulness, healthy eating, and exercise increase the size of our cup. Conversely, long-term distress from burnout, financial struggles, a bad work environment, illnesses, and unhealthy relationships decrease the size of the cup. As a representation of the health of the autonomic nervous system, a large cup to manage stress will result in high HRV (Bennett, 2020).

Typically, the capacity of the cup stays consistent over time if we do not experience significant life changes. The exception to this rule is trauma. The overwhelming nature of trauma reduces capacity quickly, and if healing does not occur, it can keep capacity low over long periods of time. When people go through trauma at work, such as layoffs, bullying, harassment, or violence, leaders must ensure their employees get the support they need to recover or risk long-term decreases in cognitive performance and emotional stability (Herman, 1997).

It is just as important to support people who experience trauma in their personal life. Helping people heal from trauma is the right thing to do and an intelligent business decision. Someone carrying around the pain and suffering of trauma will struggle emotionally and cognitively until they get the help they need to heal. A business' investments in employee assistance programs that provide mental-health services to help people address trauma, burnout, and other struggles are an investment in the resiliency and performance of their people. The good news is that, if trauma heals, it results in increased self-confidence, resiliency, cognitive capacity,

relational health, and higher HRV (Siegel, 2011; Tedeschi & Calhoun, 2004; Van der Kolk, 2014).

The size of the cup represents traits associated with resiliency and robustness. Resiliency is a person's ability to recover from hardship; robustness speaks to their ability to bring the energy they need to succeed in life. HRV scores measure the ability to recover from distress and the available energy for the day's challenges and activities.

HRV helps translate cup size to an objective measure. Comparing a person's 30-day HRV average to population norms provides insight into their resiliency based on others in their demographics. They can then compare their 30-day average to their overall average to determine whether their cups have increased or decreased in size.

The second component of this analogy concerns the water in the cup. The water represents the amount of stress or cortisol in the body at any given time. As a measure of the effects of distress and allostatic load, HRV helps bring this analogy to life.

Taking an HRV reading and comparing the score to a 30-day or longer average helps show how much water is in someone's cup. A significantly lower HRV score versus these averages shows that their cup is filling up. This drop in HRV demonstrates their mind and body's struggle to maintain homeostasis in the face of distress and their risk of going into allostatic overload.

Ideally, when their cups start to fill, as measured by decreases in HRV, they realize that stress is building and apply coping skills like deep breathing, exercise, getting into nature, or talking to someone about their distress. Initially, the

distress increases heart rate and decreases HRV as the water fills the cup; then as they apply a coping skill, heart rate and HRV return to normal levels. During stressful times, an HRV reading provides insight into the mind and body's resiliency to distress in the environment.

The space between the top of someone's cup and the water level represents the window of tolerance. When someone has adequate space between the water level in their cup and the top, they are in their window of tolerance. Thinking and behavior are motivated, adaptive, safe, social, energized, and stable, indicated by the acronym MASSES. If MASSES describes a person's state, it is a strong indication that they are successfully managing allostatic load (Stanley, 2021).

When the allostatic load increases and starts to fill up their cup's capacity, people's actions become more rigid or chaotic. These responses are an effort to control the stressful situation before going into crisis. Some people react to stress by over organizing and managing their world, which indicates a rigid response (Siegel, 2016).

When in a rigid state, someone might start bossing people around or putting unrealistic expectations on themselves or others. They might also feel great anxiety or sadness when things get frustrating and do not go exactly how they want them to go. Another rigid response is obsessing or ruminating over something, even if it is not that important. When people are rigid, it is hard to think creatively, and they often automatically rely on behaviors used in the past, even if they have had negative consequences.

Leaders need to pay extra attention to their rigidity. Due to their power, when a leader's cup starts to fill, they

often begin to micromanage the processes and people they oversee. This rigid response shuts down creativity and innovation. As people become frustrated and anxious about their leader's rigid micromanaging, their cups start to fill up, negatively impacting their performance and morale.

The nature of the chaos response serves to create distance between the person and the cause of the distress filling up their cup. They often achieve this distance by yelling, threatening, or using intimidating behaviors or words. When a leader's behaviors become chaotic, it destroys trust and psychological safety, a term we will explore later. Their people shift their focus from performing for the business to strategizing on keeping themselves away from a chaotic leader. Even though they are just trying to get space, others experience the behavior as frustrating, counterproductive, and disrespectful (Siegel, 2011).

If distress challenges the cup's capacity, the person experiences allostatic overload. Now in a crisis, they operate in the sympathetic survival mode of flight, and if they cannot run away, they shift into the fight response. If they cannot escape or fight the cause of distress, the cup overflows and collapses in on itself. The result is the dorsal vagal freeze response.

People develop behaviors and strategies to survive and thrive in their work and business environments. Unfortunately, too many people live on the edge of their window of tolerance, learning to rely on rigid, chaotic, flight, fight, and freeze behaviors to survive their reality. Short-term HRV measures help track distress' impact in the present moment. Long-term HRV improvements demonstrate increased cup capacity, which should translate into motivation, adaptation, safe behavior, social engagement,

energy, and stability, all of which help them succeed in services and the larger world.

Chapter 2: Understanding Health and Wellness with HRV

Pearson's Law: That which is measured improves. That which is measured and reported improves exponentially (Hay, 2015).

Until HRV, it was challenging for leaders to gather real-time data on people's cognitive, medical, mental, and social health. In this chapter, we explore what HRV scores tell a leader about individuals and the collective workforce. While an HRV score is a specific number, putting that number in context provides businesses with crucial data on the cognitive capacity and wellness of their workforce.

States and Traits

Measuring states and traits that support performance and productivity at work is the most practical and powerful

use for HRV. Traits are long-term trends or patterns of psychological, physical, relational, and cognitive functioning. They describe a person's personality; their overall physical health, including chronic health conditions; how they function at work; and ways in which they problem solve and think about the world. Traits are a mix of strengths, talents, and weaknesses.

States include moods, physical sensations, cognitive focus, energy levels, morale, and motivation. Traits transcend the environment. Traits answer, "Who is this person?" States change as situations, stress, and challenges fluctuate throughout the day, as the body and mind work to maintain homeostasis. States answer, "How is this person doing right now?"

Initially, states allow a person to survive or thrive in certain situations. When specific behaviors or ways of thinking help manage short-term distress, maintain homeostasis, or overcome challenges, the person will use that state again when confronted with similar situations. Eventually, when repeated over and over, a state becomes a trait. While healthy states promote traits of wellness, distressed states might lead to unhealthy traits such as addiction, anxiety, disease, and social problems.

The science of how states evolve into traits is fascinating. Genes, brains, and nervous systems change throughout life to meet the ever-changing dynamics of careers, relationships, and other environmental demands. Epigenetics is the science of how DNA expresses itself differently to support the traits needed to survive or thrive in life and work. Neuroplasticity describes the flexible or plastic nature of brains and nervous systems that support the evolution and development of traits over time.

The critical thing to remember is that developing new traits requires time, practice, and patience. People's psychology, biology, and genetics take time to evolve and support new behaviors and ways of being at work and in the world. Creating healthy habits at work requires changes in DNA, brains, and nervous systems. The exciting news is that HRV is one of the best ways to measure improvements in states and traits of health and wellness (Lipton, 2006; Shenk, 2010; Wolynn, 2016).

Let's take a moment to think about states and traits in the business environment. We encourage you to grab a pen and paper, as it is worth writing down your answers to the following questions for later reference. You can also find these questions in Appendix 1. Answer the following with a particular focus on the positions you supervise.

- What traits does a person need to thrive in a specific job?
- What traits does someone need to succeed under the leadership of the team or business?
- What traits does a person need to thrive in the culture of a team and business?
- Are the traits someone needs to thrive in their job and culture traits that you would associate with a well-adjusted and healthy individual?
- How do you assess these traits when hiring or promoting someone into a new position?
- How do you support people in the development of these traits over time?
- What states do the jobs you supervise require for success?
- How do you support people in reaching and maintaining these states?

- What states do you expect people to reach without your support?
- Are the states that someone needs to thrive in their job the same states you would associate with a well-adjusted and healthy individual?

Using HRV to measure improvements in states and traits will continue as a theme of this book. Leaders should strive to create environments and strategies that elicit states and build traits in people that promote business success. HRV will help quantify a leader's success.

Using HRV and Individual Wellness

A single HRV reading results in a simple number or HRV score. In isolation, this score does not provide much information. However, as someone takes more readings, a story begins to emerge. This story reveals compelling information about their past and present, and helps chart a future path to improved health and job performance.

In HRV scores, one learns a great deal about a person's autonomic nervous system condition. As they track change over time, HRV provides people with feedback on improvement or declines in overall cognitive, medical, mental, and social health and wellness.

We will use Matt's readings from the Optimal HRV app as an example throughout this chapter. This book is not about Optimal HRV specifically; however, we need some specifics from the app to help understand the data we are interpreting.

When we developed the Optimal HRV app, we wanted to present the most reliable data possible. RMSSD, the root mean square of the successive differences, is the most common and best-researched measure of HRV. In Appendix 2, there is a list of other HRV algorithms for comparison. When someone says the term HRV without providing a specific algorithm, there is a good chance they mean RMSSD. To show the complexity behind calculating HRV, here is the equation used to calculate RMSSD from heart rate (Moore & Elliott, 2020).

$$RMSSD = \sqrt{\frac{\sum_{i=1}^{N-1} (RR_i - RR_{i+1})^2}{N - 1}}$$

Figure 3: RMSSD

Did we mention that HRV is a rabbit hole of complexity? To put this a little more simply, RMSSD tells us how each time interval between heartbeats is different from preceding and subsequent time intervals. The critical thing to remember is that the increased variation between heartbeats results in higher RMSSD scores. Since time intervals between heartbeats are measured in milliseconds, the differences between them (i.e., RMSSD) are also measured in milliseconds or ms.

The graphic is from one of Matt's morning readings. For Optimal HRV, we encourage people to take a reading first thing every morning and use this as the primary way to track wellness over time. Consistent morning readings work best, as only a limited number of variables will impact the score.

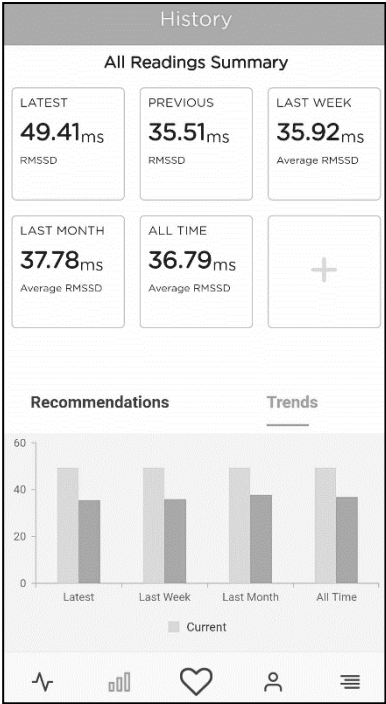


Figure 4: Daily HRV Reading Results

HRV, along with sleep, hormone secretion, and other key bodily functions, operates on a circadian rhythm. Therefore, it is best to take readings at about the same time each day in order to be able to compare one reading to another. Sleep quality is one of the most critical predictors of performance and dramatically affects HRV. By limiting variables, morning readings help measure how well the mind and body recovered from the previous day's stressors and the amount of physical and cognitive energy and emotional regulation they possess for the day ahead.

Population Norms for Individuals

Because HRV data has been collected over several decades, most measures, including RMSSD, have population averages or norms for groups based on demographic information. Population norms provide information on how one person's HRV scores compare to a larger group with similar demographics. While population norms have their usefulness, they also have their limitations.

One study found that genetic influences accounted for 47 to 64% of a person's HRV score. Therefore, due to genetic factors, two people of the same age and gender might have different HRV scores, even though they have similar levels of health. The individual's original scores do not matter nearly as much as whether scores improve or decline over time. These trends result from behavioral changes or life changes and less from genetic factors (Golosheykin, Grant, Novak, Heath, & Anokhin, 2017).

Below are the population norms for RMSSD. Appendix 2 includes population norms for other HRV algorithms. To read this chart:

- Identify the age and gender of the target person. Currently, gender data for HRV is only binary and does not account for gender identities beyond male and female.
- The RMSSD is the average score for those demographics.
- The standard deviation shows the positive and negative range of RMSSD, where 68.2% of the population falls.

Population Norms (Voss, Schroeder, Heitmann, Peters, & Perz, 2015)			
Age Range	Gender	RMSSD (ms)	Standard Deviation (ms)
25 – 34	Male	39.7	±19.9
	Female	42.9	±22.8
35 – 44	Male	32.0	±16.5
	Female	35.4	±18.5
45 – 54	Male	23.0	±10.9
	Female	26.3	±13.6
55 – 64	Male	19.9	±11.1
	Female	21.4	±11.9
65 – 74	Male	19.1	±10.7
	Female	19.1	±11.8

Figure 5: RMSSD Population Norm

For example, the average score for a female aged 50 is 26.3 ms. In this demographic, 68.2% of people have averages that range from 12.7 to 39.9 ms. In other words, scores within the 12.7-to-39.9-ms range are typical for females aged 50. Someone might fall above or below these ranges due to genetic, behavioral, physical health, or psychological reasons. Population norms provide insight but few answers.

Now let's compare Matt's scores and averages to the population norms. At the time of this writing, he is 47. The average RMSSD score for someone his age and gender is 23.0 ms, ranging from 13.9 to 33.9 ms.

First off, Matt's most recent score was 49.41 ms, well above the average and even substantially above one standard deviation, 33.9 ms, for his demographic. It is safe to say he is off to an excellent start to his day!

While less impressive, Matt's Last Week score, an average of the last week, is 35.93 ms, just above one standard deviation of 33.9. Matt's Last Month score, an average of the

previous 30 days, is 37.78 ms, and his All-Time average, in this case, an average of about 100 readings, is 36.79 ms, which is also just above the 1 standard deviation mark.

So what? The graph below shows the typical bell curve used to chart standard deviations. The σ symbol represents standard deviations. Matt's Last Week, Last Month, and All-Time averages fall between one and two standard deviations of the norm in a positive direction. In other words, Matt's averages are higher than at least 84.1% of those in his demographic group.

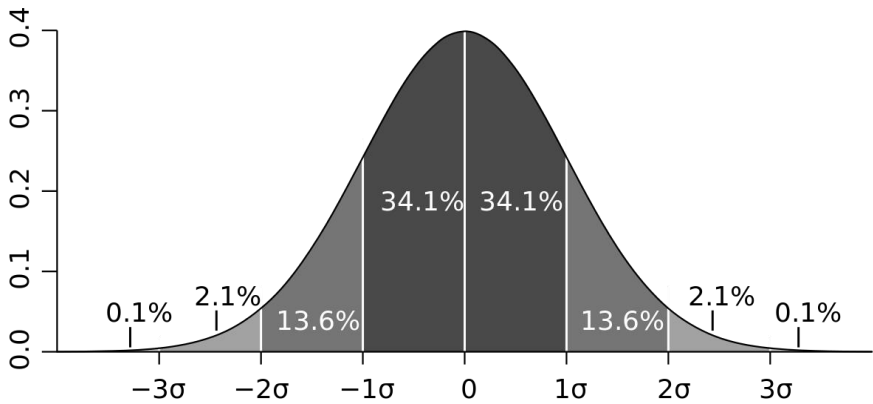


Figure 6: Bell Curve

During the three months of readings reflected here, Matt had and then recovered from COVID-19. Knowing that, even with illness, he outperformed his demographics. This feedback shows that Matt's focus on health and wellness produces tangible results, even when under the physical stress of the virus and all the other distress in the world in the spring of 2020. While he can only speculate about how his strong HRV helped him through COVID, Matt remains curious about his recovery process as time passes and he gets more data.

In the end, population norms give us some data to ponder and direct us to ask questions about an individual's scores. Why are scores above or below the population norms? What medical or psychological conditions might account for scores significantly below the population norms? And should someone consider seeking advice from a healthcare professional to ensure that more significant issues do not exist?

While we caution people from putting too much stock into comparing an individual's HRV with population norms, the norms are helpful when comparing teams and the entire business to these norms. Organizations might ask questions such as: How do the average scores for our people compare to population norms? What accounts for these differences? We will discuss using population norms to assess and monitor team and business health later.

Single Readings for Individuals

What does a single HRV reading tell about someone? Honestly, it does not reveal much in isolation. For example, Matt's 49.41-ms reading looks excellent. If all we knew about him was that score, we could assume that he is one of the fittest and healthiest people in the world compared to others in his age and gender demographics. However, when Matt struggled with COVID-19, his lowest score was 9.1 ms. If we just saw that score in isolation, we might call Matt an ambulance!

When we start looking at a 49.41-ms score against longer-term averages, the assumption goes from Matt being

one of the healthiest 47-year-olds on the planet to a reasonably fit person having a great day. So many factors go into an HRV score that no one should get too excited or depressed over one reading. As they build the longer averages, these daily scores will have a greater context for interpretation.

Most HRV apps, including Optimal HRV, allow for comparing recent readings. Comparing a Latest to the Previous score measures the effects of recent activities such as exercise, a tough meeting, a work shift, sleep, or meditation. Remember the working definition of HRV from Chapter 1: HRV measures the person's ability to handle or recover from stress. When the Latest score is lower than the previous, it measures the current allostatic load. The drop in the Latest score since the Previous score indicates how much the allostatic load decreases physical stamina, mental health, and cognitive ability.

A higher Latest score versus the Previous score shows recovery and increased energy since the last reading. When improvement happens, it demonstrates recovery from the allostatic load and a readiness to take on more challenging or energy-intensive activities. Simply put, when the Latest score is higher than the Previous score, the person is effectively managing stress and possesses considerably more energy to take on the challenges they face. When the Latest score is lower than the Previous score, they have less energy and cognitive capacity for those challenges.

Longer averages will provide additional context for these scores. For example, let's say Matt's Latest score is 10 ms higher than his Previous score, but 5 ms lower than his Last Month's average. We know that Matt's body and mind are doing a good job of recovering from the short-term stress that lowered his Previous score. However, he is still not fully

recovered, and his performance or energy level might lag behind what it is on a typical day.

Tags are another feature most HRV apps have to allow people to track the context of their readings. Tags let users track how specific activities, such as exercise, work, sleep, mindfulness, drinking, etc, impact HRV and then sort HRV scores over time by related activities. After taking several scores tagged with a particular activity, someone can quickly search for a specific tag and see scores associated with that activity. Tags include the activity and the second label of “pre” or “post.”

The pre- and post- functions isolate the impact of an activity and its effects on HRV. Tags help build motivation to continue by quantifying the short-term gains in physical and psychological health. Tags also help show the adverse effects of other behaviors, such as work stress, an argument with a partner, drinking, or drug use. As with changes that improve health, sometimes it is hard to identify how specific actions negatively affect wellness. Seeing how specific behaviors can crash HRV scores will provide short-term feedback on health that could help build insight and motivation to change.

Moreover, tags allow the person to identify their emotional states during the reading. Tagging emotional states enables people to track how mental and emotional health impacts HRV. Over time, people start to recognize the connection between their emotions and biology and how certain activities impact both. As an indicator of mental health, tagging emotional states provides a great deal of insight, especially when struggling with an intense work project, new responsibilities, or events in one’s personal life.

One final issue with individual daily HRV readings occurs when people stop taking them. While it might seem

counterintuitive, not getting HRV data is still an essential piece of information. Leaders should approach the change in behavior with curiosity. Did the person have a great trend and then suddenly miss 3 or 4 days of readings? Perhaps their child is ill, maybe their family is in town, or they just forgot to charge their HRV reader. If their HRV decreased gradually over the last few weeks, a few days of no readings might indicate the onset of burnout or illness or a growing social issue at home or with their work team.

When typical behaviors begin to change, it alerts leaders that there is a need for intervention. A person experiencing increased depression may not take a reading because they lack motivation or energy. Others might stop as a small rebellion against their leader or team. Regardless of the reason, if someone stops taking readings, it is a signal that the leader needs to reach out to the person to understand the reasons behind their behavior.

Longer Baseline Averages for Individuals

Longer baselines unlock the real benefits of HRV. These averages provide a unique context to interpret an individual's scores. They also demonstrate the positive effects of workplace wellness initiatives, work habits, or healthy lifestyle changes.

Let's look at some ways to use longer baseline averages. A 7-day average, the Last Week score, is enough time to begin seeing small positive effects of decreasing drinking, changing one's eating habits, taking a new medication, or trying a new wellness practice. It is important

to note again that some actions that will improve long-term HRV, such as a new exercise program or engaging in emotionally intense mental-health therapy, can decrease daily scores and weekly averages before realizing their future positive benefits and eventually improving HRV. The key is to stay curious about what the Last Week scores might indicate.

The Last Month score, or 30-day average, is enough to establish a medium-term baseline for traits associated with cognitive, medical, mental, and social health and wellness. This average incorporates the ups and downs of daily and weekly variations, providing a number representing traits of overall health. For those working to improve productivity, health, and wellness, a steady increase in Last Month averages helps demonstrate progress toward these goals.

The All-Time average provides a long-term baseline of trait improvement, especially when taking consistent readings over several months. With Optimal HRV, we provide short-term feedback with the Latest, Previous, and Last Week scores. Last Month provides medium-term feedback, and All-Time provides a long-term baseline for comparison.

Let's dive a little deeper into the insight that score comparisons provide. Each Latest HRV reading, when compared to a 30-day or greater baseline, allows a measure of how the nervous system is handling or recovering from stress and answers the question, "How is this person doing right now?" Similarly, comparing the Last Week average to the longer baseline helps answer the question, "How is this person doing this week?"

The goal for reading comparison is two-fold. First, people want to implement strategies to help their short-term HRV readings, the Latest or Last Week average, outperform

their longer baseline averages. This result demonstrates that their minds and bodies are healthy enough to take on more significant challenges with greater resiliency.

Second, the person wants to improve their Last Month and All-Time averages gradually. Depending on the behavior, it takes roughly two months to form a habit or begin to turn a new mental or behavioral state into a trait. As daily readings gradually improve, the 30-day average starts to outperform All-Time averages, demonstrating measurable improvement in psychological and biological functioning (Gardner, Lally, & Wardle, 2012).

Decades of research prove HRV's effectiveness in measuring cognitive, medical, mental, and social health and wellness. Yet HRV remained on the sideline due to the need for expensive and bulky equipment. As research in neuroscience, epigenetics, and health expanded exponentially, HRV played a supporting role in supplementing research conducted in well-funded laboratory studies. HRV is emerging from a supporting role to a starring role. While it remains expensive to take a brain scan or measure epigenetic expression, reliable HRV data is available for just a few dollars a month.

Leadership and Team Health

Comparing the team's HRV average to population norms provides a reliable measure of team health. For teams, a focus on 30-day averages helps the leader answer, "What is the health of the team?" If the team's 30-day average is below population norms, it is a strong indicator that work distress

threatens to bring down their collective performance.

The leader's goal is to work with the team to increase HRV to match or outperform the population norm. If the team's 30-day average meets or exceeds the population norms, the leader's goal is to maintain this level of wellness or find ways to make minor improvements.

HRV also provides daily feedback to the leader. Whereas individual daily HRV scores do not give the leader much actionable data in most situations, daily team averages, especially for larger teams, inform leaders about the health and wellness of their teams. A significant drop in a team's daily average signals the leader to check in with the team members. The first goal is to search for the cause of the decline. After identifying the issue, the leader can provide support and address any problems. If followed by a recovery in HRV, this action will prevent short-term struggles from escalating and negatively impacting the emotional health and motivation of the team.

Once a team or business establishes a 30-day average, HRV provides data on efforts to improve health and performance. Some efforts might dramatically improve the health of specific teams but result in adverse outcomes for others. HRV allows leaders to customize business efforts to the unique needs of particular teams. HRV data enables the leader to reinforce changes that improve HRV and discontinue actions that reduce group averages.

Monitoring Workforce HRV

HRV provides a language for business-wide conversations on wellness and performance. When everyone begins to take an HRV reading every morning, most businesses see improvements, as attention on wellness increases. Implementing an HRV tracking and training program provides a focus and language that brings cognitive, medical, mental, and social health to the forefront of everyone's mind.

We can adapt Pearson's Law. When we measure health and wellness, they improve. When we share our HRV scores with someone we trust, health and wellness improve exponentially.

When people establish their first 7-day average, a comparison with population norms provides a context for this initial score. The leader and staff member should approach this initial average with curiosity. While the first week of readings provides a reasonably accurate baseline, a couple of really good or bad scores might skew the data in a way that will correct itself once they have enough data to establish a 30-day average. The first week of HRV at a business will create excitement and nervousness. Leaders should try to meet with each person individually during this week to discuss what their initial baseline is telling them and what they are learning about themselves.

For each person, establishing a 30-day average and comparing data to population norms helps answer "How is this person handling the distress of their personal and professional life?" Each person and their leader can then compare 7-day averages with 30-day or longer averages to

answer, “How is this person doing this week?”

A person within a standard deviation of their relevant population norms is probably doing well managing their allostatic load, both at work and personally. Their goal is to keep their 7-day average within a consistent range with their longer averages and population norms, while finding ways to improve gradually over time. For healthy people, HRV provides a gauge as to whether distress is impacting them negatively, as demonstrated by drops in their 7-day averages over multiple weeks.

For those with lower HRV scores, leaders should stay curious and supportive. Remember, genetic factors alone might account for higher or lower scores. Leaders and their people do not want to overreact to scores when establishing initial baselines. Regardless of the starting point, the question always remains, “How do we help improve health and wellness?”

The above approaches work well when implementing HRV for people currently working in the business. What about a new hire? New hires should receive training on HRV as part of their orientation. Their leader or human resources department needs to ensure that they feel comfortable with the technology and assist them in taking an accurate reading.

Ideally, a new person would begin to take readings as soon as possible after getting hired. Establishing a 7-day average before starting work helps the business assess its onboarding process and provide emotional and social support for new people. These initial readings will inform their discussions with their leader as they develop their wellness plan.

Chapter 3: Job Demands, HRV, and Burnout

In this chapter, we put HRV science into a practical context for leaders and businesses. To understand the connection between burnout, performance, and business outcomes, we will utilize the Job Demand and Resource (JD-R) Model. We chose the JD-R Model because of its simplicity and twenty years of research to support its efficacy (Passmore, 2016).

The JD-R Model provides leaders and businesses with concrete tasks to help manage distress and burnout to help avoid adverse business outcomes. The decades of research behind the JD-R Model correlate health with performance and productivity. The innovation of HRV is its ability to quantify the impact of distress from job demands. Technology now provides daily and weekly data on the effect of stress on health.

We will start our exploration of the JD-R Model by exploring the connection between job demands, distress,

burnout, and outcomes. According to the originators of the JD-R Model, job demands are the “physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological effort or skills. Therefore, they are associated with certain physiological and/or psychological costs” (Bakker & Demerouti, 2007).

As mentioned earlier, some stress, called eustress, increases motivation, while negative stress, or distress, harms health and wellness. In this chapter, we will examine what happens when the *physiological and/or psychological costs* lead to burnout. Future chapters explore eustress and motivation.

Below is the complete JD-R Model, which we will explore in detail in the following chapters. A note: While we are utilizing the basic structure of the JD-R Model, our graphic adds some details to incorporate the science discussed in the first two chapters. Appendix 3 includes the complete model and supporting definitions.

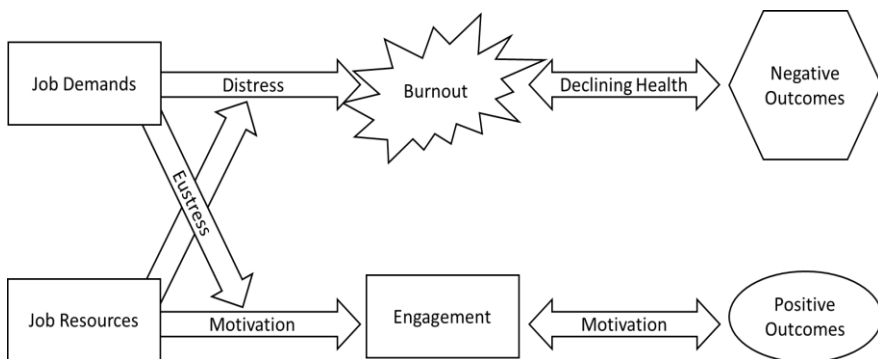


Figure 7: Job Demands and Resources Model

Distress and burnout threaten to destroy the collective cognitive capacity and emotional and relational health needed for individuals and teams to thrive. As we will discuss in this chapter, HRV helps quantify the impact of burnout on cognitive, medical, mental, and relational health. As people

struggle, outcomes suffer, creating a terrible cycle for individuals and businesses. Understanding that their performance and work fail to achieve the desired results only furthers burnout and its dangerous effects.

The inverse is also true. Wellness creates the energy that fuels successful business outcomes. Successful outcomes increase motivation and engagement, creating a self-reinforcing cycle as HRV, morale, and engagement soar (Passmore, 2016).

The JD-R model lays down a specific leadership challenge: support people in managing the distress from job demands or suffer adverse outcomes. HRV provides an effective daily measure of both the people's resiliency and the leader's ability to structure their work in a way that prevents burnout.

Distress and Burnout

Burnout is the enemy of productivity, creativity, healthy cultures, and positive business results. Let's define burnout based on the science of stress and the nervous system, as already presented. Burnout happens when the following occurs for a sustained period:

- Distress levels start to increase; vagal tone decreases, leading to more sympathetic or dorsal vagal activation, increasing levels of anxiety and depression, and causing a lack of usual energy.

- Distress levels cause more activation in the amygdala and less in the prefrontal cortex, decreasing cognitive ability, emotional regulation, and relational health.
- A significant drop in the Last Week average when compared to the All-Time average.
- People hold too much stress in their cups, and behaviors become more rigid or chaotic.

There is a great deal of research surrounding burnout and the long-term consequences of work distress. Here are just some of the findings on occupational distress and burnout (Achor, 2010; Fernandez, 2006; Hoopes & Kelly, 2004; Maslach & Leiter, 1997; Siebert, 2005).

Impact on physical/medical health:

- Heart disease
- Stroke
- Type II diabetes
- Cancer
- Musculoskeletal disorders
- Gastrointestinal disorders
- Autoimmune disorders
- Chronic fatigue
- Sexual issues
- Headaches
- Colds and flu
- Back problems

Impact on psychological health:

- Feelings of incompetence and doubt
- A negative attitude about work and the rest of life
- Memory loss
- Cognitive decline
- Early-onset Alzheimer's disease
- Drop in IQ
- Loss of creativity and cognitive flexibility
- Sleep problems
- Shame
- Mental fatigue
- Anxiety and irritability
- Depression
- Guilt
- Aggression

Impact on social/occupational health:

- Social isolation or relationship issues
- Poor job performance
- Decrease in morale
- Decrease in motivation
- Absenteeism
- Tardiness
- Theft at work
- Turnover – 40% is stress-related across different fields
- Grievances and complaints
- Litigation
- Low job satisfaction
- Injuries

It is not overly dramatic to say that chronic work stress kills people and businesses. Poorly managed distress levels rob individuals of the cognitive, medical, mental, and social health they need to succeed at work and enjoy life. Burnout causes teams and businesses to operate well below their potential while opening them up to various risks.

The good news is that HRV provides people and their leaders with daily feedback on their health and productivity. HRV serves as an early warning sign, allowing people to take action before they experience the negative consequences listed above. It also helps measure the health of the business culture, the effectiveness of wellness efforts, and the impact of human resource strategies.

Quantifying Work Distress

A daily HRV reading provides a great deal of helpful information when compared to longer-term averages. A morning reading compared to 30-day or longer averages offers feedback on the impact of distress and the allostatic load of the previous day or days, the energy they have for their workday, and how well sleep restores physical and mental health. Daily morning readings serve as an early warning that the distress from job demands threatens burnout.

Morning HRV readings also help people plan their days based on their current state of wellness. A lower-than-average score means they might not possess the usual energy and stamina for the day. While a low HRV score does not require them to call in sick, it does alert them to limitations on

their emotional regulation and cognitive flexibility. They might want to focus on less-challenging tasks, if possible. If this is not possible, they should avoid making hasty decisions, ask co-workers to double-check their essential work, and take small breaks throughout the day. They should also fall back on healthy habits, such as a salad for lunch, a walk or slow jog after work, and some quick mindfulness practices.

The inverse is also true. If a relatively healthy person's HRV score is close to or above baseline, they are ready to take on new challenges and push themselves if necessary. A strong HRV score does not permit them to slack off on healthy habits; in fact, they might want to do a more strenuous workout, as their body is both physically and mentally ready to perform.

HRV also quantifies the impact of the allostatic load accumulated during the workday. Taking a reading before work (for many this is their morning reading) and then a reading after work provides information on the allostatic load accumulated during the workday. The goal with before- and after-work readings is not to improve HRV scores, as the typical workday will decrease HRV.

Instead, the goal is to understand how the allostatic load impacts wellness and to use this information to utilize wellness strategies after work. If successful, these strategies will promote recovery and help them bring their best to work the next day. A moderate drop in HRV, a workout, a healthy dinner, a quick mindfulness practice, and a good night's sleep will set them up for a great day tomorrow.

If the after-work HRV score is significantly lower, it shows that their nervous system is struggling with their allostatic load. A hard workout or intellectually strenuous activity might increase the risk of illness or injury. If energy is

crashing, the person should practice mindfulness, go for a walk in nature, eat a healthy dinner, and get to sleep early. These restorative practices help their bodies and minds recover, and their HRV should improve. We will take a deep dive into best practices for wellness later in this book.

Regardless of the industry, there is a possibility that traumatic events might occur in the work environment. In health care, law enforcement, or social services, professionals may experience a person getting angry and attacking them, committing suicide, harming another person, passing away, overdosing, and other events that are traumatic for individuals and teams working with vulnerable populations. Those in retail or hospitality might experience an angry, threatening, or even violent customer.

Traumas can happen in every industry, including bullying, lay-offs and firings, workplace violence, and injuries. Other traumas might occur outside the work environment but still traumatize people, such as the death of a friend or family member, a natural disaster, a personal health emergency or diagnosis, and terrorism. HRV provides insights into how these events impact mental health and whether human resources and other strategies are helping support recovery.

A trauma will result in a dramatic drop in HRV. Unlike a tough couple of days at work or other short-term stress, trauma threatens long-term cognitive, medical, mental, and social health. Many leaders feel that they do not possess the skills to help people who experience trauma. Leaders are not therapists. Leaders walk a tricky line of providing adequate support to the individual while keeping overall performance steady. Employee assistance programs that offer free therapeutic services are an excellent investment, as they provide leaders with a tangible resource to provide the

support that someone needs to overcome the trauma. Fostering an organizational culture with an open, nonjudgmental, and non-retaliative response to requests for help is extremely important as a foundation to an emotionally healthy workplace.

Stages of Burnout

To this point in our discussion, we have examined burnout as a state, as if people are either burned out or they are healthy. While this approach is helpful for introducing the concept, it is more accurate to conceptualize burnout as a process, with symptoms increasing over time. A simple four-stage model of burnout helps demonstrate the escalating effects of distress on people's well-being. The four stages are 1) Exhaustion, 2) Guilt, Shame, and Doubt, 3) Cynicism and Callousness, and 4) Crisis.

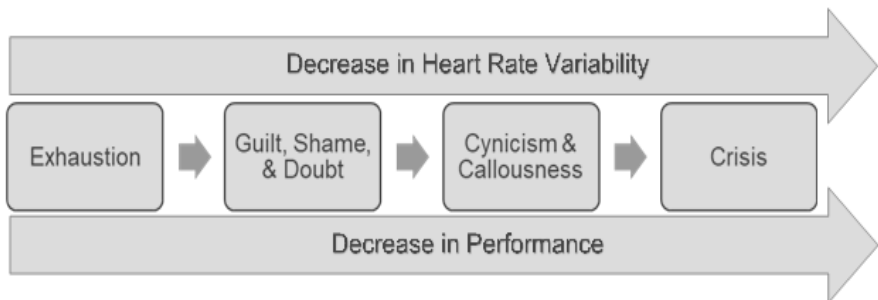


Figure 8: Stages of Burnout

As people progress through the stages, they experience the symptoms of the stage they are in and those of previous stages. The higher the stage, the more anxiety, sympathetic activation, or depression, and dorsal vagal activation are apparent, and the lower the quality of work. The primary goal

is to stay out of these stages altogether. The secondary goal is to recognize the symptoms of the early stages and take action to get out of that stage before moving to higher stages (Maslach & Leiter, 1997).

Exhaustion

The first stage, exhaustion, is something almost everyone struggles with from time to time. While the goal is to stay out of the stages of burnout, the distress of modern life and work makes it nearly impossible to go more than a few months without experiencing some level of exhaustion. Most people exist a few tough days away from falling into this stage.

Early identification of exhaustion is critical because if people do not address it, they are at risk of quickly moving into more harmful stages. HRV provides an early warning of exhaustion when the 7-day average falls considerably, 15% or more, below 30-day or All-Time averages. Recognizing that we are on the edge of exhaustion allows people to take small actions that help get out of that stage and back into wellness.

Identifying warning signs can provide an early indication that someone's cup is holding too much stress. Physical, psychological, and social warning signs usually accompany significant drops in 7-day averages, which we identify as a drop of around 15% or more. Along with HRV drops, warning signs signal that one's work and overall allostatic load are starting to impact wellness. Think of these warning signs and significant declines in 7-day averages as a way that the mind, body, and behaviors alert the person that something is wrong with their current state. It is time to take

action before the state worsens and they progress to later stages.

Notice your physical state. Physical warning signs are often the easiest to identify. Common physical warning signs include stiff necks, sore backs, strained muscles, headaches, and other minor aches and pains that are more annoying than debilitating.

The sympathetic nervous system is highly connected to trigger points throughout the body. As people carry around too much distress, the sympathetic system becomes more active, creating tightness and soreness in these sensitive points. An excellent way to distinguish the physical warning signs associated with burnout from typical aches or pains is whether a drop in HRV accompanies the warning sign. Most small injuries will not bring down the functioning of the autonomic nervous system, but physical warning signs brought on by increasing allostatic load will show up as drops in HRV (Khazan, 2019).

Psychological warning signs indicate an increase in sympathetic or dorsal vagal activation and include dreaming about work, trouble sleeping, obsessive worry, ruminating about work, low energy, and minor depression or anxiety. These warning signs are not at the level of a mental-health diagnosis unless someone is already struggling with a psychological issue. They do put people at risk of more significant threats to their mental health if they do not take action to get out of the exhaustion stage.

Physical and psychological warning signs exist within the body and mind. Social warning signs show up in professional and personal relationships. Personally, social warning signs include a lack of desire to connect with friends

and family in meaningful ways and less patience with co-workers, children, and loved ones. The good thing about social warning signs is that other people might provide some feedback about the changes in behavior. The key is to listen!

When in the exhaustion stage, people may find it harder to listen to and be present with co-workers and customers. Connecting meaningfully with others is essential to any business's success. Yet, when someone is exhausted, listening, patience, and understanding become emotionally draining, which takes lots of focus, energy, and attention. When someone holds too much stress in their cup for too long, they will find it harder to engage fully in conversation and connect meaningfully to co-workers and customers.

As with the other warning signs in this stage, social warning signs will not result in marriages breaking up, friendships ending, or getting fired from jobs. However, if unaddressed, these small changes in relationships often become more significant issues with greater consequences. The important thing with all warning signs is to recognize when the mind, body, and behaviors are telling the person that something is wrong and then to act to correct the problem.

In exhaustion, healthier coping skills shift to unhealthy ones. Instead of jogging or going to the gym, many opt for another glass of wine, binge-watching a new favorite television show, or spending hours lost on social media. While none of these activities is inherently bad, they should not be the primary coping skills for distress and exhaustion.

The more time spent in the exhaustion stage, the harder it becomes to get out of bed in the morning, find excitement in work, and locate the energy for social interactions in their

personal and professional life. The good news is that if people identify that they are in this stage, a long weekend, a few great workouts, and some time with good friends can lower the level of distress in their cups. Finding their way back into wellness should result in improved daily HRV scores. If they fail to address burnout at the exhaustion stage, they risk moving to the next stage: guilt, shame, and doubt.

Guilt, Shame, and Doubt

It is tricky to measure when exhaustion moves to guilt, shame, and doubt from HRV averages. People might experience exhaustion for months, as their 7-day averages remain lower than longer averages, without any sign of recovery. Guilt, shame, and doubt are psychological reactions to someone not performing at their best. One possible HRV indicator is when monthly averages fall 5 to 10% below All-Time averages. Let's examine some other warning signs.

Most people want to bring their best self to work every day. It is uncomfortable to realize that exhaustion is decreasing their quality of work. This realization leads to feelings of doubt about their ability to regain their former level of performance. A sense of guilt and shame usually accompanies this doubt, as they recognize they are not living up to their own and others' standards and expectations. It is also hard not possessing the energy to be a good co-worker or teammate.

A result of guilt, shame, and doubt is a sense of hypervigilance. Because exhaustion prevents people from accomplishing everything they want at work, they start to work longer hours, often bringing work home. Just because

they work longer hours does not mean they are getting more done. The opposite is true. The exhaustion from the long hours decreases energy further. While they may technically work longer hours, these hours become largely unproductive and inefficient (Rock, 2009).

People may also have trouble disconnecting. They may start checking work emails at home in the evening and on vacation. They feel guilty because how can they disconnect when so many people count on them? Then they feel ashamed because the quality of their work is declining. These feelings of guilt and shame cause a dangerous cycle of emotional distress and may become noticeable in further decreases in productivity and effectiveness.

This cycle creates a sympathetic response, pushing them to work longer. However, the exhaustion and sympathetic activation hinder cognitive capacity, work quality suffers, and the person struggles to find the energy necessary for the social aspects of their work. The sympathetic push is short-term and is followed by a dorsal vagal crash where they have little or no energy for family and personal life (Schwartz, 2010).

In the second stage, people may find that it helps to talk to someone else to process these feelings and frustrations. Often an empathetic co-worker, supervisor, or friend serves as a good source of support. If they exist in this stage for long periods, they might benefit from psychotherapy to resolve their guilt, shame, and doubt. Time off is a good idea. In the second stage, they might need two weeks off to recover from the exhaustion and regain their mental health. Time off will help with the effects of burnout in the short term. It is important to return from the break to a healthier work-life balance, and to utilize skills like HRV biofeedback, in order to

not end up in the same place again in a few weeks.

Cynicism and Callousness

People can only hold guilt, shame, and doubt for so long before they trigger a defensive reaction, leading to the third stage of burnout, which is cynicism and callousness. Cynicism and callousness are natural reactions to continuous experiences of exhaustion, shame, guilt, and doubt. Whereas the first two stages are emotional states resulting from an excessive allostatic load, cynicism and callousness become traits that transcend the work environment.

As traits, cynicism and callousness usually take months and even years to develop. It takes a great deal of HRV data to show progression to this later stage. At best, we could speculate that seeing a year-over-year drop of 20% or more in HRV scores might indicate that someone is at risk for moving to this later stage of burnout. This significant drop might also indicate serious medical issues, so if someone experiences a year-over-year drop, they should get a physical and talk to their healthcare professional.

Many people in this stage experience a dorsal vagal response. Their lack of energy results in having little patience for co-workers and customers. Others experience a sympathetic response where increased anxiety leads to disrespecting people they serve and co-workers by gossiping and acting passive-aggressively. People in this stage for extended periods will display a toxic mix of dorsal vagal and sympathetic responses throughout the day. In cynicism and callousness, these behaviors and emotions become traits in their work and personal lives.

The devastation of stage 3 demonstrates why people must address burnout in stages 1 and 2 before they progress to cynicism and callousness. Everyone finds it challenging to work with people at this stage. Negative experiences with cynical and callous people make it hard to recover without drastic action. Individuals in this stage cause real hurt to others. Resentment and frustration grow beyond the point where a simple apology gets everyone back on good terms.

Usually, mental-health services are needed to recover from stage 3. Exhaustion, guilt, shame, and doubt are states that dissipate with some effort. Cynicism and callousness become personality traits that impact relationships at work and in personal life. If someone finds themselves in this stage, know that the path back to wellness will take time and considerable effort. HRV will help them monitor this journey.

Crisis

The final stage, crisis, is where no person wants to end up professionally or personally. People in the crisis stage are actively experiencing trauma from work. Due to high levels of distress, allostatic overload, and trauma over long periods, they can no longer function from a healthy place personally or professionally. If the person in crisis somehow manages to keep their job, they most likely isolate themselves from their co-workers. Rarely can co-workers maintain a healthy working relationship with someone in so much pain.

The trauma of crisis transcends the work environment and prevents the person from being a decent spouse, partner, friend, or parent. Divorce and other extreme relational issues often happen when someone is in crisis due to work distress.

Addiction is not uncommon and makes all the person's difficulties much more intense.

Heart disease, cancer, mental illness, Alzheimer's, relationship issues, and the other scary impacts of work distress are the consequences we will pay if we do not focus on our wellness. Unfortunately, unmanaged distress and burnout threaten to take years, if not decades, off our lives.

Balancing the Personal and Professional

Self-care is a fascinating topic in modern leadership. After this chapter, we use the terms wellness and wellness plans instead of self-care. Unfortunately, we feel that the term self-care has lost much of its positive connotation in the business world and many even view it as a negative term.

In some circles, leaders view the idea of self-care as an excuse for the business not to focus on burnout prevention or people's health. The message many leaders implicitly or explicitly send to their people is that it is the employee's responsibility to personally manage the distress from job demands. While rarely stated bluntly, the message many hear from their leaders goes something like, "Sure, we'll burn you out during the day. However, we expect you to practice self-care on your own time to perform at peak levels the next day."

The JD-R Model demonstrates the absurdity of this approach. While researchers of the model find benefits in self-care, they do not excuse the business' responsibility to manage the distress their job demands they put on their people. We like to challenge leaders to think a specific way about job demands and self-care in high-performing businesses

(Passmore, 2016).

A business and its leadership need to provide resources to help people handle job demands effectively. Simply stated, leaders should strive to balance distress experienced by their staff with resources provided to offset that distress. We will explore job resources in future chapters.

It falls on the individual to utilize self-care to manage the distress in their personal life. Just as job resources should cancel out distress from job demands, self-care should balance any personal distress experienced outside work. Combined, job resources and self-care should set people up to engage in their work and get the best results possible for the business.

In a world where burnout seems epidemic, just balancing out distress with resources and self-care is a competitive advantage. However, once a business is effectively managing job demands, in most cases getting the team and monthly HRV averages close to population norms, why not go a step further? While balancing out distress from job demands prevents burnout, outperforming population norms helps people reach a level of peak performance crucial to creativity and innovation (Schwartz, 2010; Stulberg & Magness, 2017).

Another practice we witness is leadership asking people to practice self-care and ending the discussion there. If a business is serious about people's health, they need to create and implement a concrete wellness plan. Leaders should play supportive roles and hold people and themselves accountable to these plans. Prioritizing wellness and ensuring every person has a plan integrates wellness as a central component to a business' culture. Everyone understands the connection between their health and outcomes.

Unfortunately, no one gets separate cups for personal distress and work distress. Instead, an allostatic load builds throughout the day regardless of our environment. If people are going through personal trauma, it is nearly impossible to prevent it from impacting emotional, cognitive, and social functioning at work. While people should do everything possible not to let distress in their personal lives affect work quality, if their cups come into work full, quality will suffer. It is pointless to pretend people possess a superhuman capacity to drop all personal stress before entering work. Instead, leaders need to acknowledge that people's behaviors and mental health in their personal lives directly impact the quality of their work.

As seen above, the same is also true about burnout impacting people's mental, relational, and medical health. After conducting hundreds of talks and trainings on wellness, it is not unusual for participants to come up after the training and share the devastating impact of work distress on their lives. "My marriage broke up because of work stress," "I got cancer because of burnout," "I'm not the parent I know I should be because of stress at work." We have not just heard these comments once or twice, but over and over again.

The research on distress and work performance presents a difficult challenge to leaders and businesses. If someone lives a particular lifestyle and makes choices that harm their mental and medical health in their personal life, it will impact their performance at work. Traditionally, what someone does outside the work environment gets little to no attention in the business literature.

While this line of privacy and differentiation between work and home should continue to exist, HRV helps open up more significant conversations about health and wellness both

inside and outside the workplace. Just like people only get one cup to handle distress throughout the day, their HRV score does not distinguish between work and personal distress. In later chapters, we will discuss how leaders can position wellness strategically to support healthy people.

As HRV challenges us to connect performance and business results to both the work environment and to personal lifestyle choices, leaders and businesses that successfully support wellness will create a more engaged, motivated, creative, intelligent, satisfied, and healthier workforce as a competitive advantage. There is a strong business argument for leaders to support overall wellness. The American Psychological Association compared businesses with leaders directly involved with wellness programs to those without leadership involvement. Employees of businesses with involved leaders felt more motivated to do their best, 91% versus 38%; stated they were satisfied with their jobs, 91% versus 30%; and would recommend the company as a good place to work, 89% versus 17% (Clifton & Harter, 2020; Fisher & Phillips, 2021).

Supporting Wellness Planning

Finally, let's explore integrating HRV into wellness as a strategic approach to maintaining health while maximizing productivity and effectiveness at work. HRV does more than demonstrate the adverse effects of work distress. It also helps assess whether wellness strategies are working. We include a template for a wellness plan in Appendix 4.

An effective wellness plan includes proactive and reactive strategies. Proactive strategies are daily and weekly

practices that maintain health, as measured by HRV. The goal of proactive strategies is for everyone to bring their best self to work every day.

HRV provides daily feedback to measure the effectiveness of these proactive strategies to mitigate the negative impact of job demands and personal distress. For someone beginning to measure HRV, it is helpful to compare scores and initial averages to population norms and set some concrete goals. If their HRV is performing well compared to people in their demographics, the goal is to maintain these high scores over time. If scores are at the low end, what strategies, behavioral changes, and healthy habits will help raise scores gradually? Again, do not get too worried or excited when comparing scores to population norms. The primary focus remains on improving personal averages over time.

The proactive components of a wellness plan clearly state what the person will do on a daily, weekly, and monthly basis to maintain their health and wellness. If a business is serious about wellness, they need to offer time and space throughout the workday to practice some of the strategies presented later in this book. Self-care is not just about the individual's health. It is about maximizing their performance at work.

HRV and identifying physical, psychological, and social warning signs are crucial parts of the wellness plan. Individuals will work with their leader to set goals and identify strategies when drops in HRV become a cause for concern. Again, population norms help direct whether the strategy needs to address improving or maintaining HRV averages. Sharing warning signs with a trusted leader allows the leader to point out when they might identify these

warning signs, even if the person does not possess the self-awareness to see them because of increasing allostatic load.

When people see significant drops in their HRV scores or start experiencing warning signs, they need to have created a set of reactive strategies to implement in order to get out of the exhaustion stage. The leader also can support the individual with job resources presented in future chapters. It is much easier to proactively plan how to get HRV scores back up when someone is healthy than to try to do it when energy and cognitive functioning are struggling due to burnout. To help create the reactive plan, answer these questions:

- What strategies will I implement if my 7-day average is significantly lower, 15% or more, than my 30-day or all-time averages?
- What are my strategies if my 30-day average is significantly lower, 5 to 10%, than my all-time baseline?

Establishing a wellness plan with a leader helps to increase accountability. This accountability needs to go both ways. The leader's psychological, social, and cognitive health is one of the most potent determinants of wellness and performance in a business. Burnout manifests in states of negative emotions, thinking, and moods. A leader's mental state is highly contagious, and a burned-out leader will burn out the people they supervise.

Talking about and sharing wellness strategies, warning signs, and HRV scores put people in a potentially vulnerable position. A good leader supports the integration of a wellness focus into the business culture by sharing their plans with those they supervise. If the leadership holds their people accountable to their wellness plans, the leader should allow

others to keep them responsible for their plans. The leader should also consider sharing their HRV scores with their team and people. Again, this strategy promotes accountability and the supportive nature of HRV use in high-performing businesses.

Once people establish wellness plans, the leader focuses on monitoring their health. HRV dashboards provide daily feedback on the health of individuals and teams. The leader should also schedule time to check in with the person at least every two weeks. This check-in allows the leader to review HRV scores, identify warning signs, and adjust plans to support someone struggling to manage distress. This scheduled check-in time helps build trust and operationalize wellness into the business's operations.

Chapter 4: Approaches to Minimize Distress from Job Demands

The battle against burnout starts with strategies to limit the distress resulting from job demands. How leaders set up people's jobs and the work environment will determine the impact of distress on people and their performance. In this chapter, we will begin with a set of crucial strategies that set people up for success. If leaders effectively manage job demands, they elicit eustress and motivation, which promote engagement and positive outcomes. Those who fail to address the distress from job demands and burnout will decrease HRV, and people will lack the energy to focus on positive results.

This chapter will also examine basic work strategies that, if mismanaged, result in higher rates of burnout. Minimizing distress by effectively structuring work and the work environment allows the leader to focus more energy on promoting engagement and less on offsetting the frustration

when the work environment becomes a source of distress and burnout. Effective management of the job demands should manifest in higher HRV scores. These strategies help eliminate some distress from going into the person's cup, provide energy for tasks that improve outcomes, and keep people in their window of tolerance.

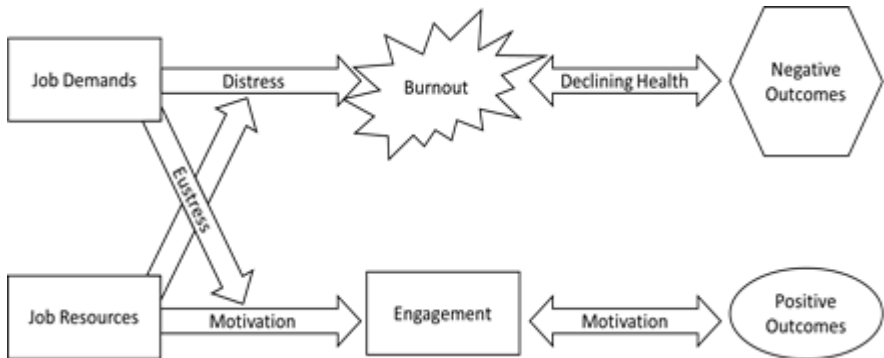


Figure 9: Job Demands and Resource Model

Shared Expectations

When creating shared expectations, the crucial question for leaders is, “Do people know how to work and what activities will produce desired business outcomes?”

Research shows that most people cannot state their job expectations, nor do they ask for clarification. The vast majority of people exist in a state of ambiguity, with everyone trying to figure out their jobs in isolation, absent any proper direction (Wagner & Harter, 2006).

Many leaders and human resource professionals fall back on the job description to prove they established shared

expectations. However, the final bullet point on most job descriptions reads something like “all other duties assigned.” In other words, pretty much any task the leader asks them to do is technically part of their job description. As long as job descriptions include this last bullet point, leaders must realize that these descriptions fail to provide clear and concrete guidance.

The excellent news about shared expectations is that they are easy to test. Ask people, “What do you think I expect from you in your job?” We encourage leaders to share the research findings just described and ensure the question comes from curiosity and the desire to correct any conflicts due to lack of communication on the business’ side. This task is not just to identify the discrepancy. It is to create an opportunity to get on the same page.

Shared expectations help people feel safe and keep them in their ventral vagal and prefrontal cortex. Distress levels decrease when people use shared experiences to guide their behavior, problem-solving, and decision-making. If expectations constantly shift without clarification, it robs them of a sense of confidence and conviction, as any decision could get questioned by leadership. This lack of confidence often leads to inaction or hesitation as the person searches for the safest action that will minimize that chance of getting punished.

When expectations fail to adapt to changes in the environment, it disrupts homeostasis and increases allostatic load, and people expend energy to figure out these shifting expectations instead of performing at their best. This struggle leads to irritation, anger, frustration, depression, despair, and even a decline in physical health. The mix of confusion and frustration leads to more mistakes and accidents, and lower

performance.

Leaders who set clear expectations get enormous payoffs for their work. People know where to focus their energy and become more productive, while turnover and accidents decrease. Creativity also increases. When people focus on critical tasks, it improves the level of creativity given to those tasks. By helping people narrow their focus, leaders free up energy and creativity (Clifton & Harter, 2020; Hoopes & Kelly, 2004).

When it comes to expectation and HRV, the vital thing to remember is that a clear set of expectations limits distress and improves focus. Shared expectations do not mean that a job is not dynamic and will not change over time. The leadership task is to ensure the expectations around the changing job are communicated and understood.

Fit

Fit entails finding people with the skills, talents, and motivation to thrive within a job's shared expectations. In his study of transformative leaders, Jim Collins (2001) found that executives who ignited the transformations from good to great first got the right people into positions where their skills and talents set them up for success. They also removed or reassigned people who were not in roles that matched their passion and talents. Only with the right people on board did they collectively figure out a shared vision for the future.

It might seem counterintuitive to focus on people first and not the destination, because one might logically assume

that an exciting vision would attract the right people. However, these transformational leaders found that focusing on fit first gave the business the energy for the journey toward excellence. People who enjoy and feel confident in their jobs create their own motivation and focus, freeing up the leader's time and attention to focus this energy toward activities that lead to engagement and maximizing outcomes.

On the other hand, accomplishing great things with people who do not possess the traits to succeed at their work is nearly impossible. Positive outcomes are more dependent on having excellent people than on any other single factor. A good leader can easily lead the right people to a great future, but even the best leaders in the world will not get far with a business populated with people who do not possess a good fit with their jobs (Collins, 2001).

Unfortunately, according to Rath and Harter (2010), only 20% of people strongly stated that they like what they do each day. It is hard to engage people in work that does not bring them some level of joy and satisfaction. No one loves everything about all their job duties. However, if someone dislikes their job, their motivation will lag, and distress will likely quickly lead to burnout.

Putting people in positions that engage their cognitive interest and ignite their passion creates resiliency against distress and burnout and improves performance. As we saw in the JD-R Model and will cover in detail later, engagement is crucial to positive outcomes. Getting people in the right positions increases engagement by 33%.

As engagement increases, leaders start to see positive trends from fit. Studies show that sales increase by 15% and profits by 20%. Absences decrease 24%, which indicates a

healthier workforce. Turnover rates drop as low as 13% (Rath & Harter, 2010; Wagner & Harter, 2006).

What happens when the leader identifies that someone is in the wrong position in the business? Maybe they do not have the passion necessary to move toward excellence or give everything they have, so the quality of their work cannot keep up with rising expectations. Regardless of the underlying reason, at some point in time, every leader confronts the fact that one or more of their people are not a good match for the seat they occupy.

Research demonstrates that the effort of a group is disproportionately affected by low performers. Let's use a scale of 1 to 10, where 10 is the best employee, and 1 is the worst employee ever. If, on a team of six people, five of them rank an 8 on performance and one is a 5, instead of the high performers pulling the low performer up, the one low performer will pull the 8s down.

Few things elicit more distress and frustration than when someone feels they experience unfair treatment. The 8s will start to see that they are working harder, without more pay or recognition, and will lower their performance to regain a sense of equity with their lower-performing co-worker. The 8s might not end up at a 5, but they will slowly lower to a 7 and probably even a 6. Leaders have a formidable responsibility, because poor performers do not only deliver poor performance, they also lower the collective outcomes of their co-workers.

There is one more piece of bad news about low performers: let's say the 5 does everything they can to meet expectations, shows up early, leaves late, and works weekends if necessary to meet all their job expectations.

Despite all this effort, their work is still inferior compared to their teammates. In this scenario, the co-workers will struggle less with fairness, but their performance will still decrease. It probably won't go all the way down to a 6, but it will likely still decrease down to a 7 and stay there.

Poor performers, whether due to ability or effort, function like a computer virus in a team's dynamics. They slow things down, operations do not run as smoothly, and if left unaddressed, they negatively impact the business' outcomes. Underperformers hurt businesses and teams by increasing the distress level of those around them. This distress decreases efficiency and effectiveness in the team, costs the business money, and makes mistakes that expose the business to a range of risks (Schwartz, 2010).

While fit entails hiring, training, and retaining great people, it also means relocating or removing those who cannot meet shared expectations. While removing people from their positions is difficult, there are often win-win options if the leader is creative and treats people with dignity and respect. Here are some key things to consider when thinking about fit.

First, the leader should open an honest dialog about their perceptions of their performance. Second, the leader should realize that the person might be suitable for the business but wrong for their position. Just because they struggle in one place does not mean they will not thrive in another. If this is not the case or an option, the leader can discuss what job outside the business interests them and how the leader could support them in moving into a position where they can succeed.

A final word about the challenges of fit: fit does not excuse leaders and businesses from a focus on diversity. A

diverse range of backgrounds, races, sexual orientations, gender identities, and neurological talents will increase the strength of the business and its culture. People of diverse backgrounds and experiences bring unique skills, talents, and motivations to the job.

Hyper-efficiency Sprints

The brain operates similarly to a muscle. The more a person works it, the stronger it gets. However, like a muscle, it also needs rest and recovery, or it becomes weaker and less effective.

Think of someone doing bicep curls with weights at the gym. They start strong for the first several reps, but the last few reps become more of a struggle. The brain is the same way and requires similar rest and recovery to function at its best. If not allowed to recover, the brain tires and HRV plummets. Hyper-efficiency sprints can set up a work environment that uses neurobiology and HRV to maximize performance and quality.

The first component of hyper-efficiency sprints challenges leaders to support a workflow that breaks up work into sprints and rest. The brain can only operate at its maximum effectiveness for 120 minutes. Setting up a healthy and high-performing workplace challenges every leader to structure the workday around the 120-rule of hyper-efficiency (Schwartz, 2010).

When someone does not take a break, it is like skipping the rest between sets of curls. The person will fail to perform

at their best and experience a crash in performance and productivity. This fatigue results in dramatic decreases in creativity and cognitive flexibility and leads to more accidents, mistakes, and inefficiency.

Research in this area supports the traditional manufacturing schedule as ideal for neurobiology. Work two hours, take a 15-minute break, work another 2 hours, take a more extended lunch break, work 2 hours, take a 15-minute break, work two more hours, and end the day. For those working all-too-typical 9-, 10-, or even longer-hour days, extending this pattern of hyper-efficiency sprints helps maintain high HRV scores throughout these longer days (Liu, Ikeda, Oyama, Wakisaka, & Takahashi, 2018).

Take two people. One does not take any breaks and answers emails all through lunch. Another takes breaks throughout the day, paying attention to the 120-minute rule. They both are at their workplace from 9 am to 5 pm. The person taking breaks will get more work done! Also, the quality of their work will be much higher than the person with a tired brain who didn't take any breaks (Rock, 2009; Schwartz, 2010).

Recent studies showed that longer breaks, such as 60-minute lunch breaks, help HRV scores recover to pre-work levels. That is right. Supporting an extended break during the day provides a significant recovery from distress and creates an ideal state to maximize performance for the rest of the day (Goffeng et al., 2018; McClelland, Holland, Lomas, Redfern, & Plunkett, 2017).

Let's use the cup analogy to apply the HRV research to work structure. Someone starts the workday with a moderate allostatic load in their cup and well within their window of

tolerance. On the typical day of any job, distress increases throughout the morning, and their cup fills. A break after a 2-hour hyper-efficiency sprint allows a pause in the rising distress. A short HRV biofeedback training session or a walk around the block helps get some of the distress out of the cup and lowers allostatic load. The first break helps set the person up for another 2-hour hyper-efficiency sprint.

After their second sprint, they take a 60-minute lunch break, which would ideally include healthy food selections discussed in later chapters. The leader should also support additional short wellness strategies over the lunch break. These might involve connecting socially with peers, walking outside, getting a quick workout, and practicing some HRV biofeedback or mindfulness. A healthy lunch break will help the person disconnect from work distress and recover from the first part of their day. As HRV recovers, they possess the capacity for two more work sprints in the afternoon with a short break in between.

An effective break requires the person to change their energy for a period of time. So, if their work requires time at a computer, their break needs to be something other than checking social media or personal email. On the other hand, if their work is highly social, a quiet moment of solitude and some mindful breathing can help reset their energy. The key here is to do something different.

HRV helps leaders support people in finding the correct type of break. When people take HRV readings before and after work, they can track changes in HRV scores as they implement different strategies on their breaks. Taking readings throughout the day quantifies the positive benefits of longer lunch breaks and shorter breaks. Pre-/post-break readings can further help identify the best strategies for the

specific individual.

The second component of hyper-efficiency sprints challenges people to maintain a type of focus that creates states that bring out their cognitive potential. The brain functions best when focusing on one thing at a time. To maximize productivity and outcomes, leaders need to create environments that minimize distractions and allow people to focus and get work done during their hyper-efficiency sprints.

Every time someone changes focus to another task, they activate different brain structures needed to succeed on the second task. This act of shifting attention takes a great deal of energy. Then when they move back to the original task, they use more energy to refocus. Studies show that interrupting a person's work reduces HRV and lowers their cognitive ability by 10 IQ points, which is equal to the psychological and cognitive effects of missing a night's sleep (Madden & Savard, 1995; Rock, 2009).

Studies demonstrate that the average worker focuses on a task for only 11 minutes before getting interrupted by a distraction. It then takes the person 25 minutes to return to this task. Over a day, distractions eat up an average of 2.1 hours (Hari, 2022).

Constant distractions build allostatic load and increase activation of the sympathetic nervous system. In response, heart rate increases and HRV drops, reflecting a decrease in the executive function that most people need to perform at their best. While distractions are a natural part of most work environments, many people strategically increase the distractions with multitasking, thinking it improves their performance.

Multitasking is a burnout monster. It drains people's energy, lowers HRV, and increases distress. The human brain is not actually capable of effectively multitasking without a crash in quality and efficiency; it can only focus on one cognitive activity at a time. What appears to be multitasking is actually the brain switching from one activity to the other.

People who consider themselves good multitaskers have brains that make this switch quickly, making it seem as if two activities are happening at the same time. In reality, the brain just keeps switching back and forth. People who are not good multitaskers have brains that are slower in making the switch, creating a more obvious lag. The switching back and forth between different activities and constantly refocusing on the main one, significantly drains the available resources. People feel more tired and end up being much less effective in their work when trying to multitask (Hari, 2022).

The myth that multitasking improves productivity perpetuates popular thinking, with technology that ensures the need for it. Email and social media notifications, instant messages, phone calls, and numerous other distractions in modern work environments destroy productivity and increase distress and burnout.

Leaders must warn people about the dangers of multitasking and fight the misinformation that it increases productivity. This includes nurturing a work environment that discourages multitasking, does not expect instant answers on various message platforms, and helps people identify and minimize distractions.

Setting team rules and shared expectations about distractions will help everyone get on the same page. Here are some options to consider:

- Set up ways for people to signal that they are in a hyper-efficient sprint and should not be disturbed, barring an emergency. This signal might be a closed office door and a do-not-disturb sign. In an open or cubicle setting, noise-canceling headphones, earplugs, and a do-not-disturb sign can be helpful.
- When appropriate, encourage employees to minimize sources of distraction during their focused activity times, including silencing phones, email, and message notifications. Setting up this behavior as a shared expectation will help employees follow through.
- Encourage employees to set up dedicated times for answering emails and messages and returning phone calls. This way, employees will be able to attend to important communication without compromising time in hyper-efficient sprints. Strategically setting aside communication time before and after breaks or hyper-efficient sprints helps people shift energy in the most efficient way and feel less guilt about taking breaks or setting aside do-not-disturb time. Treating emails and phone calls as separate tasks instead of a constant demand improves efficiency.
- Discuss situations that truly qualify as urgent and justify disturbing someone in a highly focused state. At the same time, discuss situations that are justified as do-not-disturb in order to balance giving people the ability to focus with allowing co-workers to have access to each other for help, collaboration, and socialization.
- Encourage employees to send noncritical questions and information via email without an expectation for an immediate response rather than instant

messaging someone or physically coming into their space.

- Model this behavior for employees. Let people know when something is truly urgent and needs immediate attention, while specifically stating when non-urgent matters can be resolved later in the day, the next day, etc.

The goal of minimizing social disruptions is not to reduce social interaction. Time with teammates improves mental and emotional health, lowers levels of illness and absenteeism, increases job performance, fosters a greater sense of purpose, lowers distress, and promotes faster recovery from setbacks. Not surprisingly, higher HRV scores and expanded intellectual capacity increase with healthy team dynamics. The crucial task for the leader is to provide people with time to engage in sprints, while also encouraging social interactions on breaks, during meals, and in meetings (Christakis & Fowler, 2011; Kitamura, Murai, Wakida, Mitomo, & Fukushima, 2017).

Sometimes the work environment creates additional distractions. Irregular and low-frequency noises, poor lighting, air pollution, strong smells, and hot or cold temperatures distract attention and focus from work. Research also shows that these distractions lower HRV and productivity (Alvarsson, Wiens, & Nilsson, 2010; Porras, 2020; Totsuka, Soh, Sasaoka, Yamawaki, & Tsuji, 2018; Walker, Brammer, Cherniack, Laden, & Cavallari, 2016).

The leader should work with people and teams to identify distractions inherent to their job expectations. Many positions require people to answer phone calls or emails right away. Some jobs involve constant interruptions. The key is to acknowledge that aspect of their job and identify times, even if

it is just for ten or twenty minutes at a time, to eliminate distractions to get other work completed. While work sprints can extend to 2 hours, shorter hyper-efficiency sprints still allow people to maximize their available time.

The great thing about hyper-efficiency sprints and the accompanying changes discussed here is that it does not take long for people to realize the benefits. Most people who integrate sprints experience an immediate jump in productivity. They also report that emails and similar communications stop dominating their workday, as these tasks become more manageable. Increased productivity will give people more hours of time in the work week to feel more productive and less overwhelmed. Leaders should check in with people during this transition and encourage them to utilize this additional time for breaks and to take on projects that motivate them.

Recovery

Recovery times are as crucial to work productivity as undisturbed high-efficiency sprints. HRV transformed athletic training by clearly demonstrating the need to focus on recovery. Many athletes use HRV to measure the stress of strenuous activity and track their recovery. A healthy recovery maximizes the benefits of the subsequent challenging workout, helps optimize performance at events, games, and competitions, and minimizes the chance of injury and illness.

HRV challenges businesses to begin to prioritize recovery similarly to athletes. Too many businesses constantly fill people's cups with the challenges and distress of work

without thinking about supporting recovery necessary to achieve peak performance. This lack of focus on recovery leads to burnout, lower productivity, and poor outcomes for the business. Few would encourage an athlete to do a brutal workout before a game. Yet many leaders constantly push people beyond their limits without supporting the recovery necessary to manage allostatic load and keep people in their window of tolerance (Rock, 2009; Schwartz, 2010).

Not all the fault lies in leadership. Technology brings all work communication and information to people's fingertips when they log into their laptops, phones, and tablets. The ability to work anywhere at any time carries many benefits. However, more and more people feel that the ability to stay connected 24/7 means they should work around the clock.

The leadership challenge in the modern business world is not to get people to work longer. Leaders need to support recovery to maximize productivity and performance, especially when it is most important. An intention to improve recovery times might mean eliminating expectations for emails to be answered in the evenings or early mornings, eliminating late evening meetings and phone calls, and discussing the importance of sleep and time off.

Daily Recovery

Let's return to the cup analogy to understand the importance of disconnecting and recovery. Again, ideally, someone begins the workday with a manageable level of distress in their cups and well within their window of

tolerance. As the day progresses, they accumulate additional distress as they work to meet the demands of the typical day. Most people leave the typical workday with a greater allostatic load in their cups and a lower HRV than when they started their day.

As they leave the workday, they shift from performing to recovery. Recovery entails two components. First, they stop adding additional work distress to their cup. Second, they apply the strategies throughout this book to help their mind and nervous system recover, lowering the allostatic load of the day and getting distress out of their cup. After a healthy meal, a long walk or jog, time with friends or family, an HRV biofeedback session, and a good night's sleep, they recover and come back the next day ready to perform at their best. If a leader values performance, productivity, and quality, they must support this type of recovery.

Too many people's work habits never allow for adequate recovery. After leaving work, they might disconnect for an hour or two. Then they pull out their phone and start reconnecting with work emails, tasks, and other communications. This habit disrupts both aspects of their recovery.

By connecting back to work, people stop their recovery. Not only do they counteract the positive effects of wellness strategies, but they also add more distress to their cups. At that moment, their allostatic load needs to decrease to ensure maximum productivity the next day. Instead, they increase it by engaging in communications and work-related tasks.

It is one thing to take work home occasionally to meet a deadline on a crucial project. Most jobs will require this additional work from time to time. It is the consistent

expectation of working overtime that creates a problem. The lack of ability to disconnect creates a sympathetic anxiety response. People are always anticipating and reacting to the next piece of communication. Existing in an always-on state is a sure route to burnout and decreased productivity.

It falls on leaders to stop this insanity or suffer the consequences of people without the mental, cognitive, and relational brainpower to perform at the high levels necessary for success. Leaders must educate their people on the importance of recovery and then be role models for a healthier approach to working. It is also crucial to create shared expectations around communication and work outside the traditional workday.

Setting specific expectations allows people to feel comfortable focusing on recovery. It also helps them understand when it is appropriate to work longer hours and which issues rise to the importance of staying connected to work communication beyond the typical workday. There are always exceptions in every business. Shared expectations will help people identify these exceptions.

As people get more work done, distress should decrease, and longer HRV trends will improve. As people implement hyper-efficiency sprints, leaders should encourage them to take readings throughout the day. The goal is for everyone to find their ideal workflow to maximize productivity. This chapter provides a structure of best practices. HRV helps customize these around an individual's traits and job structure.

Leaders need to understand that long hours, important projects, and tough deadlines require more intense recovery periods to prevent the distress of these stretches from

negatively impacting performance. Like running sprints, hyper-efficiency sprints allow the person to cover a lot of ground quickly. Longer breaks help people's mental and cognitive energy recover, allowing them to reenter work ready to maximize potential and productivity. The following section focuses on these longer recoveries.

Time Off

Paid time off, long weekends, and vacations are crucial job resources the business provides to offset job demands. However, these resources need support by leaders to ensure that people think about their recovery in a way that promotes productivity and health. As mentioned above, time off supports recovery. Time off that maintains continued work-related communication is not truly recovery time and is likely to produce only minor benefits.

Leaders must establish a culture where using time off is celebrated. When people hit the guilt, shame, and doubt stage of burnout, their guilt will prevent them from utilizing time off for recovery. Many business cultures celebrate behaviors that lead to burnout while sending negative messages to those focused on wellness. Hopefully, the science of HRV will reverse this dangerous and unproductive mindset.

Another challenge leaders must address is the distress people experience when they start thinking of returning from vacation. The positive recovery benefits from time off quickly disappear when someone returns to thousands of emails and other tasks. For many, HRV starts to decrease and cortisol levels increase when someone hits the final few days of a vacation, when thoughts of the nightmare of returning to

work start to dominate their thinking.

With all the benefits of recovery, leaders should provide a half or full-day after vacation for people to get back on top of the work they missed. This strategy allows for more significant recovery, a less stressful end to the vacation, and a healthy transition back into the work environment. It also prevents them from feeling overwhelmed by all the tasks they missed and need to catch up on, while still managing the distress of their regular weekly workload.

Often, vacations include things that decrease HRV, including changing time zones, air travel, disrupting sleep schedules, eating out, consuming more drugs and alcohol, and dramatically increased physical exertion associated with ski trips or beach activities. Educating people on how certain activities promote healthy recovery and improve HRV can help them plan a vacation that benefits both them and the business. With this information, people can plan a mix of fun and restorative activities that promote overall recovery.

The research helps show the power of vacations. Those who do not take regular vacations are twice as likely to have a heart attack, have a 20 to 35% higher risk of stroke, and have a higher risk of dying of any cause over nine years compared to people who do take regular vacations. Plus, and hopefully not surprisingly at this point, burnout rates associated with poor outcomes are much higher for those not taking regular vacations.

Besides avoiding negative consequences, encouraging people to take vacations will pay off for businesses and leaders. People who take regular vacations are half as likely to experience depression, have improved overall wellbeing, and sleep better. Those who take regular vacations become more

productive, sustain higher levels of performance, possess greater cognitive flexibility, and become better problem-solvers. These benefits can just spike after a vacation, but if leaders help people effectively re-enter the workflow, they can continue to occur long after the vacation is over (Castrillon, 2021; Rock, 2009; Schwartz, 2010).

Chapter 5: HRV Biofeedback and Mindfulness

Imagine if a business could offer a benefit that improved people's physical and mental health, HRV, productivity, immune functioning, and problem-solving ability while reducing distress, burnout, absenteeism, and healthcare costs. This benefit could also enhance team cohesion and relationships through the business contributing to an overall healthier organizational culture. HRV biofeedback and mindfulness provides leaders and businesses with a decisive competitive advantage if they implement it as a strategic job resource (Davidson et al., 2003; Davis & Hayes, 2012; Goleman & Davidson, 2017; Langer, 2009; Rock, 2009; Siegel, 2011; Siegel, 2016)

Up to this point, the focus has been on the benefits of implementing HRV to track health and wellness. In this chapter, we shift focus to using HRV biofeedback and mindfulness to improve resiliency and performance. Taking a morning HRV reading helps everyone start the day focusing on their health and stress levels. Practicing HRV biofeedback

and mindfulness provides a research-based best practice to regulate distress, build resiliency, and maximize performance.

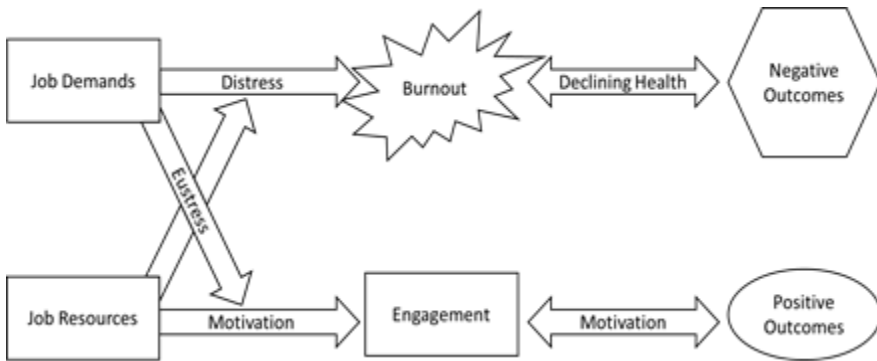


Figure 10: Job Demands and Resources Model

Giving people access to HRV biofeedback and mindfulness training provides a crucial job resource. Job resources are the physical, social, emotional, or organizational aspects of the job that may do any of the following:

- Reduce job demands and the associated physiological and psychological costs
- Be functional in achieving work goals
- Stimulate personal growth and development (Bakker and Demerouti, 2007)

Research indicates that HRV biofeedback and mindfulness address all three aspects of job resources. With a small investment in an HRV app, leaders provide a powerful tool that promotes cognitive, medical, mental, and social health.

A quick note: At the time of publication, the Optimal HRV app is the only app on the market that we are aware of with the components of HRV biofeedback and mindfulness combined with a dashboard for business leaders. In this

chapter, we will speak specifically about the functions of the Optimal HRV app that support this science.

Resonance Frequency

The autonomic nervous system operates outside of conscious control. The heart beats and the lungs take in air without the need for conscious attention. Built-in unconscious processes work to maintain homeostasis by adjusting bodily functions like heart rate, breathing, and blood pressure. The beauty of the autonomic nervous system lies in the fact that while people do not need to do anything at all for it to function, there is quite a bit they can do to help it perform at its best, especially during times of stress.

People possess one powerful tool to regulate their physiology and their stress response. This same tool also allows people to strengthen the parts of their nervous system that promote resilience, emotional regulation, and cognitive capacity. This powerful tool is the breath (Siegel, 2011; Siegel, 2016).

Breathing is the most direct way to increase HRV and recover from short-term distress. The respiratory and cardiovascular systems work synchronously to maintain homeostasis through the parasympathetic nervous system. As mentioned earlier, on each inhalation, the parasympathetic nervous system takes its foot off the vagal brake and allows the heart rate to go up. On each exhalation, the vagal brake comes back on, and the heart rate slows down. This synchronicity between the heart rate and the breath is called Respiratory Sinus Arrhythmia or RSA. RSA is one of the

primary sources of HRV: when the heart rate and the breath are the most in sync, HRV is at its highest (Lehrer & Gevirtz, 2014).

In physics, this kind of reciprocal relationship between breathing and heart rate is called resonance. Resonance is the property of a system where two oscillating or alternating components are in interplay with each other. Breathing stimulates heart rate in an interplay-feedback relationship. The more in sync the breath is with the heart rate, the greater the oscillations of the heart rate, resulting in higher HRV.

The easiest way to think about it is by comparing this system to pushing a child on a swing. There are lots of different ways to push that swing. Someone could push it infrequently and with a lot of force. The swing would go up high, but not smoothly, and it would gradually decrease its oscillations. The child in this scenario would not be pleased!

Someone could also push the swing with short, frequent bursts. The swing would go up a bit and come down right away, never going up high. Again, the child would not be pleased.

Another approach is to push the swing in a measured, regular way. This approach allows the swing to go up as much as possible and come down as much as possible. In this scenario, one would find a rate of pushing the swing that would maximize the child's delight.

The breath acts to stimulate the heart rate in the same way as the person pushing the swing. It is possible to determine an ideal breathing rate that would stimulate the heart rate to produce maximum oscillations. The goal is for the heart rate to increase as much as possible on the

inhalation, then come down as much as possible on the exhalation. The ideal breathing rate that accomplishes this goal is called resonance frequency breathing rate.

While people do not possess much direct conscious control over their heart rate, they can consciously regulate their breath. Therefore, resonance frequency breathing is a powerful tool to increase heart rate variability, increase resiliency, improve performance, and effectively manage allostatic load (Fournie et al., 2021; Goessl, Curtiss, & Hofmann, 2017; Lehrer et al., 2020; Pizzoli et al., 2021; Schneider & Schwerdtfeger, 2020).

HRV biofeedback uses resonance frequency breathing to improve people's health and performance. Biofeedback is a powerful mind-body tool that teaches people to develop greater awareness and influence their physiological and mental functions by using signals from their bodies. HRV biofeedback provides real-time feedback on how adjusting breathing rates improves HRV.

Apps like the Optimal HRV app walk users through a short process to determine their resonance frequency breathing rate. People then use resonance frequency breathing to help improve their HRV through HRV biofeedback and mindfulness training. Each person has their own resonance frequency breathing rate, which, for adults, is somewhere between 4 and 7 breaths per minute (Khazan, 2019).

Carbon Dioxide and Overbreathing

Resonance frequency breathing strengthens the vagal brake and regulates the stress response. The breath is an amazing tool to help build cognitive, medical, mental, and social health. However, the primary function of the respiratory system is to provide optimal levels of oxygen to the brain, organs, and tissues in the body.

As many as 60% of people experience disordered breathing episodes. Disordered breathing causes distressing symptoms that impact health and performance. Unfortunately, most people experience these symptoms without realizing the cause is related to their breathing.

For many people, attempts to use their breath to calm down or relax backfire, making them feel worse rather than better. The primary reason behind this problem is a prevalent misconception about breathing. The fallacy has to do with oxygen and carbon dioxide. Most people believe that to relax or calm down, they need to get more oxygen. They also believe that carbon dioxide is toxic and needs to be cleansed or eliminated from the body. Neither one of these statements are true.

Oxygen is needed for cells to derive energy. The more strenuous the task, the more oxygen someone needs for energy. The air that is inhaled contains about 21% oxygen. Exhaled air contains about 16% oxygen. At rest, people only use about a quarter of their oxygen and do not need any extra oxygen. The idea that we need more oxygen to relax or calm down is simply incorrect.

It is important to note that the same principles apply at any altitude. At higher altitudes, the atmospheric pressure is lower, and therefore the oxygen molecules are spread further apart. The air at higher altitudes still contains 21% oxygen, but because the molecules are further apart, there is less oxygen in each breath. If changing altitudes, practicing low and slow breathing, as described later in this chapter, at resonance frequency breathing rate will help optimize oxygen levels.

If a person suffers from heart or lung disease, they may not efficiently extract oxygen from the air. As a result, they may have lower oxygen levels in the blood. The same breathing principles apply, but it may be wise to use a pulse oximeter to monitor oxygen levels during breathing training.

The second misconception about breathing is that carbon dioxide is toxic and harmful, and we must get rid of it. In fact, carbon dioxide is vital to the distribution of oxygen. People need to retain about 85% of the carbon dioxide they produce to ensure oxygen gets to where it needs to go.

Carbon dioxide is a byproduct of metabolism. As cells use up oxygen for energy, they produce carbon dioxide and water. The carbon dioxide then enters the bloodstream to regulate our pH, which reflects the acid-base balance in the body.

Oxygen distribution depends on the pH balance. As activity levels increase, the body uses more oxygen and produces more carbon dioxide. Carbon dioxide enters the blood as carbonic acid, making the pH level more acidic. When activity levels decrease, carbon dioxide production also decreases, lowering acidity.

Hemoglobin, the part of the red blood cells that transports oxygen and other gases throughout the body, is sensitive to pH changes. Higher activity increases acidity of the blood, signaling the need to release more oxygen. Without sufficient carbon dioxide, hemoglobin releases less oxygen. Carbon dioxide is crucial for delivering oxygen to places in the body in need of energy.

When someone takes a deep breath to relax, they take in more oxygen, even though the physiological need for oxygen has not increased. A deep inhale is often followed by a too-short exhale, causing them to breathe out too much carbon dioxide too quickly. This habit of breathing out too much carbon dioxide is called overbreathing.

As less carbon dioxide enters the blood, acidity levels drop, and hemoglobin misinterprets that as a decrease in activity level and releases less oxygen. Because the activity level has not decreased, the oxygen demand has not changed either, but now less oxygen is available. Ironically, an attempt to get more oxygen with deeper breaths creates an oxygen-deprived state. This state of oxygen deprivation results in lightheadedness, dizziness, shortness of breath, faster heartbeat, gastrointestinal distress, numb or tingly fingers and toes, and muscle tension. It also impacts the amount of oxygen that the brain receives, resulting in problems with focus, concentration, learning, decision making, and problem-solving.

Overbreathing creates states that prevent people from performing at their best. It also makes it more challenging to regulate emotions, resulting in anxiety, agitation, and nervousness. Overbreathing may cause or exacerbate a whole host of problems, such as asthma, chronic pain, heart problems, insomnia, irritable bowel syndrome, other digestive

problems, and stomach discomfort.

Unfortunately, there is a complementary relationship between distress and overbreathing. As someone's cup starts to fill up with distress, the sympathetic activation speeds up the breathing rate, increasing the sympathetic response further. Overbreathing itself brings on feelings of anxiety, which add to the allostatic load already in someone's cup. In addition, attempts to relax or calm down by taking big deep breaths exacerbate overbreathing and make symptoms worse. The key to overcoming and preventing overbreathing is to learn healthy breathing skills.

Healthy Breathing

Everyone knows how to breathe, right? How can anyone screw up something so natural and unconscious? Healthy breathing is crucial to performance and health, yet many people breathe in ways that negatively impact their cognitive, medical, mental, and social health.

One of the most important aspects of healthy breathing is nasal breathing. Nasal breathing warms, humidifies, and filters the air coming into the lungs, benefits lost with mouth breathing. Cold, dry, and unfiltered air coming through the mouth may result in overbreathing, sleep disruptions, inflammation, ear infections, illnesses, increased allergy and asthma symptoms, and decreased HRV.

Every breath taken through the nose comes with a natural shot of nitric oxide. Nitric oxide has an array of health benefits. These include decreased blood pressure, decreased

heart rate, decreased breathing rate, a more open airway, better gas exchange, increased ventral vagal activity, increased immunity, and of course, an increased HRV (Kaur, Sharma, Tewari, & Narula, 2018; Tamkin, 2020; White & Bradley, 2013).

Spinal posture is also critical to healthy breathing. It is important to sit or stand straight with one's weight balanced evenly on both sides. Straight posture gives the diaphragm plenty of room to move and fill the lungs.

Next, learn healthy breathing skills through practicing *low and slow* breathing. Begin by shifting the breath down to the belly and slowing down the breathing rate. Breathe in gently through the nose into the abdomen. Allow the abdominal muscles to expand on the in-breath and contract on the out-breath.

It helps to imagine a balloon in the belly. On the breath in, gently inflate the balloon. On the breath out, gently let the air out of the balloon through the nose or pursed lips, slowly and fully, as if blowing out a candle. There is no need for a large or a particularly deep breath.

Shifting the breath into the abdomen will naturally deepen the breath and provide the optimal amount of oxygen. A new practice will always require a conscious decision to change, as well as cognitive effort and patience. However, there should not be a physical effort when breathing. In other words, don't pull the air in and push the air out. Just allow the air to come in and out of the lungs.

Initially, practice low and slow breathing for about 5 minutes each day, just noticing the sensations of your breath coming in and out of the nose. Remember that breathing practice may not always feel relaxing. If it is difficult to relax,

let go of the intention to relax and bring focus to the process of breathing itself. As this breathing practice feels more familiar and more comfortable, increase practice time and combine it with HRV biofeedback and mindfulness practice, as discussed in the following sections.

Low and slow breathing combined with HRV biofeedback and mindfulness trains people to avoid overbreathing, as many people learn to breathe correctly for the first time. Training and the resulting changes in breathing create a match between metabolic needs, levels of carbon-dioxide production, and the size and rate of the breath.

Establishing an HRV Mindfulness and Biofeedback Practice

There are nearly as many definitions of mindfulness as ways to practice it. All these definitions include some version of present focus, acceptance of the moment, and nonjudgment. Biofeedback involves providing people insight into how their breathing changes their physiology and HRV. Optimal HRV allows people to integrate biofeedback into their mindfulness practice. We will discuss these benefits later in this chapter.

Let's compare mindfulness to free throws in basketball to help understand mindfulness as both a practice and skill. As anyone who has played basketball knows, a player spends a ton of time at the free-throw line. Basketball players might shoot a hundred free throws in practice for every one taken in a game. Free throws are not always the most exciting part of basketball, but with the game on the line, the player needs the

practice to manage nerves and knock down the free throws when it counts.

Over time, the practice builds self-confidence and a new skill set. Through deliberate practice, the player hones the precision of their free throws, increasing their value to the team and their performance on the court. Eventually, they become a clutch player who the team wants on the line with the game in the balance.

Mindfulness practice is a lot like practicing free throws. People should set aside 15 to 20 minutes a day for mindfulness practice. During this practice, they work to train the mind's ability to enter a focused state, recognize when focus has been disrupted, and return to the calm, focused state.

The good news for leaders is that apps like Optimal HRV will help people start a mindfulness practice even if they have never practiced before downloading the app. While there are numerous mindfulness apps in the marketplace, we encourage leaders to recommend apps that provide HRV biofeedback with the mindfulness activity. Apps like Optimal HRV help people view how mindfulness practice improves HRV and track improvements to their baselines over time.

Beginner meditators should start with a concentration practice following a breathing pacer and a guided focused-awareness meditation session. The pacer will help them integrate resonance frequency breathing, maximizing the positive benefits of their new practice. Following the guided meditation will assist them in staying focused and help them build new skills as their practice develops over time.

Once the mind gets skilled at focused awareness, the next challenge is an open-awareness practice. These practices bring attention to what predominates in the mind moment to moment. Guided open-awareness meditations help the person become aware of sights, sounds, smells, thoughts, feelings, and physiological sensations as they occur without holding on to them.

Open-awareness practice hones people's ability to focus on what is happening in the present moment and to disengage from unhelpful mind chatter and other distractions. The mindfulness module in the Optimal HRV app provides people with a wide selection of guided meditation practices, from concentration to open-awareness practices tailored to various needs. The daily use of the app as a job resource is akin to practicing free throws, training the mind for peak performance when it matters most.

Like practicing free throws, few people get overly excited about their daily mindful meditation practice. There are always emails, movies, and a range of other activities that seem more enjoyable or essential. But as everyone who has stuck with a practice will likely agree, they rarely regret the time spent after completing their daily practice, due to the feelings of calm and focus they achieve and the long-term benefit they gain.

FLARE

The daily mindfulness practice described in the previous section will strengthen the mind's ability to regulate emotions and bring focus and concentration to work. What

about times of high distress when sitting down for a 20-minute practice is not a realistic solution? Under distress, like shooting free throws in a close game, mindfulness skills will help calm the sympathetic response and maintain high levels of cognitive functioning and emotional regulation.

One of the co-authors of this book, Dr. Inna Khazan, developed a 5-step approach that guides people through a series of mindfulness-based skills most helpful in navigating challenges and stressful situations. Knowing about mindfulness skills is different from using them during a challenge. As someone's cup fills up, a concrete and structured approach to finding a helpful response is what is most needed. For this reason, Dr. Khazan uses the acronym FLARE to provide a structured set of skills that works in any difficult or stressful situation. FLARE stands for Feel, Label, Allow, Respond, and Expand awareness.

FLARE comprises a set of skills scientifically shown to manage different aspects of a stressful situation. It works to increase the ability to regulate emotions, channel inner resources most efficiently, and find the most helpful response without getting stuck. The mindfulness module in the Optimal HRV app provides a guide to FLARE that you can easily use in a challenging moment. Practicing FLARE is, again, a lot like practicing free throws. Practice under neutral or only mildly stressful conditions will strengthen the ability of the brain to turn to FLARE almost automatically in future, more challenging situations. Let's now review each step in FLARE.

Feel

Feel is a sensory, nonverbal step. It is the process of becoming aware of difficult feelings, thoughts, or sensations. The goal here is awareness of the sensations themselves before automatic evaluations or judgments. The Feel skill helps the person utilize the power of mindful observation and pause long enough to distinguish what is and is not under one's control.

Feel is one of the key benefits of mindfulness in the workplace. Staying in the window of tolerance while experiencing distress requires the realization that cortisol threatens to overwhelm the capacity of the cup. Do not assume that people already possess the Feel skill. This step is necessary for any further action in managing a stressful situation.

The nervous system evolved for action, not reflection. A daily mindfulness practice will help strengthen the ability of the prefrontal cortex to bring rising distress levels into consciousness before automatic amygdala-driven reactions take over.

Label

Label names the feelings, thoughts, or sensations brought into awareness in the Feel step. Labeling allows one to turn toward distressing thoughts and emotions with curiosity, an essential part of any mindfulness practice. Labeling the emotional experience in that moment shifts energy from the sympathetic or dorsal vagal to the ventral

vagal and from the amygdala to the prefrontal cortex.

Brain imaging studies show that the process of assigning a short, descriptive, nonjudgmental label to a distressful experience reduces the activation of the amygdala and activates the parts of the prefrontal cortex responsible for emotional regulation and choice of action. This shift allows the person to make conscious choices in response to the situation instead of the automatic fight, flight, or freeze response. The relatively simple act of assigning a label to the difficult experience allows one to move away from the unhelpful, automatic, amygdala-driven reaction and toward a more thoughtful, chosen response.

Allow

Allow means giving up the struggle with thoughts and emotions and instead allowing them to be as they are after labeling them. Most people's immediate automatic response to first noticing difficult emotions, such as fear, anger, and shame, is to try to make those feelings go away or to get them under control. However, research shows that actually controlling thoughts and feelings is impossible.

The more someone tries to stop thinking or feeling something, the stronger that thought or emotion grows. Research also shows that the futile efforts to control uncontrollable thoughts and emotions exhaust the glucose stores available to fuel the brain, drastically reducing cognitive capacity and the resources necessary to choose a strategic response to the situation.

Respond

By the time someone gets to the Respond step, their brain is primed for choosing a helpful response and for devoting all of its available resources toward implementing it. The intensity of the original state of distress has likely decreased. Emotionally regulated, the person has the cognitive capacity to think through which action is in their best interest at that moment. In this step, most responses will depend on the specific situation at hand. However, doing some low and slow breathing at resonance frequency rate is always a good idea in this stage.

Many leaders expect people to show up in the Respond step and stay there, on the ready, throughout the workday. This assumption goes against the science of mindfulness and distress. Providing the job resource of mindfulness and biofeedback will help the workforce develop and maintain states and traits to support effective decision-making and high performance.

Expand Awareness

Expanding awareness is necessary to widen the narrow focus created by the stress response. When people's cups fill and allostatic load increases, attention and focus become narrowed to short-term solutions in an attempt to eliminate the stress. During the fight-or-flight sympathetic response, this narrowing of focus helps find the best action for survival. If a car swerves into someone's lane on the highway, the narrowing of focus helps identify the single best action that helps avoid the dangerous accident.

The same response that helps direct action in flight-or-fight situations is ineffective when dealing with the complexity of the modern workplace. Practically speaking, expanding awareness involves paying attention to the variables in the environment beyond the immediate source of distress. Start with attention to external stimuli, such as the sky overhead, the people around, or the floor underneath the feet. Then bring the focus to internal stimuli, such as the breath and heartbeat. Expanding awareness further potentiates emotional regulation and allows people to access their creativity and cognitive flexibility.

FLARE provides everyone in the business world with a shared language concerning distress and emotional regulation. The true power of the approach comes when leaders integrate FLARE language into the daily communication and culture of the organization. FLARE provides leaders with a methodology to ensure that logic and not emotions guide strategic decision-making.

HRV Biofeedback

At its core, HRV biofeedback training guides the person in learning to balance their autonomic nervous system in their daily lives. HRV biofeedback training begins with resonance frequency breathing determination and practice. Consistent biofeedback-guided practice typically results in increased HRV at baseline over time. This improvement translates into a change in physiological and emotional response during challenging times, enabling the person to respond to the challenge in the most optimal way and then to quickly return to homeostasis once the challenge is over. Most

of those who practice HRV biofeedback regularly will find that in the moment of challenge, a few low and slow breaths at their resonance frequency provide an effective reminder for better focus and self regulation.

As part of their wellness plans, people should choose a practice time that will work for them most days of the week. With all the benefits of mindful HRV biofeedback practice, the leader needs to find the time and space to train during work hours. Allowing time to train at work will help leaders demonstrate their dedication to workforce wellness and help gather HRV data during the workday.

The goal is to practice resonance frequency breathing for 20 minutes each day. Research shows that 20 minutes of daily training is necessary to derive the benefits of HRV practice. However, finding 20 minutes in a busy workday can be surprisingly challenging. To make the transition to regular practice easier, start with 5 minutes each day for a week. Then go up to 10 minutes a day for a week. Next, increase to 15 minutes a day for another week, and finally, get to the 20-minute goal.

When hearing about resonance frequency breathing rate, many people worry that they will need to breathe that slowly all the time. That is not the case at all. Resonance frequency breathing is reserved for training times and for challenging occasions when taking a few breaths helps to remind their nervous system to regulate itself.

Think of breathing training in the same way as strength training at the gym. The person might lift weights three times a week for an hour to increase muscle strength, but would not drag dumbbells or kettlebells around the rest of the week. Resonance frequency breathing is also a workout, only for the

nervous system. As long as someone practices 20 minutes a day, they will strengthen their autonomic nervous system's ability to regulate itself and do not need to keep breathing at resonance frequency all the time to maintain and continue making gains. With continued practice, a better ability to self-regulate will remain with them at all times.

HRV biofeedback and mindfulness training give the nervous system the strength to self-regulate. Once resonance frequency breathing feels comfortable and familiar under neutral conditions, please encourage people to use it before or during challenging situations to improve self-regulation at that moment. A few minutes of training before a difficult meeting or crucial presentation regulates distress and improves performance. In combination with the skills described in other chapters of this book, HRV biofeedback training under challenging situations allows the workforce to navigate those situations with greater ease and success.

Chapter 6: Job Resources and Leadership

The JD-R Model provides leaders and businesses with a research-based and straightforward understanding of the connection between distress, burnout, and outcomes. It also puts forth a challenge: How do leaders and businesses position job resources to offset the distress from job demands and promote engagement?

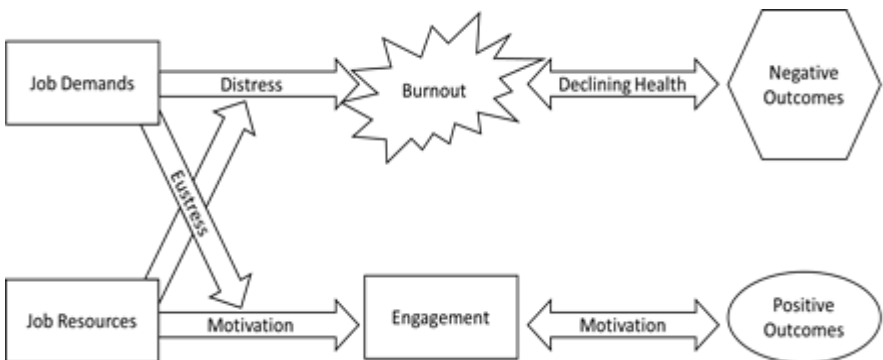


Figure 11: Job Demands and Resources Model

When distress from job demands is greater than job resources, people are at risk for burnout and a decline in performance. When job resources adequately address the distress from job demands, people possess the capacity for engagement and realizing their performance potential.

In the previous chapter, we presented HRV biofeedback training and mindfulness practice as key job resources that a business can provide for their people to improve resiliency. In this chapter, we introduce the concept of the leader as a crucial job resource. Leaders are a wild card when it comes to the JD-R Model. In too many circumstances, ineffective leaders create unhealthy psychological and social job demands. Instead of eliciting motivation and engagement, poor leaders become a tremendous source of distress and burnout for their people. Those unfortunate enough to work for terrible leaders know that the distress caused by their leader far eclipses all other sources of work distress.

In high-performing businesses, a supportive and invested leader becomes the primary job resource. These leaders help their people manage job demands while pushing them to excel. People's perspective of their leader as either primarily a job demand and a cause of distress or alternatively as a supportive job resource has tremendous consequences for business outcomes.

Unfortunately, there is an epidemic of bad leadership in modern business.

- 75% report that their boss is the most stressful part of their job
- 27% were bullied by their boss
- 24% would fire their boss
- The worst part of the day = time spent with boss

- Those who work for 'bad' bosses have a 39% higher chance of having a severe heart problem (Sutton, 2010)

Leaders and the cultures they help create need to be a job resource that promotes resiliency and not the worst part of someone's job. It does not mean that great leaders are not a cause of stress from time to time, especially when they ensure their people meet the shared expectations of their jobs. The challenge for leaders is to approach their role as more of a support and resource than as a source of constant distress. In this chapter, we will explore the biological and psychological reasons behind this argument.

Emotional Symmetry

Emotions are contagious. People mirror the emotions of the people with whom they interact. Leaders' emotional states are highly infectious due to the power they hold over people's work success and income. A leader's emotional states and behaviors will impact the motivation and emotional health of the people they lead.

The human brain evolved to survive the savannas of Africa. Compared to other predators, humans were weak and slow creatures. Humans did develop a few great advantages when it came to cooperation and teamwork. Early humans who worked well with others survived and eventually dominated their environment. There was a simple equation for survival for most of human history. An isolated individual would likely die; in a community, the person often had food, shelter, and safety.

In the past, as is the case today, the best way to incorporate oneself into a group was to adapt the group's emotional state and accepted behaviors. This innate ability is called emotional symmetry. Those who struggle to adapt are vulnerable to exclusion and can be ostracized by the group. Studies of social exclusion demonstrate an increase in the sympathetic anxiety response and dorsal vagal shutdown response, both negatively affecting HRV (Christakis & Fowler, 2011; Moor, Crone, & van der Molen, 2010; Williamson, Thomas, Eisenberger, & Stanton, 2018).

Emotional symmetry is why the leader's emotional states and relationships are so crucial to a healthy and high-performing business culture. Organizational or team culture comprises a set of beliefs, expectations, and values that guide behavior and decision-making. In many ways, culture is how it feels to be a part of a team or business.

It is not only the people in the culture who experience the collective emotional state. Customers and partners who interact with those in the culture will also feel it. Climate is how people experience the team or business, including the physical space, the processes, and the business' people (Bennett & Bennett, 2019).

A healthy leader with a high HRV will likely supervise an emotionally healthy culture with a collectively high HRV. Customers will enjoy and even celebrate their experiences of this culture and its people, helping the business establish a strong brand. The inverse is also true. A burned-out leader will fail to maintain a healthy culture, and customers will become frustrated and take their business elsewhere.

Emotional symmetry is a critical variable for high-performance businesses. The leader must understand the

impact of their emotional state on the mental health of their people and their culture. Emotional symmetry is also significantly impacted by the mental health and distress levels of co-workers. Let's return to the cup analogy. A burned-out co-worker whose cup is overflowing will spill their distress into everyone else's cup. In the short term, co-workers can support and have compassion for someone having a tough day or week. However, the longer that people and cultures get exposed to burned-out people, the more likely the emotional distress of the struggling person will fill up the cups of those who work with them.

Think of a great leader, either one who led you or someone you admire professionally. What made them a great leader? We assume that part of the answer includes the skills and talents that person brought to their leadership. We imagine that their skills are only part of your admiration for this person. Most people first think about the leader's personality and the quality of their relationship with the leader. Let's explore some relational dynamics that every leader needs to develop to be the job resource that people need to thrive in their work.

Co-regulation and Supportive Supervision

In psychology, the term co-regulation describes how a trusted person helps others regulate their sympathetic or dorsal vagal stress response and operate from their prefrontal cortex and ventral vagus. To effectively help co-regulate someone else takes time and strategic focus on building healthy relationships. Supportive supervision is a strategy to help co-regulate distress, prevent burnout, support

professional development, and engage people in their work (Porges, 2009).

Several challenges in the modern business environment make co-regulation hard to achieve. The first challenge for leaders is to know how their people are doing. HRV dashboards like Optimal HRV provide an innovative way to track the health of individuals, teams, and businesses. Before such innovations, it was difficult to identify struggling individuals and teams at risk for burnout. For leaders not yet utilizing an HRV dashboard, the challenge is that much greater. These leaders must find other ways to assess distress levels regularly.

The second challenge, which exists whether or not a leader has implemented HRV, is finding the time to support people and provide them with job resources to prevent or recover from distress and burnout. In this chapter, we will explore the characteristics of a strong leader whose connection to his team is a source of co-regulation.

A healthy relationship between the leader and their people increases resiliency and engagement. Building and maintaining healthy relationships happens with dedicated time to connect with people individually and in teams. Currently, many businesses fail to provide leaders with the time and capacity to create relationships that help regulate distress, support wellness, and assist people with reaching their potential (Bloom & Farragher, 2011).

The research presented throughout this book directly challenges this traditional minimal approach to management and supervision. The health of the leadership/workforce relationship and culture determines which parts of the nervous system are active at work and whether the leader is a

supportive job resource or a source of distress. Ignoring the relational and emotional health of teams and cultures means burnout increases while performance plummets.

The final challenge for businesses in creating and maintaining healthy relationships and high-performing cultures requires ensuring that leaders possess adequate communication and interpersonal skills. Most business leaders get little to no training on building trust and psychological safety with individuals and teams. Two of the authors of this book hold advanced degrees in psychology. Even with all the skills we have learned through our education, we find it challenging to build trust and psychological safety in the face of intense distress.

To address this challenge, let's first explore the concepts of trust and psychological safety. Then we break down some focus areas a leader can develop to co-regulate distress.

Trust

Trust is the bond that holds teams and businesses together and is the foundation for outstanding performance. Many people we talked to about HRV stated that they lacked the trust in their leadership to share HRV without some sort of incentive. These statements are consistent with research findings that only one in three people report a high level of trust in their leaders (Clifton & Harter, 2020).

Let's talk about two characteristics of trust that are particularly valuable in an organization. First, trust builds

when people develop confidence and respect for the character, ability, and strength of the leader. A leader should always keep the question, “Am I worthy of the people’s trust?” in the front of their mind. As a warning, a burned-out leader inevitably struggles to bring the strength and character to their work necessary to build trust. Remember, the leader is the role model for their people (Wagner & Harter, 2006).

The second aspect of trust is people’s ability to predict the quality and consistency of the leader's behavior. Distress levels increase when people cannot predict the mood and demands of their leader. Working for leaders with unpredictable emotional swings, inconsistent messages, or lack of follow-through leaves people struggling to predict what is coming next instead of focusing on excellence. Emotional symmetry with an emotionally dysregulated leader is nearly impossible, often resulting in a culture characterized by chaos.

Great leaders bring a high level of consistency and discipline to the teams and businesses they lead. As mentioned in the shared expectations section earlier, and as we will explore with psychological safety next, when people know what to expect in their environment, it helps calm the anxious sympathetic nervous system. When positioning themselves as a job resource for their people, leaders need discipline in focus and message (Kouzes & Posner, 2017).

A leader's actions, focus, and words signal to people: This is important. For their people, job success depends on focusing on a small set of variables. In their study of great businesses, Collins and Hansen (2011) found:

No human enterprise can succeed at the highest levels without consistency; if you bring no coherent unifying concept and disciplined methodology to your endeavors,

you'll be whipsawed by changes in your environment and cede your fate to forces outside your control.

Relationships and cultures high in trust allow people to bring the best of their prefrontal cortex and ventral vagus to their work. As trust builds, HRV increases. The strong ventral activation brings forth feelings of calm and a sense of psychological safety. As we will explore next, psychological safety is a crucial variable for business success.

Psychological Safety

Psychological safety is the sense that someone is physically, emotionally, and socially safe with people and their environment. Leaders must manage all these factors to elicit states that promote excellence. Psychological safety is necessary for people to make themselves vulnerable.

Traditionally, vulnerability is not something celebrated in the business world. However, vulnerability occurs when people challenge established ways of thinking or doing something, bring up an innovative product idea, hold peers accountable to establish norms, or engage in honest but difficult conversations. Healthy teams and businesses celebrate those people who take these sorts of risks. Besides trust, several other aspects contribute to psychological safety. Let's explore the factors of psychological safety.

Physical safety is the first factor of psychological safety. Physical safety is lost when someone fears harm from accidents or jobs that might experience physical violence, such as law enforcement, construction, or health care. As fear and allostatic load increase, energy and focus shift to creating as

much safety as possible in dangerous situations. Fear knocks the person out of their window of tolerance, leaving little capacity to focus on anything else (Passmore, 2016).

Next, social safety builds confidence that others will respect their psychological well-being. A sense of social safety evolves out of the knowledge that others will not put them down, gossip about them, or stab them in the back. Social safety allows people to take risks, knowing that their ideas will get heard, and people will respect them for their vulnerability. People thrive in healthy relationships where they feel valued both as a person and a professional. Being appreciated as more than a small part of a business machine elevates engagement, morale, and motivation (Bloom & Farragher, 2011).

Finally, moral safety gives people faith that the business and its leaders will operate within its shared values and not ask them to go against their morals and ethics. We will discuss the importance of shared values in future chapters as a crucial component to engagement and ensuring ethical behavior and decisions.

Violating moral safety elicits a type of stress termed moral distress. Moral distress occurs when people feel the leader's or business' directives or actions deviate from values, expectations, morals, and ethics. The person knows the right thing to do, but business or other restraints make it impossible to pursue the right course of action.

When moral distress hits a certain level of intensity and goes on for a duration of time, it results in moral injury. For many, moral injury is the traumatic response resulting from moral distress, creating allostatic overload. Unlike other traumatic experiences, like workplace violence, moral injury is

more difficult for leaders to identify. Leaders usually notice the fight, flight, or freeze behaviors and might label these people as insubordinate or problematic (Barnes, Hurley, & Taber, 2019; Bloom & Farragher, 2011; Duhigg, 2016).

When leaders and businesses violate psychological safety, people will seek bonding with co-workers to find safety in numbers from leadership. This bonding often results in a team fight-or-flight response. Leadership might interpret the increased sympathetic response as disrespectful and divisive. In reality, it is a natural stress response. When leaders with power make people feel unsafe, one of the few ways to counteract this is to gather other frustrated people to fight against a shared enemy, a phenomenon termed trauma bonding.

Human beings thrive in trusting safe relationships and struggle in dysfunctional and chaotic ones. When trust and safety are high, HRV usually follows, as psychological safety calms the sympathetic nervous system, allowing people to bring their best cognitive, emotional, and social selves to their work. People thrive in relationships based upon mutual trust and safety, which has a positive impact on everything from turnover, applicants for employment, productivity, creativity, the life span of the business, ability to learn, and conflict (Bloom & Farragher, 2011; Bloom & Farragher, 2013; Lewis, 2006; Wagner & Harter, 2006).

Next, let's examine leadership traits that create a strong foundation for trust and psychological safety to grow. These traits allow the leader to turn healthy relationships into high performance.

Mindfulness

Mindfulness allows a leader to recognize when their own cups are filling up and their states begin shifting from ventral vagal to sympathetic or dorsal vagal. A mindful leader provides the consistency of focus and emotional stability crucial for building trust and promoting psychological safety. When distress rises, mindfulness and emotional regulation are two of the most effective tools leaders have to tame the chaos. Co-regulation is difficult enough during good times. In a crisis, the leader's calm plays a crucial role in providing co-regulation to help people manage their sympathetic response and find the intellectual and social capacity to make it through the storm.

When leaders realize that their allostatic load is reaching the edge of their window of tolerance, they have the power to choose their response and utilize the FLARE skills discussed in the previous chapter. Catching their increasing allostatic load allows them to implement FLARE to counter the distress. This insight helps avoid allostatic overload, which negatively affects the team and business culture (Bennett, 2020).

An HRV biofeedback and mindfulness practice helps the leader develop an easily accessible coping skill that brings a sense of calm and peace when distressed. A mindfulness practice focused on breathing helps them develop the breath as a coping skill. When the leader recognizes their cup filling with distress, they can take a focused breath and bring the peace and calm they feel when they practice breathing into that moment of growing anxiety. Over years of practice, they benefit by recognizing their shifting state and then taking a few breaths to keep emotions regulated and remain in the

window of tolerance (Siegel, 2007; Siegel, 2011).

Leaders are the role models for health and wellness for the people they manage. For a team to maximize the benefits outlined in the mindfulness and biofeedback chapter, a leader must practice these themselves and communicate their experience regularly. When a leader engages in HRV mindfulness and biofeedback training, they not only build the traits essential for trust and psychological safety, they also communicate the importance of this practice in the culture

.

Honesty

James Kouzes and Barry Posner (2017) have implemented a survey with millions of people worldwide since 1987. Every participant was asked the following question: “What values, personal traits, or characteristics do you look for and admire in a leader?” In every survey in every country over the decades, the number one thing people wanted from their leaders was honesty.

Honesty is foundational to trust and psychological safety, as well as to all the leadership approaches that follow in this book. One aspect of honesty is the obvious one. Leaders should not lie to their people. While obvious, it is amazing how many examples we collected over the years where leaders lied out of convenience or lack of courage. Once the lie is exposed, it destroys the leader's integrity, distress increases, and the culture suffers.

As consultants, we have only witnessed a couple of cases where a leader recovers after an exposed lie, as most do

not survive the fallout. In these situations, the leader and their people spent a lot of time rebuilding trust. While the time and effort taken to repair the distrust must happen, those involved had little energy to focus on performance or business outcomes during the process.

The second aspect of honesty challenges the leader to confront difficult facts. In many situations where a leader gets caught in a lie, they choose to lie because they think it is easier than dealing with the problematic nature of the truth facing the business. Avoiding the short-term distress of sharing the truth leads to long-term financial, relational, and time cost necessary to repair the harm done. If people do not believe their leader will honestly disclose the business's challenges, creating the high-trust environments needed for excellent outcomes is impossible (Collins, 2001; Collins & Morten, 2011).

Confronting difficult facts also requires leaders to provide honest feedback on individual and team performance. The longer the leader allows certain counterproductive behaviors to continue, the more significant the effects on team morale and outcomes. It might seem easier in the short term to avoid these uncomfortable conversations. Unfortunately, the impact of these behaviors worsens over time and often leads to more significant disciplinary and performance issues (Wagner & Harter, 2006).

The third aspect of honesty is open communication. Leaders get privileged information that those lower down on the organizational chart do not receive. Access to this information represents power within the business culture. No leader can or should attempt to communicate everything to their people. The tricky balance leaders need to strike is ensuring they provide the information people need to do their

work and understand the health and challenges of the business, while keeping people focused on their work.

Informal networks account for 70% of business communication. Anywhere from 10 to 25% of the communication in these networks is inaccurate. People talk, and like the game of telephone, the more they talk, the more distorted the information is that they communicate (Bloom, 2006; Bloom & Farragher, 2011).

The challenge to the leader entails identifying what information is critical for people to do their work and for building trust, and then finding ways to communicate it effectively and efficiently. Open communication helps to counter misinformation and gossip. People are also more likely to bring rumors and misinformation to a trusted leader's attention. Once identified, the leader then strategically injects the corrected information back into the system.

Humility

Modern business glorifies the celebrity leader. These leaders seem to know everything about the present, have a strategy and answer for every question, and appear to know what will happen in the future. They love and need attention, praise, and fame. Celebrity leaders rise like rockets and grace the covers of magazines, write best-selling memoirs, and star on popular television shows. The message new leaders often get from these very visible celebrities is that the leader is the most critical variable in a business' success.

Unfortunately, most of these leaders fall hard and fast. Their hubris blinds them to threats and changes in the market and they stop asking essential questions. When a crisis hits, they lack the trust needed for a collective resilient response (Collins, 2009).

Many view humility as an innate trait. Someone is either humble or not. In earlier chapters, we learned that repeated states eventually develop into personality traits. The challenge is for leaders to see humility as a trait to grow and a strategy for engagement and high performance.

Think of humility as a top-shelf expensive glass of whiskey. As any whiskey connoisseur will explain with great passion, you should never put ice in your whiskey, as it changes the molecular structure of the whiskey and diminishes taste. Instead of ice, a good whiskey needs a small amount of filtered water. Most whiskey gets bottled at a strength where the alcohol quickly overwhelms the taste. The water allows the complexity of the flavor profile to develop to maximum enjoyment from the dram.

Humility is the water added to the whiskey. A leader's humility opens the flow of communication and knowledge up and down the organizational chart. Just as the space provided by the water allows for maximum enjoyment of the whiskey, humility enables people and teams to thrive, promoting teamwork and opening the communication necessary for trust and high performance (Collins & Porras, 2004; Collins, 2001).

Humility is more than the absence of narcissism and hubris. It is the understanding that the leader is one part of a business's overall success. Great leaders understand that they do not know everything and cannot possess all the correct answers or necessary expertise.

Creative and innovative solutions emerge from the group's collective knowledge, not from a single powerful individual. The more perspectives and expertise the leader elicits, the more likely it is that they have the necessary information to make an educated and correct decision. Allowing others to be a part of a collaborative decision-making process also increases buy-in and the potential for the decision to be successfully implemented (Hamel & Breen, 2007).

Empathy and Accountability

Building trust and psychological safety relies on the leader's ability to understand other people's perspectives and experiences. Healthy cultures and relationships that help people manage distress depend heavily on the leader's empathy. According to Miller and Rollnick (2012), empathy is the *ability to understand another's frame of reference and the conviction that it is worthwhile to do so*.

Striving for empathy shows that the leader values the person, and that what they are saying is important. Empathy challenges the leader to approach a situation with curiosity and without immediately jumping to judgment. To be an effective coach, it is vital to see empathy as a worthwhile endeavor and something proven to improve HRV (Lischke et al., 2018).

Empathy is the foundation for any healthy personal or professional relationship. As the one with more power, the leader needs to make a concerted effort to understand the other person's point of view. Expressing empathy does not

mean the leader will not hold the person accountable for their performance. The goal is to understand the “why” behind the behavior. Understanding the why helps to not only address the specific situation but to address more significant system issues or other variables that led to the situation.

Empathy helps leaders avoid a common mistake termed the accountability fallacy. According to Connors and Smith (2009),

The Accountability Fallacy captures a common mistake people make when they assume that others fail to follow through because there is something wrong with them...When leaders fall prey to the Accountability Fallacy, they not only assume that their people are flawed, but that they themselves can do little or nothing to change those flaws except punish people for having them. Real accountability always requires us to begin by looking at ourselves for anything that might be missing.

In difficult situations, empathy challenges leaders to set aside their frustration and view the person as a valuable human being who is more than just the sum of their current behaviors. Confronting someone about their behaviors and shortcomings often makes the person defensive, making it more likely that the problem will occur again. Counterintuitive to many traditional approaches, behaviors rarely change when someone is confronted and lectured on why they are wrong. Instead, change occurs when that person understands the reasons behind the action and collaboratively works toward finding solutions (Miller & Rollnick, 2012).

Empathy sets the stage for a partnership. Those following the accountability fallacy believe that if the leader enacted the right mix of rewards and punishment, change would follow. Research demonstrates that empathy and

understanding are, in fact, better predictors of improved performance (Murphy, 2008).

When leaders create partnerships, they understand that the other person is the expert on themselves. Bringing the person into the problem-solving conversation helps them feel valued, which is a very different experience than being on the receiving end of a discussion about punishment. The truth is that the leader does not have all the answers and solutions. If that were the case, every workplace would resemble a utopia without any problems or disruptions.

Chapter 7: Eustress, Job Resources, and HRV

The JD-R Model shows that engagement results from a mix of eustress, motivation, and job resources. Eustress results from job demands that challenge people to perform at optimal levels. How a leader manages specific job demands has a tremendous impact on engagement, motivation, and outcomes.

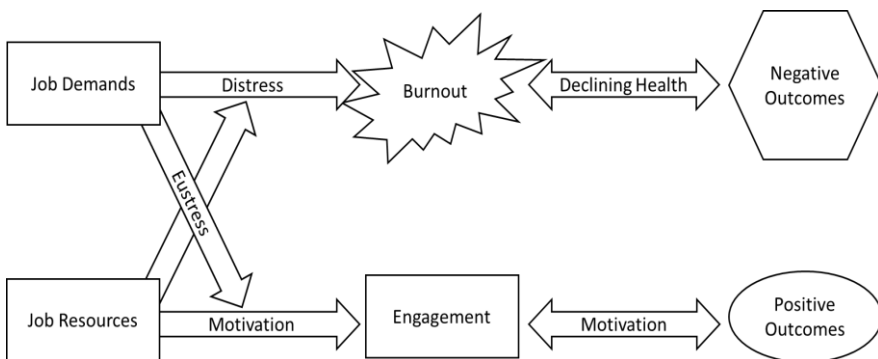


Figure 12: Job Demands and Resources Model

At this point in the book, it is evident that a leader's ability to help manage distress and burnout is a crucial factor in the outcomes a team or business achieves. In some other reality where humans are not so complicated, the leader's reward for this challenging accomplishment would be improved outcomes. In our human reality, however, effectively managing distress and burnout creates a *capacity* for engagement, lessening the chance for adverse outcomes, but not guaranteeing business success.

In this chapter, we explore the precarious dance between what makes stressors distress or eustress. How a leader approaches job demands and job resources plays a crucial role in whether the stressor contributes to burnout or engages people toward positive outcomes. Remember, to get to engagement, the leader must first position job resources to address the distress inherent to the job demands. Then, as Matt likes to say, "It's time to Rock and Roll!"

You can find a summary of the activities suggested in this chapter in Appendix 5.

Eustress and HRV

There exists a very fine line between whether a person perceives a stressor as distress or eustress, as both disrupt homeostasis and demand action to regain a balance with environmental demands. For example, assigning someone their dream project and providing them with the time and resources to experience success elicits a tremendous amount of eustress, helping to fuel the motivation necessary for positive outcomes. However, if the person lacks adequate time

and the leader does not provide the resources required for success, the exact same assignment quickly leads to distress and burnout.

Whether a stressor leads to engagement or burnout depends significantly on the person's current state and allostatic load. Let's return to the cup analogy. People are likely to experience a new challenge as eustress if they are firmly in their window of tolerance and have plenty of room in their cup to manage the additional stress the challenge adds. When someone's daily readings and 7-day average are high, it is an indication that they are effectively managing their allostatic load and can take on new challenges without getting overwhelmed.

When someone struggles to stay in their window of tolerance, even exciting new challenges get interpreted as distress. Assigning a new project to someone in the early stages of burnout might get them excited in the short term, but if they do not recover, they will struggle to find the energy and cognitive capacity to succeed. HRV monitoring is a competitive advantage because it helps leaders avoid setting new initiatives up for failure by assigning crucial tasks to those lacking capacity for success. If individuals and teams struggle with low HRV, the leader is more likely to succeed by first addressing the distress and burnout before taking on an important new project.

As early as the beginning of the 20th century, two psychologists, Robert Yerkes and John Dodson, demonstrated the importance of an optimal level of physiological activation in peak performance. They formulated what is now known as the Yerkes-Dodson Law, which states that when physiological activation is too low, so is performance. If physiological activation is too high, performance suffers as well. There exists

a sweet spot of activation that allows people to perform at their best.

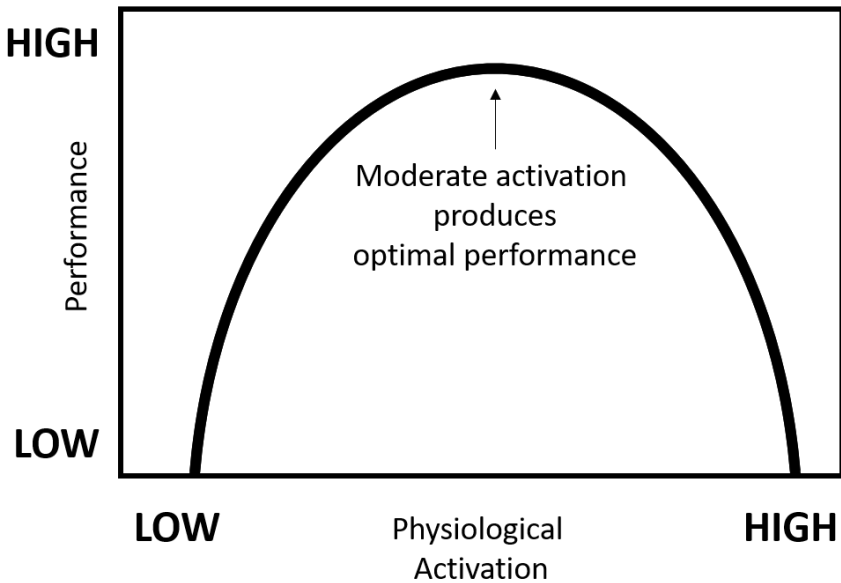


Figure 13: Yerkes-Dodson Law

The specific level of physiological activation needed for peak performance varies from task to task. For example, the level of activation necessary for running a personal best in a 5K is quite different from the level of activation needed to deliver an excellent presentation. The trick is to achieve the optimal activation level for the task at hand.

How does somebody know the right amount of activation they need for success and to elicit the proper sympathetic/ventral vagal balance? Self-regulation lies at the heart of the mind and body's ability to settle into the sweet spot of activation for each task. Again, HRV plays a crucial role in matching activation to the task. Remember that HRV is an indicator of the ability of the mind and body to self-regulate allostatic load and maintain homeostasis.

Too much or too little stress yields performance lags. HRV monitoring provides the leader with data to ensure the capacity for a new challenge that will engage people in pushing themselves to achieve positive outcomes. In the cup analogy, the leader wants to push people to the edge of their window of tolerance without overwhelming their capacity. Tony Schwartz (2010) states:

Leaders inspire higher performance by pushing those they lead beyond their comfort zones: challenging, stretching, exhorting, emboldening, and inspiring them to exceed their own limits. Stress is the means by which we expand capacity, as long as it's balanced by intermittent renewal.

HRV measurement provides leaders with quantitative data to help ensure that capacity exists, and people push themselves without experiencing allostatic overload throughout the project or challenge. As eustress increases, HRV might decrease slightly, and the person has a chance to adjust their level of activation to this novel stress. The leader should work with the person to ensure their excitement does not turn into distress.

Schwartz's statement of intermittent renewal supports the research reported in previous chapters on breaks throughout the day and the use of time off for recovery. A leader helps prepare the person for the challenge with resources and support to elicit peak performance for a set period of time. Recovery and renewal allow the individual and the team to bring their best to the next challenge they face with the lessons learned and confidence gained from meeting the previous success. Tracking HRV scores quantifies this dance between challenge and recovery.

Shared Values

Eliciting motivation for excellence requires the leader to manage the relationship between shared values, shared vision, and motivation. A shared vision is a destination. Shared values are the means by which the business reaches the vision. Motivation is the fuel for the journey.

Values are guiding principles that are timeless and require no external justification. There are tremendous benefits for businesses operating from shared values. The power of shared values comes from helping people realize how their work allows them to apply their values and life purpose to their work.

Personal values are a small set of concepts that define the personality and aspirations of the person. As a powerful motivator, leaders could help their people to identify their values. Several questions can help people identify their values. A work session focused on values is a great team-building activity.

- What beliefs and convictions are core to who you are and that you would never change?
- What do you care most about in life?
- What are the rules you live by?

There are no hard rules on the number of values a person should identify. The typical number is between five and seven. Some people find it helpful if they have a list of possible values to help them identify their own personal values. A quick internet search will provide many options for these value lists.

An individual's answers to these questions serve as critical motivators and sources of resiliency. The process for creating shared values from here will differ depending on the size and strategy of the business. The crucial next step for a business without established shared values is to bring the activity from the individual identifying their values to the business identifying its values. In larger businesses, leaders might consider having teams work on their collective values.

A few questions can help guide this process and assess if the word is powerful enough to serve as a value (Collins, 2022).

- If you were to start a new business, would you build it around this value?
- Would you want us to continue to stand for this core value one hundred years into the future?
- Would you want us to hold this value, even if at some point the environment penalized us for living this value?
- Do you believe that those who do not share this value should not work for the business?
- Would you change jobs before giving up this core value?

Smaller businesses might create a set of shared values at a retreat. Larger ones can lead teams through the process and have representatives from teams come together and create shared values for the entire business. These larger businesses might consider bringing in an outside consultant to help them structure and facilitate this process.

Establishing shared values is only the first step. Gallup found that only 27% of people strongly believe in their

business' values. Only 41% strongly agree that they know what their company stands for and what differentiates their business from competitors. The process of establishing shared values sets a standard for leaders to strive to live up to every day (Clifton & Harter, 2020).

Leaders need to be the embodiment of the business' values. The leader's job is to keep these values at the forefront of people's minds. Leaders breathe life into values by helping people connect their values to their work and the work of the business. One measure of success is simple to measure. Once a business identifies its values, ask people to name them. If they cannot name them, it is not their fault, but the fault of their leadership. The challenge is to ensure that there is enough exposure to the business' values that they become part of the business' DNA.

One meaningful way to integrate values into the business' DNA is by implementing a values-based decision-making process. After defining the problem, the team names the possible values that might help guide the decision and select the key ones that should drive the decision-making process. Revisit these values at the beginning of every team meeting or discussion about the change. As a solution emerges, continue asking, "Does this solution support our shared values?" When communicating the decision to others, explain how values helped guide the process (Bennett & Gibson, 2006).

The above process works well for more significant decisions. Shared values also provide an ethical foundation for actions and more minor choices made every day and in every meeting. When values are shared and people apply them to more minor decisions, leaders can trust their people even if they are not in every meeting or part of every decision.

Values should speak to the heart and soul of the business and its culture. Chapter 6 showed the destruction done when a business or leader acts against shared values, violating moral safety. Moral distress negatively impacts HRV and trust in the leader. If unaddressed, this moral distress will result in moral injury. Besides decreases in HRV and mental health, moral distress and injury decrease job satisfaction, commitment, and performance. It leads to an increase in distress, burnout, and turnover (Barnes, Hurley, & Taber, 2019; Kouzes & Posner, 2017).

While moral injury destroys trust and psychological safety, shared values pay off in measurable business results. Compared to businesses without shared values, those with shared values saw revenues increase four times. Stock prices grew five times faster and profit performance increased by an astounding 750%. Values might not show up on a balance sheet as a line item, but they powerfully impact the bottom line (Kouzes & Posner, 2017).

In addition to financial excellence, shared values also increase job creation by seven times. When connected to values, business goals become more powerful, as job expectations directly relate to the success and purpose of the business. Values help leaders prioritize what is truly important and help people focus energy on activities that lead to success (Kouzes & Posner, 2017).

Shared Vision

A shared vision creates motivation by setting an ambitious and inspiring goal that challenges everyone to work

together to achieve something great. This shared vision comes to life when a leader connects the future direction of the business to the passion and values of their people and helps them see how their work can positively impact the world. Without a vision, businesses can get lost, chasing quick short-term payoffs or the business trend of the month while losing sight of tasks that help differentiate them as a leader in their market.

Like shared values, a great way to assess if a business has a shared vision is to ask people. Ask them what the business will look like five to ten years from now and how their work and the work of their team contribute to the vision. Visions should speak to everyone's ambition, motivation, and passion, not just to those in leadership.

An excellent tool for framing a shared vision is the Hedgehog Concept. Hedgehogs do one thing really well, and that is to curl themselves into a protective ball of sharp spines. No matter how hungry its predator is, the thought of a mouthful of sharp spines keeps the little animal safe. Similarly, businesses that do one thing better than anyone else not only survive but can thrive in their environment (Collins, 2001).

The Hedgehog Concept is the intersection of purpose, passion, and ambition. This intersection is where excellence happens in great businesses. Purpose comes from an understanding of why the business exists. Simplistic answers such as "to make money" or "to create value for shareholders" do not motivate most people. Leaders and their people need to go deeper and ask what real value the business delivers to the world.

Many businesses find it helpful to create a shared purpose or mission statement while creating or revising shared values. The purpose tells people why the business exists, and values let them know how it operates. Creating a shared understanding of the *why* and *how* of a business will help focus energy and effort toward thinking and actions that support the vision. Here are some questions that help test a good purpose statement.

- Do you find this purpose personally inspiring?
 - Does the purpose help you think expansively about the long-term possibilities and range of activities the business can consider beyond its current products, services, markets, industries, and strategies?
 - Does the purpose help you to decide what activities not to pursue, to eliminate them from consideration?
 - Is this purpose authentic—something true to what the business is all about—not merely words on paper that “sound nice”?
 - Would this purpose be greeted with enthusiasm rather than cynicism by a broad base of people in the business?
 - When telling your children and/or other loved ones what you do for a living, would you feel proud in describing your work in terms of this purpose?
- (Collins, 2022)

As with values, first have people identify their personal purpose. Personal values state a set of guiding principles. A personal purpose evolves out of their values and creates a statement describing how the person lives their values to accomplish what is important to them.

These individual purpose statements provide the leader with a deep understanding of what motivates their people. Larger businesses should allow teams or departments to create a purpose statement for how that unit supports the larger business and vision. The data collected throughout this process will inform the business' purpose statement.

Purpose provides the *why*. Passion speaks to the emotional investment between people and their work, leaders, and the overall business. As mentioned in the Fit section, only 20% of people answered a strong 'yes' to the question: "Do you like what you do each day?" A lack of fit is a part of the problem. This finding also demonstrates a lack of passion in the typical business (Rath & Harter, 2010).

When work becomes just a job, people will struggle to find motivation for excellence. They show up for the paycheck. When pay becomes the most potent motivator, meeting basic expectations or striving for personal gain becomes the focus. Whether work is just a job or it is a calling is a crucial leadership focus when establishing a shared vision (Duckworth, 2016; Wagner & Harter, 2006).

In sports, the vision is usually to win the championship. The leader, like a great coach, must help every person see their role in accomplishing this vision. The leader strives to help everyone see the benefits for reaching the vision, understands how the work of each individual and team furthers the effort to realize the vision, and knows their people well enough to connect the vision to the individual's values and aspirations.

People desperately want to be a part of something great. Sports fans pack stadiums hoping that this is the year their team wins the championship. Fans of the arts spend a lot

of money to see a fantastic performance in person when they could easily save their money and listen to the same music or watch a recorded performance at home. This innate desire for winning and greatness comes with them to work every day. Great leaders and businesses harvest this potential passion by giving everyone something inspirational and exciting to contribute to each day when they come to work.

While a championship in sports is an apparent concrete goal, creating a shared vision requires establishing an equally tangible goal. The final aspect of the Hedgehog Concept is answering the question, “What can we be the best in the world at?” What is the business’ equivalent of the Super Bowl, World Cup, or Oscars?

Engaging people around this question after establishing shared values and purpose challenges them to apply the business's strengths to reach some future state. The best way to elicit motivation around getting to this future state is through a goal-setting process. Jim Collins calls this goal the Big Hairy Audacious Goal or BHAG. Accomplishing a BHAG is not easy. It challenges everyone to find innovations, develop new competencies, and focus attention and energy on a defined set of variables that allow the business to accomplish this goal. Think of the vision as a sports championship. At the beginning of the season, even the favorites rarely have 50% odds of completing the goal (Collins, 2001).

A strong vision or BHAG should answer the following:

- What images or emotions does the future state described in the vision elicit?

- Does it use specific, concrete examples and analogies to bring the vision to life, rather than bland platitudes?
- Does it express the ultimate potential of our passion, values, and purpose?
- When reading the vision, do you think, “Wow, it would be fantastic to be a part of that, and I’m willing to put out significant effort to realize this vision”?
- Will the vision excite a broad base of people in the business, not just those with executive responsibility?
- Do you believe the business has less than a 100% chance of achieving the vision (50% to 70% chance is ideal), yet at the same time acknowledge that the business can achieve the vision if fully committed?
- How will we know we reached the vision and what metrics will we use to measure progress and completion? (Collins, 2022)

The idea of shared values, purpose, vision, and expectations all set up a culture of accountability. The work put into developing these establishes norms and behavioral expectations for individuals, teams, and the business. Everyone becomes accountable to ensure their behaviors align with shared values and promote the shared vision. When behaviors contradict values or hinder progress toward the shared vision, it provides a context for leaders to address the issue based on a shared understanding of what is vital for business success.

Cognitive Dissonance and Motivation

One of Matt's areas of expertise is in a cognitive behavioral therapy approach called Motivational Interviewing or MI. MI is the gold standard in psychology for helping people find the motivation to change thinking or behavior to achieve their goals. According to William Miller and Stephen Rollnick (2012), the creators of MI:

Motivational interviewing is a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion.

Decades of research in MI help leaders effectively manage eustress to improve motivation, supporting thinking and behaviors to improve outcomes. MI helps leaders utilize a specific type of eustress called cognitive dissonance to help people find the motivation to improve performance. Cognitive dissonance emerges from discrepancies between the person's desired outcomes and current reality (Miller & Rollnick, 2012).

People thrive when they live a life according to their values and purpose. Similarly, teams and businesses succeed when values, purpose, and vision guide their behaviors. The power of shared values, purpose, and vision is that they elicit eustress and motivation to realize the vision, but create anxiety and stress if behaviors and outcomes do not promote these agreed-upon norms.

Discrepancies are the differences between the business'

outcomes and envisioned future and its current reality. When people realize that their behaviors are out of alignment with values, purpose, or vision, it creates cognitive dissonance. By its nature, cognitive dissonance is uncomfortable, as discrepancies force people to confront their shortcomings.

It is natural for people to search for ways to bring their behaviors back in line with expectations. Cognitive dissonance can become a motivator for improved performance and innovation (Miller & Rollnick, 2012).

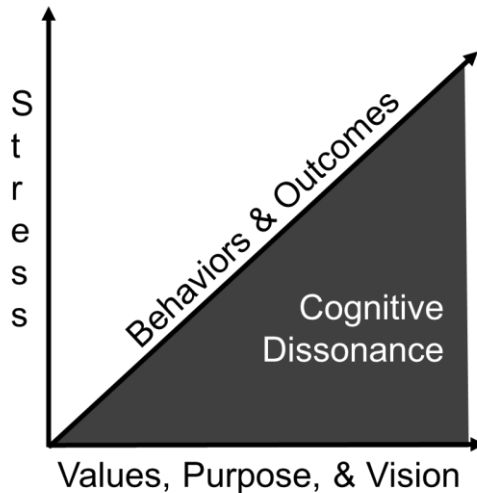


Figure 14: Cognitive Dissonance

There are two types of motivation resulting from the desire to resolve cognitive dissonance. The first is push motivation. Push motivation results when aspects of the current reality create cognitive dissonance. As an example, let's say that quarterly data shows that outcomes failed to meet established targets. This feedback proves that the team is falling short of helping the business reach its vision and quarterly milestones. Sitting in this reality does not feel good and will motivate the team to correct the situation next

quarter.

The second type of motivation resulting from cognitive dissonance is pull motivation. A shared vision by nature describes a better desirable future. A good vision challenges the business and its people to make specific behavioral changes to reach the ambitious vision of the future. Pull motivation results from someone realizing that their current ways of thinking and operating prevent them from benefiting from a realized vision.

If someone has room in their cup, cognitive dissonance becomes eustress and motivation for innovation, improved outcomes, and making complex changes. Not surprisingly, higher HRV predicts flexibility to turn cognitive dissonance into motivation. For people already struggling with burnout, cognitive dissonance will feel like more distress in an already full cup. People need the energy to resolve cognitive dissonance. When exhaustion or business barriers prevent realignment, it results in moral distress and injury (Hansen, Johnsen, & Thayer, 2009).

Leaders play a crucial role in whether people perceive cognitive dissonance as distress or eustress. The leader needs to help people to identify pathways and position job resources to help people and teams resolve conflicts between their current situation and desired state. Sometimes people need additional resources, to brainstorm with their leader to find solutions to poor performance, or to address other issues behind their cognitive dissonance.

Chapter 8: Engagement

In this chapter, we finally arrive at the box of engagement. To reinforce the point, leaders must effectively manage distress and the top line of the JD-R Model, opening up the capacity for engagement to occur. Schaufeli and Bakker (2004) define engagement as:

Positive, fulfilling, work-related state of mind characterized by vigor (i.e., high levels of energy and resiliency), dedication (experiencing a sense of significance, importance, pride, and challenge), and absorption (being fully concentrated and happily engrossed in one's work).

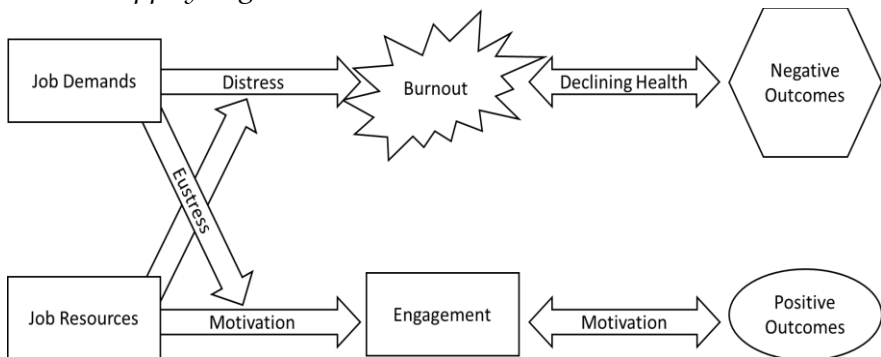


Figure 15: Job Demands and Resources Model
HRV allows leaders to strategically track and manage

the distress and burnout on the top line of the JD-R Model. Just as there is a negative loop where burnout leads to negative consequences, creating more distress and further declining health, positive outcomes increase engagement and motivation. People's wellness improves when they thrive in their work. A good job and engaging work are vital components for a happy and fulfilling life. Effectively addressing distress enables leaders to apply complementary research on engagement resulting from one of the most extensive studies in business history (Clifton & Harter, 2020).

The Gallup Q12 research helps leaders measure their success in engaging their people in ways proven to improve business outcomes. As of 2022, Gallup has studied over 100,000 teams and 2.7 million people worldwide. The simple yet powerful conclusion of the Q12 is that engaged people perform at much higher levels than disengaged people. According to Gallup, "The No. 1 reason Gallup's survey is so powerful is that it provides your company with a proven foundation for improving sales, retention, productivity, profitability, customer ratings, and more" (2022).

Gallup's research demonstrates the extent and cost of a leader's failure to engage their people. It also provides a critical finding on an engagement ratio that all leaders must strive to achieve.

Actively disengaged employees erode an organization's bottom line while breaking the spirits of colleagues in the process. Within the U.S. workforce, Gallup estimates this cost to be more than \$300 billion in lost productivity alone. In stark contrast, world-class organizations with an engagement ratio near 8:1 have built a sustainable model...As organizations move toward this benchmark, they greatly reduce the negative impact of actively disengaged employees while unleashing the organization's potential for

rapid growth (Wagner & Harter, 2006).

Through Gallup's extensive research, they found that individuals in high-performing teams and businesses tend to answer affirmatively to the following twelve workplace elements (Gallup, 2022):

I know what is expected of me at work.

I have the materials and equipment I need to do my work right.

At work, I have the opportunity to do what I do best every day.

In the last seven days, I have received recognition or praise for doing good work.

My supervisor, or someone at work, seems to care about me as a person.

There is someone at work who encourages my development.

At work, my opinions seem to count.

The mission or purpose of my company makes me feel my job is important.

My associates or fellow employees are committed to doing quality work.

I have a best friend at work.

In the last six months, someone at work has talked to me about my progress.

This last year, I have had opportunities at work to learn and

grow.

When comparing disengaged versus engaged teams, Gallup found engagement led to declines of 81% in absenteeism, 64% in accidents, 43% in turnover, and 41% in quality defects. Engaged teams experienced a gain of 10% in customer loyalty and engagement, 14% in productivity, 18% in sales, 23% in profitability, and 66% in people's well-being (Clifton & Harter, 2020)

Reviewing the Q12, it is easy to connect many of these engagement markers with concepts in previous chapters. The elements *I know what is expected of me at work* and *At work, I have the opportunity to do what I do best every day* speak to shared expectations and fit. Creating shared expectations and getting people in positions that match their passion and skills do not just help manage the distress from job demands. It promotes engagement.

The elements *The mission or purpose of my company makes me feel my job is important* and *My associates or fellow employees are committed to doing quality work* connect engagement to the concepts discussed in the previous chapter. The purpose, mission, shared values, and shared vision engage people around the work of the business and help them see the importance of their contribution. The commitment to quality work speaks to one of the foundations of trust and accountability in promoting engagement.

The rest of this chapter focuses on the job resources and strategies that promote engagement and motivation by exploring the remaining Q12 elements and how a leader works with individuals to maximize engagement. Just a reminder, most leaders get very excited about strategies to promote engagement, improve quality, and get better

outcomes. The success of these strategies relies heavily on the health and wellness of the individual, teams, and business. Burned-out people do not possess the energy and capacity to engage fully in their work.

HRV provides leadership with a metric to measure the effectiveness of their engagement efforts. Most businesses find that they have work to do on the top line to improve people's health before moving to engagement strategies. The work on distress and burnout will pay off in short-term HRV increases and long term in improved cognitive, stress management, and relational capacity to implement the changes discussed in these final chapters.

Feeling Cared About as a Person

Matt entered his MBA program a couple of days before officially completing his Master in Psychology and just as the Q12 began to gain public attention. After spending seven years studying how people heal and grow in therapeutic relationships, it did not surprise him to see the importance of relationships in business success. However, his classmates and professors struggled with the Q12, as they challenged existing business thinking about the importance of relationships.

Gallup's work forced people to think about factoring relational health into the bottom line and outcomes of a business. As consultants, we review many Q12 surveys of our clients. We find that almost half remove the elements *My supervisor, or someone at work, seems to care about me as a person* and *I have a best friend at work*.

When we ask why, we usually hear something like, “We are not in the business of best friends” or “We find it hard to define caring.” These leaders find the Q12 significant enough to take the time and cost to implement it as a survey and pay for industry-specific data, yet something about these two questions scares many leaders. As discussed in earlier chapters, leaders must pay attention to relational health to co-regulate distress and build trust.

Several studies demonstrate the power of social support at work on HRV, making a strong argument not to remove these social questions. While creating friends among co-workers does not make it onto many strategic plans, positive answers to the best-friend element demonstrate that they get support and enjoyment from their co-workers. This social support becomes a source of resilience and engagement in healthy cultures (Baethge, Vahle-Hinz, & Rigotti, 2019).

Gallup found that relational health plays a crucial role in engagement. The study also found that people who answered positively to the element *My supervisor, or someone at work, seems to care about me as a person* is a significant metric for high-performing individuals and businesses. Unfortunately, only 38% of people felt like their leaders valued their well-being. Fifty percent of people felt that their well-being didn't matter at all to their leaders, and only 10% felt like they were a vital asset to the business.

Maybe the reason many leaders excluded the relational question is that they knew they would get uncomfortable negative feedback from their people. One of the crucial findings on the caring question concerns increased turnover rates. Turnover rates are up to 37% higher for people with a negative answer to the caring question. Additionally, those

who felt cared about had a better understanding of the business' goals, increased trust, improved collaboration with leaders and co-workers, and a solid commitment to the business (Wagner & Harter, 2006).

We discussed relational health earlier in the book. Here, we want to build on that information and discuss how leaders can demonstrate caring. While each leader's personality may manifest this strategy differently, all leaders need to view caring as a business strategy that promotes engagement and improves outcomes. Nothing could clarify the leader's role in engagement more than Gallup's finding that 70% of the variance in team engagement is attributable to the leader (Clifton & Harter, 2020)

The first variable necessary to demonstrate caring is time. Chapter 6 showed that trust takes dedicated time to build and maintain. This time investment shows that the leader values the person enough to dedicate time to their wellness and professional development. Leaders should not overlook the impact of their time and attention. For people who trust their leaders, time and attention become potent reinforcers. Without an investment of time, relationships will not promote engagement.

The second variable is caring about the worker as a person. One of the best ways to show people they are a vital asset to the business is to show interest in their lives outside work. Time spent on small talk about family, hobbies, sports, favorite television shows, and children is time well invested. Every leader cares about their people's ability to get work done. Those with an engaged workforce also take the time to learn about their people and their personal lives.

It is in the leader's best interest to make a personal

connection with each person they supervise at least once a week, or for smaller teams, as frequently as every day. Connecting regularly with people demonstrates the leader cares while allowing them to get the pulse of the team or business by tapping into informal communication networks (Buckingham & Coffman, 1999; Schwartz, 2010).

The next variable to demonstrate caring is the leader's expectations of their people. The leader's belief in the ability and motivations of their people creates a set of self-fulfilling prophecies. When leaders believe someone can excel, it often predicts their ability to achieve excellence. A great example of self-fulfilling prophecies and performance is the Oak School experiment. James Rhem (1999) describes the experiment.

In the famous Oak School experiment, teachers were led to believe that certain students selected at random were likely to be showing signs of a spurt in intellectual growth and development. At the end of the year, the students of whom the teachers had these expectations showed significantly greater gains in intellectual growth than did those in the control group....First graders in the control group showed a gain of twelve IQ points; persons in the experimental group showed a gain of 27.4 IQ points.

That's right, the students whose teachers expected them to excel gained twice the IQ points when compared to their peers in the control group, even though there was no difference between the groups before the study. Just as research demonstrates that a teacher's belief impacts student performance, it also shows that a leader's belief in their people is a potent predictor of performance. The correlation between belief in a person's ability and performance levels is known as the Pygmalion effect.

The effect gets its name from an artist in Greek

mythology. Pygmalion created a beautiful statue of a woman and fell in love with his creation. A couple of millennia later, George Bernard Shaw wrote the play *Pygmalion*. In his play, the main character, on a bet, trains an impoverished girl to fit into rigid British upper-class society, a story line that was replicated in the musical *My Fair Lady*.

In leadership, the Pygmalion effect distinguishes two types of leaders: Theory X and Theory Y leaders. Theory X leaders believe that people work because the business pays them, and if not constantly monitored, they will stop working. Theory X leadership is more than the act of micromanaging. It is leading from a place of distrust. People with a Theory X leader jump to meet every demand of the leader while losing internal motivation or creativity.

Theory Y Leaders believe that people work for intrinsic motives. They work harder and achieve more because of the satisfaction they receive from good work. Theory Y leaders still set shared expectations and guidance, and then trust their people to meet these expectations.

The interesting finding is that leaders hire or transform people to fit either the X or Y theories. Leaders create teams that fulfill either a positive or negative view of people. When a leader believes a person will thrive in a position, their chances for success improve. When a leader expects a team to fail on a challenging project, the leader's actions and words will likely serve as a self-fulfilling prophecy, setting the team up for failure (Rock & Page, 2009).

Theory Y leadership is far from viewing the world through rose-colored glasses. Theory Y leadership views their work with what Sandra Schneider terms realistic optimism. Realistic optimism means "being lenient in our evaluation of

past events, actively appreciating the positive aspects of our current situation and routinely emphasizing possible opportunities for the future” (Schwartz, 2010). In addition to supporting engagement and Theory Y leadership, optimism also increases HRV (Ronayne, 2018).

The final way a leader demonstrates they care about their people is through supporting their professional development. We will explore this in the next section

Supporting Professional Development

A leader supporting professional development does two essential things. The first is realizing that professional development serves as a wellness strategy to battle distress and burnout. If someone only focuses on surviving the distress of their job each day, a hard day becomes all-encompassing. If the professionals and leaders establish goals and a plan for their people’s development, then a tough day, while still stressful, becomes part of a more extensive journey. Someone focusing on their development is more likely to view a challenging situation as an opportunity to learn and grow. This shift in perception helps minimize the distress of hard days and weeks and turns some of the distress into eustress as the person learns and grows from the experience (Duckworth, 2016).

Second, professional development is a vital job resource that supports engagement. One of the aspects of job resources in the JD-R Model is the ability to make a difference, develop professionally, and accomplish meaningful goals. It also promotes engagement and addresses the Q12 elements of

There is someone at work who encourages my development; In the last six months, someone at work has talked to me about my progress; and This last year, I have had an opportunity at work to learn and grow.

One key goal of personal development is the creation of a growth mindset. The researcher behind this concept, Carol Dweck (2006), explains the growth mindset in the following way:

This growth mindset is based on the belief that your basic qualities are things you can cultivate through your efforts. Although people may differ in every which way...they believe that a person's true potential is unknown (and unknowable); that it's impossible to foresee what can be accomplished with years of passion, toil, and training.

Burnout and past work experiences are crucial influencers on how a person sees themselves as an individual and professional. Dweck discovered that there was an opposing mindset she termed the fixed mindset. Those with a fixed mindset believe that they were either born with specific talents or not. They think there is little they can do to develop new talents or competencies.

When people with a fixed mindset receive negative feedback or experience setbacks, they feel like something is inherently wrong with them, and they have little ability to achieve future success. Obviously, looking at a setback as a personal failing and not a challenge increases distress, lowers HRV, and makes those with a fixed mindset more prone to burnout.

A person with a growth mindset realizes that success results from the effort put forth. If confronted with setbacks, a

growth mindset motivates a person to search for new creative solutions and apply more effort to turn the setback into success. A growth mindset means recognizing that a better future is dependent on the effort invested in making it a reality. Not surprisingly, research shows that adopting a growth mindset increases HRV (Koh, 1998).

Some people will bring a fixed mindset into their jobs because of their past experiences. The good news is that helping people see themselves as a result of the effort they put into developing their talents and skills strengthens resiliency and engagement, and also communicates that the leader cares about them and feels invested in their professional success. Leaders supporting professional development and the growth mindset show increases of 15% productivity, 10% profitability, and 9% loyalty, making this small investment worth the time and effort (Dweck, 2006; Wagner & Harter, 2006).

A leader's time and support provide the psychological safety for the person to get comfortable with challenging themselves at work. The best leaders see strengths in their people that they don't see in themselves.

Resources

Remember, one determinant of whether someone views a stressor as distress or eustress is perception. Someone might start out excited about a new project or opportunity. They initially view the new challenges as positive and the eustress as a motivator. Whether the leader provides the right resources and support will determine if the stress associated with the challenge will continue to motivate or become a

source of distress and burnout.

Providing the necessary resources addresses the Q12 element *I have the materials and equipment I need to do my work right*. An inspiring shared vision and healthy business culture evoke a desire to achieve outstanding outcomes. When a lack of resources prevents the person from helping the business or reaching personal goals, their motivation and passion quickly turn into frustration, moral distress, and burnout.

Unsurprisingly, people with the resources to succeed achieve better outcomes. Gallup's research shows that customer engagement, productivity, and safety all improve when people feel they have adequate resources. One of the more powerful findings on resources is their relationship with turnover. Leaders who provide the necessary materials and equipment to allow people to succeed may experience 20 to 40% drops in turnover rates.

Democracy

People feel engaged when given power and control over their work. Leaders who empower people and involve them in critical decision-making engage them in the process and ensure their investment in the implementation of the decision. Democracy addresses the Q12 element *At work, my opinions seem to count*. Bloom and Farragher (2011) state the importance of managing distress and burnout in the integration of democracy in a business:

Democracy requires the ability to manage emotions, even in the face of conflict, and to exercise good impulse control. It

requires process and patience; using words as a substitute for action; trusting others enough to share in decision making; a willingness to listen, demonstrate fair play, exercise influence wisely and flexibly; and the willingness to compromise and negotiate. All these are advanced social skills which may be severely impaired by exposure to chronic stress.

Democracy requires high levels of honesty, humility, trust, and psychological safety. The presence of these in a business culture increases collective HRV. This increased HRV helps people make better decisions. The leader uses democracy and collaborative decision-making to unleash the true potential of their people's collective expertise and motivation (Forte, Morelli, & Casagrande, 2021).

Democracy is more than just asking a group to make a decision. It involves making them trusted partners in the success of the initiative and business. When a leader shares power, then accountability, creativity, productivity, job satisfaction, commitment, and overall well-being increase (Bloom & Farragher, 2011; Hamel & Breem, 2009).

Democracy takes time and effort from the leaders. They must provide time, structure, information, and support throughout the process. With all this necessary effort, although it may seem counterintuitive, democracy is cost-effective. Because democracy leads to better solutions and increased ownership and engagement, democracy saves money and time (Hamel & Breem, 2009).

Recognition

The final leadership strategy to increase engagement is recognition. Effective recognition programs promote growth mindsets by supporting and encouraging effort and positive accomplishments. Recognition promotes growth mindsets, builds confidence, and increases motivation.

People thrive in positive environments. Studies demonstrate that for people with similar skills, those who get 5.6 times more positive feedback than negative perform much higher on a range of activities than those with lower positive-to-negative ratios. Conversely, those who received 2.8 times more negative than positive feedback struggled the most (Achor, 2010; Wagner & Harter, 2006).

When comparing high-recognition business environments to low ones, high-recognition environments have an incredible 64% increase in engagement. A focus on recognition addresses the Q12 element *In the last seven days, I have received recognition or praise for doing good work*. Besides engagement, there is also a 73% increase in morale, a 45% increase in loyalty, and a 39% increase in staff satisfaction. Why would staff leave work where they find enjoyment and satisfaction (Gostick & Elton, 2009; Wagner & Harter, 2006)?

Recognition is one of the most enjoyable parts of leadership and a key driver of improved outcomes. To realize the benefits of recognition, leaders search for specific positive actions happening throughout the workday. Applying a growth mindset, a leader should recognize behaviors and their outcomes and avoid recognizing someone's personality or talents. When a leader affirms specific behaviors, it tells everyone what behaviors help the business reach its vision,

which will motivate everyone to adopt that behavior.

A few additional best practices will help leaders maximize the positive impact of recognition. Always ensure recognition aligns with shared values and vision. Just as accountability addresses misalignment with values and vision, recognition reinforces actions that lead to success.

Make it timely. The behavioral sciences established that reinforcement increases motivation when given soon after the specific behaviors. Also, make sure that significant recognition happens publicly. Letting others celebrate their teammates' contributions will not only promote positive mindsets but also communicate which behaviors and actions help the business reach its vision.

Finally, let people recognize each other. It is almost impossible for many leaders to reach the 5.6 to 1 ratio on their own. When recognition becomes a cultural norm, people celebrate each other's accomplishments. The leader should create a formal process for peer recognition. This way, the leader can track outstanding achievements and follow up with the person getting recognized and the one providing the recognition to reinforce the positives listed above (Gostick & Elton, 2009).

Chapter 9: Individual Strategies for Peak Performance

HRV confronts leaders with a dilemma. Peoples' lifestyles, behaviors, and habits impact HRV and work performance. While a business and leaders might manage job demands and provide the necessary resources to manage distress, if someone is not living a healthy life, productivity and performance will suffer, ultimately hurting the business.

When it comes to someone's habits and lifestyle affecting work performance, it is helpful for leaders to think of themselves as a coach and their people as athletes. Like a leader, a coach needs to ensure that people bring their best self to practice daily while remaining ready to perform at peak levels when their performance counts the most. Both leaders and coaches help people consider behaviors and habits to boost performance while addressing behaviors preventing the person or team from reaching their goals.

HRV helps the leader and team members identify personal behaviors and habits that improve or harm their cognitive, emotional, medical, and relational health. People only have one cup, one autonomic nervous system, and one brain. Burnout at work will impact people's personal lives. Their behavior and habits outside the work environment will determine their ability to perform at work.

We understand that many leaders might feel that discussing personal behavior crosses a boundary. As businesses implement HRV monitoring and training, it provides a perfect opportunity to discuss the connection between behaviors, health, and performance. This chapter examines specific strategies that improve HRV, cognitive ability, and mental health. We also include some ideas on how businesses can support these strategies through job resources. In the appendix and at www.optimalhrv.com/handouts, we provide information to educate everyone in the business.

Sleep

Taking a morning HRV reading is the best time to get a snapshot of the person's available energy for taking on the day's challenges. The quality of sleep from the night before is one of the most significant determinants of a morning HRV score. HRV complements a growing awareness of the importance of sleep on physical, mental, and cognitive functioning.

Sleep helps reset the autonomic nervous system to ensure the optimal performance of the body and mind. A good analogy to demonstrate the power of sleep is thinking

about a cell phone. The autonomic nervous system is the Android or iOS operating system that helps everything function flawlessly. After a period of time, phones slow down due to the number of apps running, memory capacity, and everyday use. In most cases, the solution to the problem is a quick restart. During the reboot, the phone closes apps, installs updates, and ensures everything is operating correctly.

Sleep is like restarting a phone, but for the mind and body. Everyone knows how great a good night's sleep feels. While research shows that most adults need a full eight hours of sleep a night, in reality, the average person gets only 6.7 hours. There is a lucky, but tiny, minority of people who need slightly less sleep than eight hours. Someone waking up feeling refreshed after six or seven hours of sleep might find themselves in that group, but most people do need eight hours (Rath & Harter, 2010).

Beyond just being tired, insufficient sleep has a devastating impact on well-being and cognitive functioning. Lack of sleep has much the same effect as being drunk. Like drinking too much, lack of sleep increases the number of mistakes people make and decreases productivity and intelligence. Sleep-deprived people do and say things they usually would never say or do and might regret later. While those around them might notice the behavior change, they remain unaware of the impairment caused by lack of sleep (Stulberg & Magness, 2017).

Lack of sleep also hinders our ability to learn. During sleep, the brain files information learned throughout the day with similar knowledge gained in the past. Sleep is when many long-term memories are solidified. Without sleep, the person fails to retain knowledge (Schwartz, 2010).

Even more concerning is the research showing that lack of sleep over long stretches leads to weight gain, type 2 diabetes, and even early death. Sleep deprivation leaves the person more likely to reach for food or drink high in sugar and calories. Because the brain lacks the energy of a good night's rest, increased calorie consumption provides the short-term energy it craves.

A recent study by the National Institutes of Health showed that sleep-deprived people consume 549 additional calories a day. Eventually, these extra calories put people at risk of developing type 2 diabetes, decreasing their lifespan. In addition to preventing type 2 diabetes and premature death, sleeping eight hours per night facilitates healthy weight loss. Unfortunately, the sympathetic arousal and anxiety of burnout prevent people from getting the needed sleep, further impacting their HRV, cognitive capacity, and emotional regulation (National Sleep Foundation, 2019; Schwartz, 2010).

Luckily, there are some best practices for getting restorative sleep. As sleep quality improves, HRV trends will quantify the impact of sleep on overall health and wellness. Let us look at some research to help those who struggle with sleep.

Turn off all electronics about an hour before going to bed. Unplugging includes phones, computers, tablets, and the TV. The visual field holds the blue light from these devices for about an hour after viewing them. Also, things like games, social media, and email excite many areas in the brain. This excitement can prevent one from relaxing, thus keeping them awake longer.

Alcohol and food too close to bed can also prevent healthy sleep. It is important to stop eating and drinking

several hours before going to sleep. This time allows the body the opportunity to fully process the food and drink so it doesn't negatively impact sleep. It is also important to not drink too much. While alcohol can help someone go to sleep, it prevents or limits the time in deeper stages of sleep that help restore health and aids in stress recovery.

A cool, dark, and quiet environment promotes sleep. For someone living in a noisy urban environment, the small investments in eye masks and earplugs are money well spent. Businesses should consider providing these low-cost items when leaders talk to their people about improving health and performance in relation to the importance of sleep hygiene, thus helping people improve one of the greatest influencers of health and HRV.

There are a few cheap or free strategies that improve sleep. Choose reading material that is not too engaging. Magazine articles are perfect as they are short and do not tempt you to read the next chapter, as a good book will.

Research shows that waking up at the same time every day trains the brain and helps promote getting to sleep faster and increasing sleep quality. Sleep consistency is one of the best strategies to help people who struggle with sleep (Schwartz, 2010).

For those struggling with sleep or even insomnia, cognitive behavioral therapy for insomnia or CBT-I is an effective treatment. CBT-I helps the person change behaviors around sleep and helps to reset their sleep cycle. The good news about CBT-I is that there are several online CBT-I programs that do not require a therapist and are reasonably priced (Mitchell, Gehrman, Perlis, & Umscheid, 2012; Ruwaard, Lange, & Emmelkamp. 2011).

Using HRV to measure sleep quality is simple. All one needs to do is take a reading before going to bed and then take another reading first thing in the morning. A refreshing night's sleep will usually increase the Latest score over the Previous score taken the night before. If the inverse is true, it demonstrates that the person's sleep quality needs improvement. The strategies listed above could help enhance sleep quality, give them more energy for the day, and improve short- and long-term HRV.

Job resources that can be provided to support sleep:

- Put the business' logo on sleep masks as a gift.
- Have a fishbowl filled with earplugs that people can take.
- Offer as much job flexibility as possible to help people work at times that match their natural sleep patterns.
- Set expectations about screen time required outside the work environment to help people get away from screens.
- Encourage or incentivize pre/post-sleep HRV readings to help people identify the benefits of healthy sleep.
- Encourage or incentivize an evening HRV biofeedback session. Suggest people do this an hour before going to sleep to avoid blue-light exposure.
- Provide free access to online CBT-I programs.

Movement and Exercise

Sleep refreshes the body's systems and sets the body and mind up for a great day. Movement and exercise help manage allostatic load accumulated throughout the day. Movement is a must to maintain health under stress!

Even for someone without access to a gym or the time or resources to join a fitness class, finding time to move will dramatically improve their physical and mental health. Because moving and exercise provide a powerful method for stress management, it is not surprising that it is one of the best ways to improve overall HRV over time.

Exercise and HRV have a tricky relationship, especially when doing strenuous workouts. A good workout stresses the body physically. After the training, this stress lowers HRV, demonstrating that the body needs time to recover from the strain. It is during this recovery process that muscles repair and get stronger.

If a person's HRV morning score the day after a hard workout is lower than their 30-day average, it shows that the body is still in recovery mode. If the person then does another hard workout before their HRV is back to normal, it puts them at a higher risk for injury or illness. It might seem counterintuitive, but HRV is challenging many elite athletes to prioritize their recovery as much as pushing themselves physically. While intense physical exertion lowers short-term HRV, it improves longer averages over time as the body realizes the benefits of gains in strength and stamina (Moore & Elliott, 2020).

Let us return to the cup analogy for a moment. Visualize exercise as a release valve at the bottom of the cup. As cortisol fills the cup throughout the day, increasing allostatic load, a good workout opens the release valve, and the cortisol flows out the bottom. If cortisol is not released, it just sits in the cup and accounts for many of the negative medical, occupational, and psychological effects of distress (Rock, 2009; Stulberg & Magness, 2017).

Cortisol and stress prepare the body for physical action. Throughout human evolution, stressful events required a sympathetic nervous system response to run away from a predator or fight an enemy. Human physiology has not caught up with today's more sedentary lifestyle, where distressful situations require an intellectual and emotionally regulated ventral vagal and not a physical response.

While the physical benefits of exercise are well known, the effects on the brain are just as powerful. Not moving allows cortisol to remain in the body and become toxic. Over time, this leads to long-term physical, mental, and social problems. Eventually, cortisol starts to kill off brain cells associated with memory and intellectual functioning. People who exercise have larger prefrontal cortexes. In addition, exercise helps create new neurons in the brain, a process called neurogenesis. Neurogenesis and the removal of cortisol help improve learning and memory creation and protect the brain from injury and aging (Kharrazain, 2013; Rock, 2009; University of Texas Southwestern Medical Center, 2010).

Movement and exercise deliver emotional benefits and serve as useful coping skills for many people. Think for a moment about how it feels to run, walk in the park, or take a bike ride. That good feeling is the release of endorphins or natural opioids. Regular exercise improves overall mental

health by lowering the allostatic load and decreasing cortisol in the body (Fernandez, 2006).

Studies conducted with those suffering from depression document the power of exercise. Getting 30-45 minutes of vigorous exercise six days a week can lower depression and anxiety as effectively as psychotropic medication. While this is not a suggestion to stop medications, it does show that exercise powerfully improves mental health. Exercising promotes overall happiness and provides the energy to live a fulfilled life (Rock, 2009).

For most people, the goal is to build up to exercising several times a week at an intensity that works up a good sweat. This consistency may seem like a distant goal for many. As with any new habit, starting small is key in order for the new habit to stick. Any movement is a win! For those who are not currently active, start by walking around the block, taking the stairs instead of the elevator, jogging for a bit, and briskly walking the rest of the way for a mile. The key is to do something active and build up more and more stamina. The positive effects will show in the body and brain almost immediately.

Job resources that can be provided to support movement and exercise:

- Incentivize people to get a certain number of steps in during the workday.
- Create workstations with treadmill desks or provide access to bicycle pedals designed to work under a desk.
- Encourage a more extended break during the workday for a longer walk, bike ride, or gym workout.

- Provide access to workout and yoga classes or to a gym convenient for employee work schedules.

Nutrition

Another crucial aspect of physical health with a considerable impact on HRV is nutrition. Due to individualized needs, allergies, and rapidly evolving nutritional research, we keep our focus on approaches to eating shown to improve HRV. Generally, the challenge with nutrition is to think about how it impacts energy and mood during the day. Eating a healthy meal versus an unhealthy one can improve short-term HRV, while working on healthier eating habits in general will increase long-term HRV averages.

Eating in an HRV-friendly way helps a person maintain a healthy weight. Besides leading to many other health issues, obesity reduces HRV, as the additional weight puts stress on the body and nervous system. The good news is as someone works to lose weight, they will see improvements in HRV.

Earlier in the book, we discussed the role of stress and inflammation on the gut and the terrible condition leaky gut syndrome. The sympathetic response to distress disrupts healthy digestion, which is primarily a parasympathetic activity. One often overlooked component of healthy digestion and the intake of nutrients is stress management (Dana & Porges, 2018).

Nutritional science demonstrates that certain foods increase or decrease inflammation. Even if someone has their stress under control, their eating habits might threaten to

increase inflammation to unhealthy levels. A person should avoid or drastically limit inflammatory foods, while integrating as many anti-inflammatory foods as possible.

Here is a list of known foods that cause inflammation and should be limited.

- Processed foods
- Sugar, sugar substitutes, and artificial sweeteners
- Refined carbohydrates such as bread and pasta
- Alcohol
- Bad oils and fats such as seed oils and margarine
- Soda, most juices, and sugar-sweetened beverages
- Grain-fed red meat
- Monosodium glutamate or MSG

Here is a list of foods with anti-inflammatory properties.

- Green leafy vegetables
- Probiotic foods
- Bone broth
- Sweet potatoes, yams, beets, broccoli, tomatoes, and peppers
- Blueberries, raspberries, and strawberries
- Chia and flax seeds
- Extra-virgin olive oil
- Turmeric, ginger, and cinnamon
- Walnuts and almonds
- Garlic and onion
- Green tea
- Wild-caught fatty fish
- Dark chocolate and cocoa (Moore & Elliott, 2020)

Besides HRV-friendly eating, another approach that could help decrease inflammation, improve stress response, reduce hypertension, and improve life expectancy is caloric restriction. Often called intermittent fasting, this is something almost anyone can implement if deemed appropriate by a healthcare professional. The excellent news is that fasting, or not eating for a period of time, does not cost any money (Nicoll & Henein, 2018).

There are several different approaches to intermittent fasting. The easiest one for most people is to eat all meals within eight to ten hours during the day and then fast for 14 to 16 hours before the next intake of calories. Like a good night's sleep, fasting allows the body to reset. Food fully digests, balancing insulin and glucose levels. In addition to improved HRV, intermittent fasting also helps people lose weight and fat, improves blood sugar regulation, improves mental clarity and concentration, reduces inflammation, promotes a healthy cholesterol profile, and increases the production of natural growth hormones. People who practice intermittent fasting tend to live longer. Ideally, someone should still avoid inflammatory foods when intermittently fasting (Fung, 2016).

There are other ways of implementing intermittent fasting, including fasts of twenty-four hours and more. While these also achieve impressive results on health and HRV, they are not appropriate for everyone. If a person is interested in these longer fasting strategies, they should first check with a healthcare professional.

A final word about inflammatory foods. If someone is eating well but is still not feeling good or has low energy after meals, they might have a sensitivity or allergy to something in their food. If this is the case, speaking to their healthcare professional about safe and effective ways to identify food

sensitivities and allergies may be helpful.

It is too bad that there is not a pill that someone could take to increase HRV, decrease distress, and increase productivity. Many supplement manufacturers would love to raise their hands and claim that their supplement does everything a leader needs to maximize business productivity. With all the life-changing claims out there, the supplement world holds both promise and dangers.

Currently, the U.S. Food and Drug Administration does not regulate supplements. The unfortunate thing about the lack of regulation is that supplement companies can produce supplements that do not contain what they say on the label. In fact, there was a large study done on supplement quality. They found that only two of twelve tested supplement brands from a typical supermarket contained what they claimed on the bottle with no fillers, substitutions, or contaminants (Newmaster, Grguric, Shanmughanandhan, Ramalingan, & Ragupathy, 2013).

The advice provided in this section comes directly from peer-reviewed, validated studies on methods specifically shown to improve HRV. To get positive results from supplements, one needs to work with a trusted healthcare professional who has proper training in nutrition to ensure they use quality supplements and get the correct dose. The healthcare professional will also ensure that the supplement is appropriate for the person's specific health condition. Unfortunately, there is not a great deal of research on how supplements improve HRV. Just because no proof exists for the connection between supplements and HRV, this does not mean supplements cannot improve someone's health and wellness. Appendix 9 has a list of supplements that anyone should consider.

Whenever possible, someone should try to get these supplements through food and only use supplements when they struggle to get these from their food. Deficiencies in vitamins B-12, D, and E, as well as magnesium, decrease HRV. Research shows that micronutrient deficiencies negatively impact HRV, while addressing these deficiencies improves HRV. Again, start with improving the overall eating and then make up any deficiencies with supplements if recommended by a healthcare professional (Lopresti, 2020; Tak, Lee, Kim, Lee, & Cho, 2014; Wienecke & Nolden, 2016).

There is one supplement that does positively affect HRV. Omega-3 docosahexaenoic acid, DHA, and HRV have shown positive correlations across a variety of populations. DHA is typically associated with fish oil but is now available in an environmentally friendly vegan form (Christensen, 2011).

Job resources that can be provided to support a healthy eating:

- Stop providing unhealthy inflammatory food.
 - Replace donuts with nuts or healthy anti-inflammatory alternatives.
 - When ordering food, avoid those high in carbohydrates and sugar.
 - Encourage people to leave the dairy and sweeteners out of their coffee.
 - Check the vending machine and remove inflammatory foods.
 - Replace celebratory cakes with a healthier alternative. If there is a cake as part of a celebration, provide it at the very end of the day.

- Provide access to healthy anti-inflammatory foods whenever possible.
- Encourage long breaks so people can get movement in after lunch or other meals consumed during the workday.
- When requiring more extended hours in the workplace for an important project, cater healthy meals and limit access to inflammatory food, especially during stressful times.
- Bring in a registered dietitian nutritionist with knowledge about HRV to consult with teams and individuals.

Alcohol

A common finding of anyone starting to measure their HRV is the harmful effects of drinking alcohol. Unfortunately, the business environment often encourages alcohol consumption. Whether it is drinks with a client, free drink tickets for frequent flyers, or a happy hour with co-workers, alcohol and business often go hand in hand.

One could quickly and accurately sum up the research on alcohol and HRV in three words: do not drink. As Jaakko Kotisaari (2022) found in his research,

Alcohol raises your heart rate and weakens your heart rate variability. These effects are the most obvious during the first few hours of sleep. Alcohol causes the deep sleep stage to get deeper, with a clear dose-response relationship. Unfortunately, alcohol also delays and shortens the periods of REM sleep, which is known to have a negative influence for

example on memory functions, concentration and motor functions. When you drink 1g/kg of alcohol, it reduces the amount of recovery during the first three hours of sleep by 48%, as analysed in a Firstbeat Lifestyle Assessment. Similarly, it increases the amount of stress reactions by 54%.

Alcohol increases the sympathetic nervous system response, which exacerbates the stress response and increases inflammation. Even one drink starts to impact HRV negatively. Understanding the importance of sleep on performance and alcohol's harmful effects on sleep makes the situation even more dire (Pietilä et al., 2015).

Is there such a thing as healthy drinking or maybe less unhealthy drinking? The answer is not really; however, a single drink many hours before sleep is unlikely to impact performance the next day. The more one drinks, the more it lowers HRV and sleep quality. One study showed that heavy drinking continues to reduce HRV four days after consumption (Bataineh, 2022; Ryan & Howes, 2002).

The research on alcohol and HRV presents a challenge for leaders. Alcohol is everywhere and is socially acceptable. As a great way to feel better in the short term, drinking is an easy escape from the distress of work and the negative symptoms of burnout. Drinking as a coping skill comes with a price, though, as it increases the symptoms the person drinks to escape. For some, using alcohol to cope with work distress becomes an addiction with a range of negative consequences.

Job resources that can be provided to avoid the adverse effects of drinking:

- Do not promote or encourage drinking.
- Give social opportunities without alcohol to replace happy hours.

- Do not reimburse for alcohol.
- Put kombucha, cold coffee, or other unique drinks on tap to encourage social interactions around nonalcoholic drinks.

HRV Hacks

As people in a variety of fields recognize the power of HRV, new and exciting interventions are showing that certain practices, not usually considered in mental health and medicine, are successfully improving HRV. While some methods require additional funding, others are cheap, free, and relatively easy to implement. Here is a list of HRV hacks to improve short-term scores and long-term baselines.

Journaling

Journaling is a great way to track how certain states, behaviors, events, and wellness strategies influence HRV. When people start to implement new strategies like biofeedback, mindfulness, and others presented in this chapter, it is helpful to begin a journaling practice. For each HRV reading, write a few sentences about what was going on before the reading and how they felt physically and emotionally at the time of the reading.

While journaling after readings helps develop insight, regular journaling about one's day helps with stress management. Studies indicate journaling provides a short-

term HRV boost and can improve HRV over time, especially if someone goes through a stressful or traumatic event (Bourassa, Allen, Mehl, & Sbarra, 2017; Redwine et al., 2016).

Gratitude

Integrating gratitude into journaling or mindfulness practice is an excellent HRV hack. Set aside time each day to focus on positive events, personal strengths, and valued people. A daily focus on the positive things in life not only improves HRV, it also lowers perceived stress and depression, cortisol, inflammation, fat intake, blood pressure, fatigue, hemoglobin, A1C, and sleep quality (Redwine et al., 2016; University of California Davis Health, 2015).

Bodywork Therapies

Physical injuries or weakness in the muscular and skeletal systems negatively affect autonomic nervous system functioning. A growing number of massage therapists, chiropractors, occupational therapists, somatic therapists, acupuncturists, and craniosacral therapists understand their therapies' connections to HRV and autonomic nervous system health (Rosenberg et al., 2017).

Hydrotherapy

The use of water can affect HRV. A body of research is developing that demonstrates the power of cold water to improve HRV and overall health. Here are a few strategies that are free to implement, help to enhance autonomic functioning, and are great for providing energy.

Simply take a cold shower while maintaining steady low and slow breathing. The cold creates a mild stress response, waking up the body and providing energy. By focusing on the breath, a person supports ventral vagal activation in the face of the stress response. Over time, cold showers and breathing strengthen the ventral vagus and increase HRV.

Another form of hydrotherapy is to alternate between hot and cold water. Take your typical hot shower. Then turn it as cold as you can stand it for a minute, switch back to hot for a minute, and continue alternating for at least five minutes, ending on cold water. Maintain steady, low and slow breathing throughout. The cold creates the stress response and draws blood into the body's center. The hot brings the blood to the body's surface, activating a parasympathetic response. Maintaining a calm mental state while your body is on the hot/cold roller coaster builds resiliency and increases HRV (Hof & Jong, 2017).

Stretching and yoga

Physical stretching is a healthy habit to integrate into a daily routine. Because the vagus nerve starts just above the

neck, a simple neck stretch is excellent for cranial nerve health. Keeping the face directed forward, tilt the neck to the right shoulder for a minute, then to the left shoulder for a minute. It might sound too simple, but a flexible neck and body promote vagus nerve health and a strong HRV (Rosenberg et al., 2017).

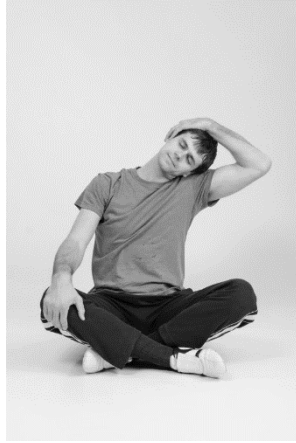


Figure 16: Neck Stretch

Internal activation of cranial nerves

Sing! Sing loud. Singing, humming, and gargling activate the cranial nerves, promoting ventral vagal activation and improving HRV over time. For people who enjoy singing, encourage them to join a choir. Not only does the singing help regulate their nervous system, the social connections and attunement with others are also a powerful way to experience synchronization with other people. Also, gargling each day helps strengthen the vagus nerve. Just a couple of minutes of singing and gargling improves HRV (Dana & Porges, 2018; Rosenberg et al., 2017).

Smiling

The activation of the facial muscles to create a smile activates the ventral vagus. Smiling before a challenging meeting gives the person a little boost to their ventral vagal and will help with emotional regulation. Equally, when others in our environment are smiling, it will activate our ventral vagus and increase our HRV (Martin, Abercrombie, Gilboa-Schechtman, & Niedenthal, 2018).

Job resources that can be provided to support HRV hacks:

- Provide free yoga classes from an instructor who understands HRV science.
- Bring a bodywork therapist on site to consult and treat people.
- Have fun with these hacks. A gargling station, sing-along, or team stretch can provide a chance to improve HRV and get a laugh.
- Provide people with a company-branded journal.

Chapter 10: Interview with the Authors

We want to end the book by sharing our personal and professional wellness strategies and how we use HRV to improve our health and productivity. As three people whose professions focus on mental, social, and medical health, we strive to serve as role models for others. We also want to show you that we are human. Too many books like this one leave you with the impression that the authors have it all figured out. Like you, we are on our own wellness journeys with all their successes and struggles.

Our strategies in this chapter come out of HRV science, research in other areas, and conversations with healthcare professionals. These strategies are right for us. They might not be suitable for you. Please do your research and talk with your healthcare professional if you implement these strategies.

What is your morning routine?

Matt

I wake up, put on a work-related podcast or audiobook, and take my morning HRV reading. I follow it up with a two-minute HRV biofeedback training session. This short biofeedback session helps me regulate my mind and body before getting out of bed.

After my bathroom routine, I work my way down to the kitchen and put the kettle on the stove. As the water heats up, I start drinking a liter of water. I also take a high-end multivitamin with micronutrients and pre- and probiotics that I might not get in my daily food. I also take a vegan omega-3 DHA/EPA supplement and an NAD+ supplement.

I use warm water to neti pot and gargle. I gargle with warm salt water in place of mouthwash, so I do not risk killing healthy bacteria that will help my gut health and immune functioning. I find the neti pot and gargling clear my sinuses and improve my breathing during a morning mindfulness practice. Before I leave the kitchen, I finish the liter of water and enjoy a cup of Yerba Mate.

Next, I do a quick set of stretches, many focused on the neck area. Then I start my twenty-minute morning mindfulness practice. I use the breathing pacer on the Optimal HRV app to ensure optimal resonance frequency breathing to maximize the benefit of my practice. I use nasal breathing with a throat hum on the exhale throughout my practice to further activate my ventral vagal.

I am a student of a southern Chinese martial art called Wing Tsun or Wing Chun, which has a set of forms similar to Tai Chi. About two-thirds of my practice involves a slow version of one of the Wing Tsun sets combined with resonance frequency breathing.

The remaining third of my practice involves a mix of gratitude, Qigong massage, and bilateral stimulation tapping. During these practices, I use alternate-nostril or nadi shodhana pranayama. I strategically use Qigong massage techniques that support the stimulation of the ventral vagal.

Finally, I put my podcast or audiobook back on and walk the dogs. I make sure the sun is up for the walk, and I do not put on my sunglasses, as the natural light helps set my sleep cycle by signaling to my brain that it is time to wake up! By the time I log into my computer to start the day, I feel great. As a bonus, I also usually get 45 to 60 minutes of professional learning done during my morning routine.

Inna

Mornings are super busy at our house with getting three kids ready and off for school, taking care of our dog, and getting ready ourselves. I wake up, take my HRV reading, and take an opportunity for informal mindfulness practice, brushing my teeth mindfully and taking a mindful shower. I help the kids get breakfast ready and get to school, and usually have some time for my own self-care after that—a mindful cup of coffee, time for formal meditation combined with HRV training, and some exercise.

Dave

Most mornings, my routine is very consistent. I wake up, take my HRV, and then meditate for 20 minutes. Meditation helps me feel clear, agile, and ready to take on the day. After my meditation, I exercise for 30-40 minutes. I then visualize how my day will go as I plan it out or look over my notebook.

I consume 32 ounces of water to start every day, and I attempt to drink at least 100 more ounces throughout the day. Yes, I pee a lot. While drinking my water, I take my daily supplements, which include vitamin D3 with K2, vitamin B complex, magnesium complex, probiotics, and fish oil. After this, I begin to dig into the most important work I will have for that day with a cup of black coffee. When my son wakes up, I hang out with him until my wife wakes up. We start to cook breakfast as a family, and usually, my daughter will wake up during that process to join the fun.

Evening Routine

Matt

I usually put on blue-light-blocking glasses about the time the sun sets. While the research varies on the effectiveness of these glasses for promoting sleep, I find them

beneficial, even if they only serve as a signal that I am starting to wind down my day. Plus, I think they make me look cool, although my wife just laughs at me.

As I transition to bed, I do some light stretching similar to my morning routine. I also gargle again with warm salt water. I take another omega-3 DHA/EPA supplement, as well as turmeric/curcumin, and a mild sleep aid with ashwagandha, magnesium, L-theanine, and chamomile.

I keep my bedroom as cool as possible. I use a weighted blanket, which provides me with the sensation of sleeping under a ton of covers without overheating during the night. Finally, I have an eye mask that blocks out the light.

Inna

Evenings are family time—we eat dinner, check on homework, and do something together, such as taking the dog on an evening walk, playing a board game, or reading together. As an introvert, I need some alone time at the end of the day. Once the kids are in bed, or in their rooms for their own alone time, I do another meditation practice or HRV biofeedback training, spend some time reading or doing some artwork, and then get ready for bed. I usually finish my day with a gratitude or appreciation practice, jotting down three things I've been grateful for or appreciated that day.

Dave

My sleep routine begins with my morning routine and includes everything throughout the day. I stop drinking coffee between noon and 2 pm. I try to do my more intense workouts in the first half of the day whenever possible. As it gets later in the day, I think about what to eat for dinner, as complex carbohydrates may help me sleep better, depending on the day's activities. For more draining days, I eat more complex carbohydrates. For less draining days, I keep carbohydrates low.

Around dinner time, we dim the lights in the house, change into more comfortable clothes, and eat as a family. We then read books with the lights very low before putting the kids to bed. It is at this point in the evening that I put on blue-light-blocking glasses. My wife and I remain awake and talk, watch a movie, or sit in the hot tub.

Immediately before bed, we brush our teeth, change clothes, and hop into bed. Sometimes my wife will read a book while I listen to an audiobook. Other times, I will meditate. Sometimes we just go to bed.

How do you structure your day to maximize productivity?

Matt

I feel the morning routine I described above is my pre-game warmup. I divide my typical day up into four 2-hour, hyper-efficiency sprints. My peak productivity time is in the morning. I try to schedule calls and more administrative work in one of my afternoon blocks. I start my workday by reading a list of my personal values and the mission, vision, and values of the Optimal Innovation Group before diving into emails and other tasks.

I fast for 16 hours, usually ending my fast around my first break. I believe my shake deserves its own Instagram page! While the ingredients list has evolved, the shake currently includes a good amount of cocoa or dark chocolate powder, fermented mushroom powder, vegan creatine powder, broccoli, blueberries, and chia seeds. It is not pretty or tasty, but it packs a ton of superfoods, micronutrients, and fiber into my cup. I usually enjoy my shake while watching a few minutes of Sports Center as a break after my first hyper-efficiency sprint.

My second break is a 60-minute lunch break. I find that lunch is critical for my afternoon energy. My go-to right now is healthy gluten-free granola with olive oil, cinnamon, cocoa, and dark cherries, put in the microwave for 20 seconds. It is a delicious and healthy lunch. I also take the dogs for a walk in the park to get some movement time in nature. I put on my

headphones and get another 30 to 45 minutes of learning during this break.

My final break in the afternoon is a little less structured. Sometimes I get in a quick jog or a Wing Tsun workout if I have time. Regardless, I try to get some movement in.

I end my day by sending at least three positive things I accomplished that day to my team. I love ending the day on a high note, and this routine helps me appreciate what I accomplished that day.

Inna

After a 16-hour fast, I have a late breakfast, usually around 10 am. I find that a late morning meal works really well. I am typically hungry by that time, and a healthy breakfast gives me good energy to dive into work. I am usually most productive mid-morning to late afternoon. I break up my day into sections dedicated to specific types of work: seeing clients, writing, working on a research project, etc. Building in breaks is crucial for productivity. It may seem counterintuitive, since breaks take away time from work, but strategically placed breaks for walking and stretching re-energize me. Even though I end up working a bit less timewise, I am much more productive overall.

On days when I see clients, I build in time for compassion and self-compassion meditation practice between appointments. This is crucial for my ability to be present and focused on the needs of each individual client. When I have an intense project that requires sustained attention, I use a

modified version of the Pomodoro technique: I set a realistic goal for my work, turn off all distracting notifications, set my timer for 20 to 30 minutes, and allow myself to focus on that one goal. As my mind gets distracted with thoughts of other things that I also need to get done that day, I write them down on a piece of paper next to me, thereby allowing my mind to refocus on the project at hand. After the intense 20- to 30-minute focused time, I take a 5- to 10-minute break for stretching, moving, meditating, etc. Then I set my timer at work for another 20 to 30 minutes in the same focused way until the next break. After three or four work cycles, I take a longer break, eating lunch and/or getting outside for a while.

Dave

I do a modified intermittent fast most days until lunchtime, and I eat all my food between 11 am and 6 pm. In the morning, I make a large coffee mixed with medium-chain triglyceride (MCT) oil and grass-fed butter to replace my breakfast and keep me in a fasting state, also known as a ketogenic state. There are many benefits to going into a ketogenic state regularly; I do it for the following benefits: autophagy or the self-killing of weak and or diseased cells within the body, decreased inflammation, improved energy, and mental clarity. I typically remain in this state until lunchtime. I do have exceptions to my fasting days, as I will explain later in the recovery section.

I exercise at least once every day or I get irritable, and no one wants to be around me, joking, kind of. I always do my base weightlifting routine first thing in the morning. I attempt to do some form of cardiovascular-specific work at least twice per week, usually sprinting or mountain biking. I also do

Brazilian jiu-jitsu at least twice a week, arguably the most strenuous workout anyone can do.

I focus on my most important work first thing in the morning, before any distractions and when my brain is at its best. I find as the day goes by, my mental ability drops. If it is a day when I am seeing patients, they get 100% of my love and focus during their time with me, so I will rarely do work outside of that to be my best for them.

Coffee is my most used supplement and cognitive enhancement strategy. I have experimented with many others and found coffee to have the most consistent, reliable effects. Occasionally I will use supplements such as pyrroloquinoline (PQQ) to help with cognitive enhancement. What I have found with all nootropics and other supplements claiming cognitive enhancement is that they are hit or miss for effectiveness based on several factors and, even then, they provide inconsistent results.

What is your strategy to reach peak performance for significant work events?

Matt

My big events are typically trainings that I'm facilitating. I feel like everything above sets me up nicely for peak performance. The one change I make is taking a hot-cold-hot-cold-hot-cold shower as close to the event as

possible. The shower puts me in a mental and physical space to perform at my best.

Inna

Sleep is always incredibly important for peak performance. I am not talking about the pressure to sleep before a big event. I generally pay attention to my sleep, giving myself enough time to sleep and addressing any sleep issues that pop up right away. This way I am in charge of what's under my control. Whether or not I get good sleep on any particular night is much less under my control; sometimes things happen and I just don't sleep very well. However, since I generally give myself an opportunity for good sleep, even if I don't sleep as well on the night prior to a big event, it does not create as much of a negative impact as one might fear.

Prior to the big event, I typically spend a little time getting in touch with my body and allowing it to achieve an optimal state of activation without trying to be relaxed; after all, a relaxed state is optimal for times of relaxation, not times of peak performance. A few breaths at resonance frequency breathing rate remind my body to regulate itself and achieve optimal activation. I get in touch with my goals for the performance and allow myself to feel the excitement.

Dave

Leading up to the event, I will practice any presentations I will be doing. I will do my best to anticipate questions and have answers ready to go. I also visualize how

the event will go several times over a week or so before the event. On the day of the event, I do my usual morning routine, and I will try to avoid eating until after the event, assuming it is before 2 or 3 pm. I will eat lightly for things happening later in the day. I find I am much sharper mentally while in a ketogenic state.

How do you approach recovery?

Matt

First and foremost, I do not work! Shutting down my computer signals that work is over for the day. My HRV scores clearly demonstrate that if I want to give my best the next day, it begins with my end-of-day ritual and not re-engaging with work or email unless absolutely necessary. The same goes for weekends and vacations. When I turn my computer off for a break, it stays off.

I am starting to rethink my behaviors on vacation. Living in Colorado, most of my vacations involve a lot of activity. Snowboarding, hiking, and snowshoeing are some of my favorite activities, and if I end up on a beach, I'm usually snorkeling or paddleboarding all day. I usually do not eat as well. My sleep is less consistent. I engage in an increased level of physical activity, and sometimes travel over different time zones. All these things do not promote optimal recovery or high HRV. I am starting to strategize more about maximizing my recovery during vacation while still having a good time.

Inna

Sleep, spending time in nature, disconnecting from electronics, spending time with family and friends, as well as alone time, are crucial for my recovery. After an intense performance of some sort or after a series of very hectic days, I need some time to take it easy. For vacations, we go for a mix of activity and a bit of down time.

Dave

Sleep is my top recovery hack each day. I ensure an 8-hour sleep opportunity every night. I have two small kids, so that is often interrupted sleep, but it is 8 hours, nonetheless. Most days, I will take a cold shower to help with recovery and feeling great.

My nutrition will help me recover or push me into a need for further recovery. I avoid common inflammatory foods and those I know disagree with me. My water intake and supplement routine, as mentioned earlier, is another part of my daily recovery plan. Oftentimes I will add additional supplements like curcumin and extra fish oil to aid in recovery.

As I said before, I do a modified fast most days. The exception is a day after I have done two or more strenuous workouts on the same day. Then I will eat breakfast the following morning. When my body is sore, I feel that the extra calories help my recovery. Similarly, on a day when I plan to participate in a strenuous physical event, early in the day, I will eat breakfast to load up glycogen stores or easily

accessible energy storage in the muscles and liver, ensuring my body is ready for action. If I skip breakfast on these days, I feel horrible physically and mentally. On days when I know I will have a strenuous physical event early in the day, I will load up glycogen stores (easily accessible energy storage in the muscles and liver) at breakfast to ensure my body is ready for action.

If there is a drive home after a big event, I listen to calm, happy music, and I take it slow. If there is no drive, I do a usual bedtime routine and end with a meditation focusing on breathing, which usually puts me out. When the event includes alcohol consumption, I take vitamin C, milk thistle, glutathione, and activated charcoal.

If I stay out later, I attempt to sleep in to get my full sleep amount, which can be difficult with small kids. If the night included alcohol, I prepare by loading up on the previously listed supplements prior to drinking and by increasing my water intake throughout the day and night.

Vacations can make it challenging to maintain the same morning routine. Often this means modifying or completely abandoning parts of my typical morning routine. Sometimes I cannot meditate first thing in the morning, so I will do it midday or even at night. It's the same with exercise: if I cannot get to the gym, or if there is no gym, I have to get crafty, possibly by doing body-weight exercises in the hotel room. What I find is on vacation, the increased relaxation, sense of freedom, and loss of responsibility all make my HRV go up enough to factor out any poor nutrition and alcohol consumption.

When you hit the exhaustion stage of burnout, what is your recovery plan?

Matt

A three-day weekend. An additional day off does wonders for the HRV. I even see a jump by just scheduling time off. I love my work, so I usually only need that extra day of recovery over a weekend to get back to or above my HRV baseline. I would love to present other strategies, but my HRV data supports the incredible power this extra day has on my health and wellness when I hit exhaustion.

Inna

I find that most of the time when I hit the exhaustion stage, it is because I have not had sufficient alone time. I love people, and I need time to spend with family and friends. I love my clients. They get a lot of my mental and emotional energy. This is exactly why I need alone time to recharge. Without time for myself, I get crabby and irritable. To recover, I will typically find time to be in nature by myself (or perhaps with my dog).

Dave

I try to avoid exhaustion through the strategies mentioned above. Fortunately, I have an amazing wife. She and I work as a team to help one another recognize when we may be taking on too much and develop a plan to step back a bit. Of course, plans fail sometimes. It depends on how far over the edge one of us has gone as to what action we need to take. Sometimes a simple date night can get things back on track and help the other partner forget about worries.

But when one of us has gone way too far, we stop everything and go on a long weekend trip. We get away from all the things to remind us of our responsibilities and obligations. Camping is one of our favorite activities and strategies. We find somewhere that does not get cell-phone reception and is far away from other humans. When we return to work, our heads are on straight, and we can look at concerns with a fresh new attitude.

What wellness strategies do you use when traveling for business?

Matt

I overprepare and show up early to everything! I fly a lot for trainings. I show up at the airport early. I would much rather work at the gate than stress about time. I show up to

meetings and trainings early to avoid problems with transportation or technology. I usually practice for a week before delivering them, so that by the day of the training, I feel great about my material and my mastery of it. I also give myself plenty of time to get to the airport early on the way home, mainly because I might not be familiar with that specific airport and the traffic in that city.

I keep my morning routine whether I am traveling or not. I get up early to make sure I have plenty of time to get through my morning routine and get that crazy shower in. I try to find a store with healthy food options early in the trip and ensure I eat anti-inflammatory foods for breakfast and lunch. Often, the business will provide attendees with meals, but rarely are they light, healthy options that maximize my energy level and keep my HRV high.

The day before my trip, I try to time my mealtime to the mealtimes in the city I am going to. If I am traveling east and losing time, I will try to wake up early a couple of days before leaving to adjust my sleep schedule. When I travel two time zones or more, I will also use melatonin to help adjust my sleep schedule. There is mixed research on melatonin as a sleep aid, but it seems effective in helping adjust sleep cycles when changing time zones.

Inna

Travel usually disrupts my routine; traveling to a conference or a training often means that I am not able to stick to the same timelines for food, sleep, and breaks that I usually do. I know that will happen and I give myself a break, give myself some slack on that. I do my best to build in breaks

when I can and still give myself sufficient time for sleep. Since travel days are typically spent with people, I make sure to give myself some down time by myself at the end of the day, even if that means that I have to say no to going out for drinks with people whose company I enjoy very much.

Dave

When flying, I do my best to cover my entire body with clothing, so my skin is not exposed to the chemicals and grime on airplanes and within airports. I also will dose up vitamin D, vitamin C, elderberry syrup, and activated charcoal to help my immune system. I do not consume anything on the plane aside from a snack I bring and water from my personal bottle. I find that foods served on airplanes are of low quality. Packing a snack ensures I get healthy food consistent with my typical diet. I have trained myself to fall asleep quickly on planes. I put on headphones, close my eyes, and wake up when we land. When flying with my kids, this does not work.

If traveling by car, I leave early enough to allow ample time to drive in a relaxed state and not rush. I visualize what is to come while I drive as much as possible, while keeping my eyes open and remaining alert. If it is an early event, I will sip coffee and water throughout the morning. If the event is in the afternoon or evening, I will sip water while driving.

If I stay at a hotel, I always bring an eye mask and earplugs. The first thing I do upon entering the hotel room is unplug everything: phones, alarm clocks, radios, TVs, and so on. I have often been disturbed by alarm clocks set by the past person or phone calls from the front desk during meditation or focused work sessions. I take a similar set of supplements

as mentioned for airplane travel. I am providing my body with a good defense. I keep my morning routine intact as much as possible, with modifications if needed, similar to what I mentioned when on vacation.

I prefer a hotel room that at least has a refrigerator so I can have some of my own food. It is nice to find a room with a full kitchen to cook some meals. When eating out, I have fun and try all foods, but I attempt to limit this to one meal per day. Otherwise, when eating out, I order what should be anti-inflammatory foods, although professional kitchen preparation and sourcing are often not done in the best way. But hey, control what you can, smile, and enjoy life with everything else. I will consume alcohol one day while traveling for business, but that is it.

What strategies do you use for low HRV days, illness, or hangovers?

Matt

Honestly, it depends on my day. I never drink to the point during the week where I have to deal with a hangover. When I get a low HRV score, which happens when I am sick or have trouble sleeping, I realize that I might have two or three good sprints, but I know that my productivity will crash earlier on low-HRV days. If possible, I will try to check out from work early.

Occasionally I will get a low score before training. I allow my competitive nature to come out. I do not care if I am struggling today. I am knocking this training out of the park. I pay special attention to my food intake and do what I can to limit social events after the training.

Inna

Sleep, lots of fruits and veggies, more water, and downtime are usually my go to. I've had to learn to listen to my body telling me that I really just need a break, even if it means canceling a meeting or not being able to do something.

Dave

I increase sleep and water. I also increase or add the following supplements: vitamin D, vitamin C, elderberry, and zinc. I also nebulize with hydrogen peroxide. I have found that this combination helps me avoid illness nearly every time, pulls me out of a slump, and helps me recover from toxin exposure (alcohol). If I am recovering from exercise impacting my HRV, I might not go as hard with the supplements and instead do some active recovery, like yoga or light cardio work.

If I ever do get sick, I keep an eye on my HRV and my resting heart rate (RHR). When I see my HRV beginning to return toward the baseline and my RHR slowing down to my normal, I will do a light workout that helps push out the illness.

What are you considering changing to improve HRV?

Matt

Since I used my COVID scores in Chapter 2, I will update you first. At the time of the example, my All-Time average was just under 37 RMSSD. Over a year later, my All-Time average is now 76, and my Last Month was 103. I contribute this colossal jump to three factors.

First, focusing daily on my wellness gave me a concrete number to improve through trial and error. I adjusted my behavior to improve my scores. Second, after one of the most stressful 18 months of my career, I took a good chunk of time to focus on recovery over the summer of 2021. During this stretch, I saw my scores hit the 70s, then 80s, and now my weekly average approaches or even exceeds 100.

Finally, I started to practice 20 minutes of HRV biofeedback training every night. It is incredible to watch a specific strategy build your resiliency quantitatively over a period of a couple of months. I believe my summer recovery helped me raise the bar to a certain level. HRV biofeedback training took me to the next level and kept me there!

The simple answer to the question “What am I considering?” is that I will keep doing what I am currently doing and hopefully keep moving my All-Time averages up above 100 RMSSD. As part of my goal, I am rethinking alcohol. It does not do anything positive for me and I have

plenty of data to show that anything over two drinks wrecks my HRV the next day.

I enjoy a great IPA or dram of whiskey, but I came to the conclusion that it just is not worth it. As someone who only drinks occasionally, I tried Sober October in 2021 and got my first 7-day average of over 100, and it stayed there the entire month. There are no behaviors left in my life that I choose to engage in that bring my HRV down. I think alcohol needed to go. Thanks, HRV!

Inna

I've been doing HRV biofeedback training for two decades. It is very familiar to me, and my resonance frequency breathing rate comes easily at this point. That means that I don't always use an HRV device while doing my breathing practice, and there have been times when I did not take my morning readings consistently. I find that tracking my HRV helps a lot, since it alerts me to the need for extra self-care or a need for some other change before I can really notice anything on a conscious level. Consistent HRV and mindfulness training, exercise, and sleep are the three components of HRV health that I pay the most attention to and always work to fine-tune and improve.

Dave

Portion sizes with meals is an area I could improve. Frequently, I overeat at meals, not because I am hungry, but simply because I enjoy the food we cook, and when it is there,

I eat it. Same with snacking; within my eating window, I often find myself snacking because food is available, and I know I can eat. Although I am not overweight and appear very healthy, I know I can cut out snacks altogether, put less on my plate at meals, and don't go back for seconds and thirds! I know adjusting my eating habits will raise my HRV and extend my life.

Conclusion

It proved much more difficult to stop writing this book than to fill the chapters with research, best practices, and strategies. With the advances in HRV technology mentioned throughout the book, the research using HRV to measure a vast range of variables seems to exponentially grow each week. While we all enjoy being a part of this blossoming science and technological revolution, when do you stop writing and publish, as you continue to sort through an exciting avalanche of new research?

We joked about this conclusion being the introduction of the second edition of this book! Several powerful factors leave us feeling that hitting publish begins another step of our journey.

The first of these factors is the COVID pandemic's impact on the future of business and work. As we write these words, a mental-health crisis has hit our society. This crisis along with the continuing public health emergency of COVID has traumatized people in so many different ways. We know that trauma does not just heal itself or disappear with a certain vaccination rate or return to some resemblance of normal.

COVID forced businesses to rethink the very nature of work and the workplace. As leaders search to find a balance between in-person and virtual work, many struggle to find what works best for their people and the success of their business. The gig economy and advancement in remote work had us questioning, “What is work?” before COVID. This question seems even more prominent now.

The workforce shortage experienced by many industries at the time of this writing indicates that many people do not want to go back to business as usual. With workers becoming a scarce resource, businesses must evolve their practices to show the value of work beyond people getting a paycheck to work as a small part of a larger faceless machine.

This disruption hits us on the brink of another transformation. Artificial intelligence (AI) and machine learning will transform all aspects of our work and lives. It seems like everyone has an opinion on whether these technologies will create a utopia or end the human race.

Whether someone is an optimist or pessimist, everyone agrees that AI and machine learning will transform everyone’s work and eliminate some jobs altogether, while also creating new ones. It seems that in the coming age of AI, businesses that maximize creativity and interpersonal skills will innovate and survive, while rigid businesses will not survive. AI might take over many repetitive jobs and tasks, but the next generation of technology seems very unlikely to replace human innovation and the interpersonal skills needed for business success.

Developing alongside AI and machine learning, biometric technology will also evolve at a rapid pace. Many of

us already put monitors in our cars that send data to our insurance companies on our driving habits. We get a discount for safe driving. When do we get the first offer to lower our health and life insurance if we share our biometric data with our insurance provider?

AI and machine learning will help sort out the massive amounts of HRV and other biometric data to help us realize which behaviors promote or harm health. As AI identifies new strategies for health and longevity, it will also help customize the data. While many healthy behaviors will stay universal, soon an AI system will look at our unique biometrics and genetics and create a wellness plan customized to each individual.

The three of us are excited to walk into this future with you. As with any technological revolution, there will always be positive and negative consequences. We hope that our attempt to put forth a research-based argument in this book as to why leaders should care about the wellbeing of their people puts forth an example of using technology for good.

Thanks so much for joining us on this journey, even if it is just the start!

About the Authors

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Matthew S. Bennett is a relentless advocate for interventions that help people and communities heal and thrive. His passion manifests in his books *Heart Rate Variability*, *Connecting Paradigms*, *Talking about Trauma and Change*, and *Trauma-Sensitive Early Education*, as well as the *Heart Rate Variability Podcast*. Matt combines his masters' degrees in psychology and business administration with his practical experience as a therapist and leader to develop research-based solutions and trainings to improve the health of individuals, leaders, businesses, and systems.

As soon as Matt learned about heart rate variability (HRV), he saw its life-changing potential. For him, HRV became the next logical step in his work with the trauma-informed care paradigm, self-care, and leadership in high stress occupations. After spending months trying to figure out how to help integrate existing HRV technology into services, his frustration led him to create the Optimal HRV app specifically for those trying to help others live their best lives. He currently serves as President of the Optimal Innovation Group, a nonprofit organization with a mission to ensure that advancements in biometric technology do not create another health inequity for historically underserved communities.

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Recognized as a pioneer in mindfulness-based biofeedback, Dr. Khazan is a popular speaker at national and international conferences on the topics of biofeedback and mindfulness. She has conducted biofeedback and mindfulness trainings for notable institutions in the United States and abroad, including the U.S. Navy Special Warfare, U.S. Army Special Forces, and the Stuttgart Opera and Ballet Company.

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Dr. David Hopper

Dr. David Hopper is a father of two amazing children, Jobin and Petunia, and is married to his dream wife, Brooke. Dr. Dave is a practicing chiropractor in the Chicagoland area. His wife and he own and operate two pediatric clinics offering occupational therapy, speech therapy, and physical therapy, as well as owning and operating a chiropractic clinic seeing people of all ages and abilities.

Dr. Dave is also a professor of anatomy & physiology at the National University of Health Sciences, teaching future chiropractors and others to be doctors. As well, Dr. Dave holds two United States patents on exercise equipment and ergonomic equipment. Formerly, he was a professional athlete and brings the same drive and passion to all of his life's current work.

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To learn more about Optimal HRV, visit us at www.optimalhrv.com, and for our nonprofit work to bring HRV technology to underserved populations at www.optimalinnovationgroup.com

Appendix 1: Assessing States and Traits

Answer the following with a particular focus on the positions you supervise.

What traits does a person need to thrive in a specific job?

What traits does someone need to succeed under the leadership of the team or business?

What traits does a person need to thrive in the culture of a team and business?

Are the traits someone needs to thrive in their job and culture traits that you would associate with a well-adjusted and healthy individual?

How do you assess these traits when hiring or promoting someone into a new position?

How do you support people in the development of these traits over time?

What states do the jobs you supervise require for success?

How do you support people in reaching and maintaining these states?

What states do you expect people to reach without your support?

Are the states that someone needs to thrive in their job the same states you would associate with a well-adjusted and healthy individual?

Appendix 2: HRV Algorithms

Below is a sample electrocardiogram or EKG reading. The Q wave, R wave, and S wave, or QRS complex, show the variation in milliseconds between depolarization or contraction of the large ventricular muscles of the heart. This depolarization creates positive and negative electrical charges. Typically, the Q wave indicates a negative charge, the R wave is the positive charge, and the S wave is another negative charge.

One way to measure heart rate is to track the number of QRS complexes over 60 seconds. Heart rate variability measures the differences in time between R wave peaks or the R-R interval. Measured in milliseconds, tracking the differences between R-R intervals over a period of time provides a measure of heart rate variability. As shown below by the numbers in the circles, there are small variations between R-R intervals.

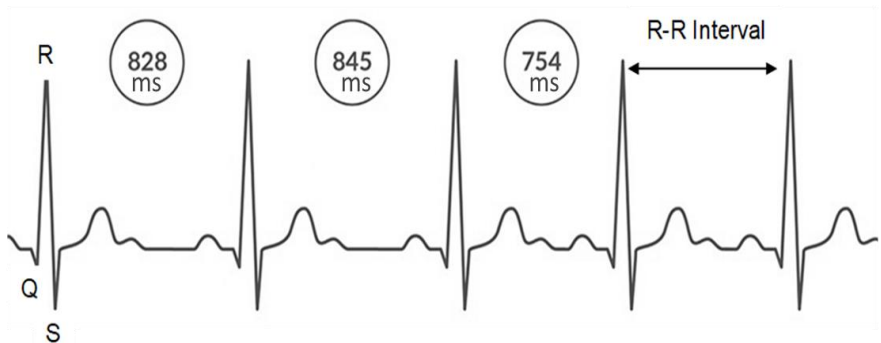


Figure 17: Sample EKG

Root mean square of the successive differences (RMSSD) is one of several time-domain tools used to assess heart rate variability, the successive differences being neighboring RR intervals. The higher your RMSSD the better! Focus on your training to help raise those numbers. In(RMSSD) is an algorithm that simplifies the RMSSD score.

Max-min is a particularly helpful way to illustrate heart rate variability—watch your heart rate going up and coming down. This shows you the changes in your heart rate in real time, moment to moment. This is also an important measurement of the way your breath and your heart rate work together and one of the ways that we know when your breathing practice brings you into your optimal training zone for improving HRV.

Standard deviation of normal-to-normal intervals (SDNN) is similar to RMSSD in that it provides a measurement of the differences in the intervals between heartbeats. However, SDNN looks at all the intervals, not just the adjacent ones, the way RMSSD does. SDNN provides us with a general measurement of overall HRV, whereas RMSSD tells us more about the contribution of the parasympathetic nervous system to HRV.

pNN50 is the percentage of time intervals between heartbeats that differ from adjacent intervals by 50 milliseconds or more. pNN50 provides us with information regarding your nervous system's ability to regulate itself.

Total power is a frequency domain measurement of the total variance of the time intervals between heartbeats, or the total activity of your nervous system. It includes HF, LF, VLF, and ULF power. We use the individual power components, such as LF and HF, a lot more than total power itself.

Low frequency (LF) power is a frequency domain measure of HRV, reflecting the strength of your blood pressure reflex and the ability of your heart rate and breath to synchronize and work together. LF is an indicator of being at your optimal breathing rate (RF breathing), which is needed to train HRV most effectively. We want to see an increase in LF power during RF breathing only (for HRV biofeedback training). A high-LF power peak during biofeedback training indicates that you are making the most out of your training time in strengthening your nervous system reflexes and ability to self-regulate. Over time, you might notice an increase in your LF power during biofeedback training, indicating greater efficiency in your training.

A low-LF peak during biofeedback training may mean that you are just having an off day; perhaps you didn't sleep well, you don't feel well, or you have been under more stress than typical. It may also mean that you had trouble breathing at your RF breathing rate.

High frequency (HF) power and natural log of high frequency power are frequency domain measures that tell us about the strength of your vagal tone, or the ability of the parasympathetic nervous system to regulate your overall activation. HF power itself can be influenced by your overall breathing rate, and the distribution of its values is skewed. Therefore, we do not use raw HF power, but instead normalize those values by using the natural log, or $\ln HF$.

Very low frequency power (VLF) is a frequency domain measurement of your HRV, reflecting the activity of your sympathetic nervous system, the part of your nervous system responsible for physiological activation. Short-term measurements of VLF power need to be interpreted with caution, since the signal travels in a very slow wave, not

giving us a lot of data in a 3-minute measurement interval. However, high-VLF power on short-term recordings may indicate worry and excessive physiological activation.

Appendix 3: Job Demand and Resource Model

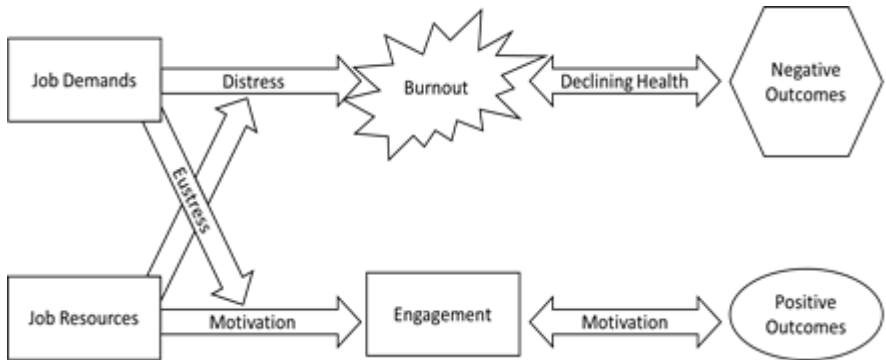


Figure 18: Job Demands and Resources Model

Job Demands: Physical, psychological, social, or business aspects of the job that require sustained physical and/or psychological effort or skills. Therefore, they are associated with certain physiological and/or psychological costs.

Job Resources: Physical, social, emotional, or business aspects of the job that may do any of the following:

- Reduce job demands and the associated physiological and psychological costs
- Be functional in achieving work goals
- Stimulate personal growth and development

Distress: Physical, psychological, social, or business aspects of the job that disrupt homeostasis and threaten productivity, as well as cognitive, medical, mental, and social health.

Eustress: Positive stress that challenges homeostasis and creates motivation to meet the challenge.

Burnout:

- Distress levels start to increase; vagal tone decreases, leading to more sympathetic or dorsal vagal activation, which leads to increased levels of anxiety, depression, and a lack of usual energy.
- Distress levels cause more activation in the amygdala and less in the prefrontal cortex, decreasing cognitive ability, emotional regulation, and relational health.
- A significant drop in the Last Week average when compared to the All-Time average.
- People hold too much stress in their cups, and behaviors become more rigid or chaotic.

Motivation: The reason or reasons one has for acting or behaving in a particular way; the general desire or willingness of someone to do something.

Engagement: Positive, fulfilling, work-related state of mind characterized by vigor (i.e., high levels of energy and resiliency), dedication (experiencing a sense of significance, importance, pride, and challenge), and absorption (being fully concentrated and happily engrossed in one's work).

Appendix 4: Wellness Plans

List your warning signs:

Physical:

Psychological:

Social:

What strategies will you implement if your 7-day average is significantly lower, 15% or more than your 30-day or all-time averages?

What are your strategies if my 30-day average is significantly lower, 5 to 10%, than your all-time baseline?

Do you need to do anything now? If so, what?

Your Goals to Improve HRV, Health, and Productivity

Sleep:

Movement and Exercise:

Nutrition:

HRV Mindfulness and Biofeedback:

Purpose and Values:

Social Connection:

Recovery Time:

Hyperefficiency:

Professional Development:

Professional Social Health:

Appendix 5: Values and Vision Questions

Identifying personal values (usually 5 to 7)

What beliefs and convictions are core to who you are and that you would never change?

What do you care most about in life?

What are the rules you live by?

Identifying shared values for the business (usually 3 to 7)

If you were to start a new business, would you build it around this value?

Would you want us to continue to stand for this core value one hundred years into the future?

Would you want us to hold this value, even if at some point the environment penalized us for living this value?

Do you believe that those who do not share this value should not work for the business?

Would you change jobs before giving up this core value?

Values-based decision-making questions

Clearly define the problem.

Name the possible values that might help drive the decision-making process.

Revisit these values at the beginning of every team meeting or discussion about the change.

As a solution emerges, continue asking, “Does this solution support our shared values?”

When communicating the decision to others in the business, explain how values helped guide the process.

Shared purpose questions

Do you find this purpose personally inspiring?

Does the purpose help you think expansively about the long-term possibilities and range of activities that the business can consider beyond its current products, services, markets, industries, and strategies?

Does the purpose help you to decide what activities not to pursue, to eliminate them from consideration?

Is this purpose authentic—something true to what the business is all about—not merely words on paper that “sound nice”?

Would this purpose be greeted with enthusiasm rather than cynicism by a broad base of people in the business?

When telling your children and/or other loved ones what you do for a living, would you feel proud in describing your work in terms of this purpose?

Big Hairy Audacious Goal (BHAG) questions

What images or emotions does the future state described in the vision elicit?

Does it use specific, concrete examples and analogies to bring the vision to life rather than bland platitudes?

Does it express the ultimate potential of our passion, values, and purpose?

When reading the vision, do you think, “Wow, it would be fantastic to be a part of that, and I’m willing

to put out significant effort to realize this vision”?

Will the vision excite a broad base of people in the business, not just those with executive responsibility?

Do you believe the business has less than a 100% chance of achieving the vision (50% to 70% chance is ideal), yet at the same time, acknowledge that the business can achieve the vision if fully committed?

How will we know we reached the vision and what metrics will we use to measure progress and completion?

Appendix 6: Job Resources to Support Wellness Practices

Job resources to support sleep:

- Put the business' logo on sleep masks as a gift.
- Have a fishbowl filled with earplugs that people can take.
- Offer as much job flexibility as possible to help people work at times that match their natural sleep patterns.
- Set expectations about screen time required outside the work environment to help people get away from screens.
- Encourage or incentivize pre/post-sleep HRV readings to help people identify the benefits of healthy sleep.
- Encourage or incentivize an evening (at least an hour before sleep) HRV biofeedback session.
- Provide free access to online CBT-I programs.

Job resources to support movement and exercise:

- Incentivize people to get a certain number of steps in during the workday.
- Create workstations with treadmill desks or provide access to bicycle pedals designed to work under a desk.
- Encourage a more extended break during the workday for a longer walk, bike ride, or gym workout.

- Provide access to workout and yoga classes or to a gym convenient for employee work schedules.

Job resources to support healthy eating:

- Stop providing unhealthy inflammatory food.
 - Replace donuts with nuts or healthy anti-inflammatory alternatives.
 - When ordering food, avoid those high in carbohydrates and sugar.
 - Encourage people to leave the dairy and sweeteners out of their coffee.
 - Check the vending machine and remove inflammatory foods.
 - Replace celebratory cakes with a healthier alternative. If there is a cake as part of a celebration, provide it at the very end of the day.
- Provide access to healthy anti-inflammatory foods whenever possible.
- Encourage long breaks so people can get movement in after lunch or other meals consumed during the workday.
- When requiring more extended hours in the workplace for an important project, cater healthy meals and limit access to inflammatory food, especially during stressful times.
- Bring in a registered dietitian nutritionist with knowledge about HRV to consult with teams and individuals.

Job resources to avoid adverse effects of drinking:

- Do not promote or encourage drinking.
- Give social opportunities without alcohol to replace happy hours.
- Do not reimburse for alcohol.
- Put kombucha, cold coffee, or other unique drinks on tap to encourage social interactions around nonalcoholic drinks.

Job resources to support HRV hacks:

- Provide free yoga classes from an instructor who understands HRV science.
- Bring a bodywork therapist on site to consult and treat people.
- Have fun with these hacks. A gargling station, sing-along, or team stretch can provide a chance to improve HRV and get a laugh.
- Provide people with a company-branded journal.

Appendix 7: Sleep Improvement

Timing and Duration

- Going to bed and waking at similar times each day is one of the most powerful tools to help your body set a healthy sleep cycle and maintain a hormone balance that promotes healthy sleep.
- Most people need around 8 hours of sleep. Due to genetic differences, you might need a little more or less nightly sleep. Waking up refreshed with a strong HRV reading will help you determine your optimal sleep time.

Temperature

- A hot environment will decrease sleep quality.
- Sixty-five degrees Fahrenheit is the most optimal sleep temperature.
- Find an optimal balance between room temperature, sleepwear, and blanket use.

Noise

- Eliminate all noise sources, electronics, and anything else that might disrupt sleep.
- Use earplugs or a sound machine if in a noisy or unpredictable environment.

Light

- Eliminate or cover all sources of light; electronics, blinking or static lights, etc.
- Use blackout curtains and/or an eye mask.
- Avoid sources of blue light from phones, television, computers, and other electronics at least one hour before bed.

Disturbances

- Bed partners should be limited to humans. Avoid pets in the bed if possible.
- If snoring is an issue for you or a partner, please see a sleep specialist. No level of snoring is normal.

Activity

- Avoid strenuous exercise late in the day.
- Cease all significant activity two hours before bed.

Nutrition

- Stop consuming calories, including alcohol, at least two hours before bed.
- Avoid overeating at dinner or eating too much red meat; digestion will disrupt sleep.
- Do not skip dinner, as hunger can make it difficult to fall asleep.

Appendix 8: Inflammatory and Anti-inflammatory Food

Foods that cause inflammation and should be limited:

- Processed foods
- Sugar, sugar substitutes, and artificial sweeteners
- Refined carbohydrates such as bread and pasta
- Alcohol
- Bad oils and fats such as seed oils and margarine
- Soda and sugar-sweetened beverages
- Grain-fed red meat
- Monosodium glutamate or MSG

Foods with anti-inflammatory properties:

- Green leafy vegetables
- Probiotic foods
- Bone broth
- Sweet potatoes, yams, beets, broccoli, tomatoes, and peppers
- Blueberries, raspberries, and strawberries
- Chia and flax seeds
- Extra-virgin olive oil
- Turmeric, ginger, and cinnamon
- Walnuts and almonds
- Garlic and onion
- Green tea
- Wild-caught fatty fish
- Dark chocolate and cocoa

Appendix 9: Basic Supplements

Vitamin D3 with K2

- Improves health, function, and quality: Sleep, immunity, brain, nervous system, mood stabilization, blood-sugar regulation, and cardiovascular health.
- Vitamin K ensures the calcium absorbed and released with vitamin D goes to the appropriate place, such as bones and teeth, rather than calcifying soft tissues, such as blood vessels and the pituitary gland.
- Form: Vitamin D3 with vitamin K2.
- Food sources: Salmon, egg yolks, and cheese.
- Time to take: Morning.

Vitamin B complex

- Improves health, function, and quality: Nutrient absorption, brain, and nervous system.
- Form: B complex.
- Food sources: Organ meats, chicken, eggs, and leafy greens.
- Time to take: Morning.

Docosahexaenoic acid and Eicosatetraenoic acid (DHA and EPA)

- Improves health, function, and quality: Brain, nervous system, cardiovascular, skin, eye, and inflammation.
- Form: Fish oil or algae.
- Food sources: Wild-caught fish, krill, chia seeds, and flax seeds.
- Time to take: With a meal.

Magnesium

- Improves health, function, and quality: Sleep, relaxation of body and mind, cardiovascular, and gastrointestinal.
- Form: Complex of some or all; citrate, glycinate, threonate, taurate.
- Food sources: Pumpkin seeds, almonds, and most vegetables.
- Time to take: Morning and or evening.

Probiotics and Prebiotics

- Improves health, function, and quality: Digestion, immunity, mood, and mental clarity.
- Form: 8+ strains, at least 50 million per dose.
- Food sources: Green bananas, plantains, and fermented foods: yogurt, sauerkraut, miso soup, kefir, sour pickles, tempeh, and kombucha.
- Time to take: On an empty stomach. If the stomach becomes upset, take with a snack.

Curcumin

- Improves health, function, and quality: Inflammatory, pain and discomfort, headaches, arthritis, cholesterol, depression, anxiety, and neurodegenerative diseases.
- Form: Curcumin with black pepper.
- Food sources: Turmeric.
- Time to take: Morning and midday if needed/recommended, or as needed.

Talk to your healthcare professional for proper dosing

References

- Achor, S. (2010). *The happiness advantage*. New York: Crown Business.
- Alvarsson, J. J., Wiens, S., & Nilsson, M. E. (2010). Stress recovery during exposure to nature sound and environmental noise. *International Journal of Environmental Research and Public Health*, 7(3), 1036–1046.
<https://doi.org/10.3390/ijerph7031036>
- Baethge, A., Vahle-Hinz, T., and Rigotti, T. (2019). Coworker support and its relationship to allostasis during a workday: A diary study on trajectories of heartrate variability during work. *Journal of Applied Psychology*, 105.
<https://doi.org/10.1037/apl0000445>
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22 (3), 309–328.
- Barnes, H. A., Hurley, R. A., & Taber, K. H. (2019). Moral injury and PTSD: Often co-occurring yet mechanistically different. *Journal of Neuropsychiatry and Clinical Neurosciences*, 31(2): A4–103.
<https://doi.org/10.1176/appi.neuropsych.19020036>. PMID: 31012825.
- Bataineh, A. (2022). *Why a surprisingly small amount of alcohol might affect heart rate variability (HRV)*.
<https://www.span.health/blog/how-surprisingly-little-alcohol-can-affect-hrv>

Beauchaine, T. P., Gatzke-Kopp, L., & Mead, H. K. (2007). Polyvagal theory and developmental psychopathology: Emotion dysregulation and conduct problems from preschool to adolescence. *Biological Psychology*, 7(2), 174–84.

Bennett, M. S. (2017). *Connecting paradigms: A trauma-informed and neurobiological framework for motivational interviewing implementation*. Denver: A BIG Publication.

Bennett, M. S. (2018). *Talking about trauma and change: A connecting paradigms supplement*. Denver: A BIG Publication.

Bennett, M.S. (2020). *Heart rate variability: Using biometrics to improve outcomes in trauma-informed organizations*. Denver: A BIG Publication.

Bennett, M. S., & Bennett, S. (2019). *Trauma-sensitive early education: Helping pre-school and elementary students thrive!* Denver: A BIG Publication.

Bennett, M. D., & Gibson, J. M. (2006). *Field guide to good decisions: Values in action*. West Port, CT: Praeger.

Billman, G. E. (2011). Heart rate variability – A historical perspective. *Frontiers in Physiology*, 2, 86.
<https://doi.org/10.3389/fphys.2011.00086>

Bloom, S. L. (2006). Organizational stress as a barrier to trauma-sensitive change and system transformation. A white paper for National Technical Assistance Center for State Mental Health Planning (NTAC).

Bloom, S. L., & Farragher, B. (2011). *Destroying sanctuary: The crisis in human service delivery systems*. New York: Oxford University Press.

Bloom, S., L., & Farragher, B. (2013). *Restoring sanctuary: A new*

operating system for trauma-informed systems of care. New York: Oxford University Press.

Bourassa, K. J., Allen, J., Mehl, M. R., & Sbarra, D. A. (2017). Impact of narrative expressive writing on heart rate, heart rate variability, and blood pressure after marital separation. *Psychosomatic Medicine*, 79(6), 697–705.
<https://doi.org/10.1097/PSY.0000000000000475>

Breit, S., Kupferberg, A., Rogler, G., & Hasler, G. (2018). Vagus nerve as modulator of the brain–gut axis in psychiatric and inflammatory disorders. *Psychiatry*, 9, 44.
<https://doi.org/10.3389/fpsyt.2018.00044>

Buckingham, M., & Coffman, C. (1999). *First, break all the rules: What the world's greatest managers do differently*. New York: Simon and Schuster.

Castrillon, C. (2021). *Why taking vacation time could save your life*. Forbes.
<https://www.forbes.com/sites/carolinecastrillon/2021/05/23/why-taking-vacation-time-could-save-your-life/?sh=15bcc31224de>

Christakis, N. A., & Fowler, J. H. (2011). *Connected: The surprising power of our social networks and how they shape our lives*. New York: Little, Brown and Company.

Christensen, J. H. (2011). Omega-3 polyunsaturated fatty acids and heart rate variability. *Frontiers in Physiology*, 2, 84.

Clifton, J., & Harter, J. (2020). *It's the manager: Moving from boss to coach*. New York: Gallup Press.
Collins, J. (2001). *Good to great: Why some companies make the leap...and others don't*. New York: HarperCollins.

Collins, J. (2009). *How the mighty fall and why some companies never give in*. New York: HarperCollins.

Collins (2022). <https://www.jimcollins.com/>

Collins, J., & Hansen, M. T. (2011). *Great by choice: Uncertainty, chaos, and luck – Why some thrive despite them all*. New York: Harper Business.

Collins, J., & Morten, T. H. (2011). *Great by choice: Uncertainty, chaos, and luck--why some thrive despite them all*. New York: HarperCollins.

Collins, J. & Porras, J. I. (2004). *Built to last: Successful habits of visionary companies*. New York: Harper Business.

Connors, R., & Smith, T. (2009). *How did that happen?* New York: Portfolio/Penguin.

Dana, D. A., & Porges, S. W. (2018). *The polyvagal theory in therapy: Engaging the rhythm of regulation*. New York: W. W. Norton and Company.

Dantzer, R., O'Connor, J. C., Freund, G. G., Johnson, R. W., & Kelley, K. W. (2008). From inflammation to sickness and depression: When the immune system subjugates the brain. *National Review of Neuroscience*, 9(1), 46–56.

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., Urbanowski, F., Harrington, A., Bonus, K., & Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, 65(4), 564–570.

Davis, D. M., & Hayes, J. A. (2012). What are the benefits of mindfulness? *Monitor on Psychology*, 43(7), 64.

Duckworth, A. (2016). *Grit: The power of passion and perseverance*. New York: Scribner.

Duhigg, C. (2016). *Smarter, faster, better*. New York: Penguin Random House.

Dweck, D. S. (2006). *Mindset: The new psychology of success*. New York: Ballantine Books.

Fernandez, A. (2006). Physical fitness and brain fitness. [Wed log comment]. Retrieved October 15, 2010, from <http://sharpbrains.wordpress.com/2006/08/13/role-of-physical-fitness>.

Fisher, J., & Phillips, A. (2021). *Work better together: How to cultivate strong relationships to maximize well-being and boost bottom line*. New York: McGraw Hill.

Forte, G., Morelli, M., & Casagrande, M. (2021). Heart rate variability and decision-making: Autonomic responses in making decisions. *Brain Sciences*, 11(2), 243. <https://doi.org/10.3390/brainsci11020243> PMID: 33672004; PMCID: PMC7919341.

Fournié, C., Chouchou, F., Dalleau, G., Caderby, T., Cabrera, Q., & Verkindt, C. (2021). Heart rate variability biofeedback in chronic disease management: A systematic review. *Complementary Therapies in Medicine*, 102750.

Fung, J. (2016). *The obesity code: Unlocking the secrets of weight loss*. Berkeley, CA: Greystone Books.

Gallup (2022). *Gallup access*. <https://www.gallup.com/access/323333/q12-employee-engagement-survey.aspx>.

Gardner, B., Lally, P., & Wardle, J. (2012). Making health habitual: the psychology of 'habit-formation' and general practice. *British Journal of General Practice*, 62(605), 664–666.

Gentleman, R., Hornick, K., & Parmigiani, G. (Eds.) (2017). *Heart rate variability analysis with the R package*. Cham, Switzerland: Springer International Publishing.

Goessl, V. C., Curtiss, J. E., & Hofmann, S. G. (2017). The effect of heart rate variability biofeedback training on stress and anxiety: A meta-analysis. *Psychological Medicine*, 47(15), 2578–2586.

Goffeng, E. M., Nordby, K.-C., Tarvainen, M. P., Järvelin-Pasanen, S., Wagstaff, A., Goffeng, L. O., Bugge, M., Skare, Ø, & Sigstad Lie, J.-A. (2018). Fluctuations in heart rate variability of health care workers during four consecutive extended work shifts and recovery during rest and sleep, *Industrial Health*, 56 (2), 122–131.

Goldberger, A. L., & Stein, P. K. (2017). *Evaluation of heart rate variability*. www.uptodate.com.

Goleman, D. (2006). *Social intelligence: The new science of human relationships*. New York: Bantam Books.

Goleman, D., & Davidson, R. J. (2017). *Altered traits: Science reveals how meditation changes your mind, brain, and body*. New York: Avery.

Golosheykin, S., Grant, J. D., Novak, O. V., Heath, A. C., & Anokhin, A. P. (2017). Genetic influences on heart rate variability. *International Journal of Psychophysiology*, 115, 65–73.

Gostick, A., & Elton, C. (2009). *The carrot principle*. New York:

Free Press.

Hamel, G., & Breen, B. (2007). *The future of management*. Boston: Harvard Business Press.

Hansen, A. L., Johnsen, B. H., & Thayer, J. F. (2009). Relationship between heart rate variability and cognitive function during threat of shock. *Anxiety, Stress, and Coping*, 22(1), 77-89. <https://doi.org/10.1080/10615800802272251>

Hari, J. (2022). *Stolen focus: Why you can't pay attention - and how to think deeply again*. New York: Crown.

Hay, A. (2015). *100 facts about your brain: Discover what goes on inside your head*. Mumbai, India: Orange Owl Media.

Herman, J. L. (1997). *Trauma and recovery*. New York: Basic Books.

Hof, W., & Jong, K. D. (2017). *The way of the iceman: How the Wim Hof method creates radiant, longterm health*. Little Canada, MN: Dragon Door Publications.

Hoopes, L., & Kelly, M. (2004). *Managing change with personal resilience: Keys for bouncing back and staying on top in turbulent organizations*. Raleigh, NC: MK Books.

Kamath, M. V., Watanabe, M. A., & Upton, A. R. M. (2016). *Heart rate variability (HRV) signal analysis: Clinical applications*. Boca Raton, FL: CRC Press.

Kaur, M., Sharma, R. K., Tewari, S., & Narula, S. C. (2018). Influence of mouth breathing on outcome of scaling and root planing in chronic periodontitis. *BDJ Open*, 4, 17039. <https://doi.org/10.1038/s41405-018-0007-3>

Kemp, A. H., Quintana, D. S., Kuhnert, R. L., Griffiths, K., Hickie, I. B., & Guastella, A. J. (2012). Oxytocin increases heart rate variability in humans at rest: implications for social approach-related motivation and capacity for social engagement. *PLoS ONE*, 7(8), e44014. <https://doi.org/doi:10.1371/journal.pone.0044014>

Kharrazain, D. (2013). *Why isn't my brain working? A revolutionary understanding of brain decline and effective strategies to recover your brain's health*. Carlsbad, CA: Elephant Press.

Khazan, I. (2019). *Biofeedback and mindfulness in everyday life: Practical solutions for improving your health and performance*. New York: W. W. Norton and Company.

Kitamura, K., Murai, K., Wakida, S., Mitomo, N., & Fukushi, K. (2017). A ship navigator's mental workload using salivary NO₃⁻ concentration for simulator-based experiment. *Intelligent Automation and Soft Computing*, 23(1), 161–166.

Koh, K. B. (1998). Emotion and Immunity, *Journal of Psychosomatic Research*, 45(2), 107–115.
<https://www.sciencedirect.com/science/article/abs/pii/S0022399997002924?via%3Dihub>

Kotisaari, J. (2022). *Let's drink to that! Reflections and findings on alcohol and recovery*. Firstbeat.
<https://www.firstbeat.com/en/blog/lets-drink-to-that-reflections-and/>

Kouzes, J. M., & Posner, B. Z. (2017). *The leadership challenge: How to make extraordinary things happen in organizations*. Noboken, New Jersey: Wiley and Sons.

Langer, E. J. (2009). *Counterclockwise: Mindful health and the power of possibility*. New York: Random House.

Lehrer, P., Kaur, K., Sharma, A., Shah, K., Huseby, R., Bhavsar, J., Sgobba, P., & Zhang, Y. (2020). Heart rate variability biofeedback improves emotional and physical health and performance: A systematic review and meta analysis. *Applied Psychophysiology and Biofeedback*, 45(3), 109-129.

Lewis, G. (2006). *Organizational crisis management: The human factor*. Boca Raton, FL: Auerbach Publications.

Lipton, B. H. (2006). *The wisdom of your cells: How your beliefs control your biology*. Louisville, CO: Sounds True.

Lischke, A., Pahnke, R., Mau-Moeller, A., Behrens, M., Grabe, H. J., Freyberger, H. J., Hamm, A. O., & Weippert, M. (2018). Inter-individual differences in heart rate variability are associated with inter-individual differences in empathy and alexithymia. *Frontiers in Psychology*, 9, 229.
<https://doi.org/10.3389/fpsyg.2018.00229>

Liu, X., Ikeda, H., Oyama, F., Wakisaka, K., & Takahashi, M. (2018). Hemodynamic responses to simulated long working hours with short and long breaks in healthy men. *Science Reports*, 8, 14556. <https://doi.org/10.1038/s41598-018-32908-y>

Lopresti, A. L. (2020). Association between micronutrients and heart rate variability: A review of human studies, *Advances in Nutrition*, 11 (3), 559–575.
<https://doi.org/10.1093/advances/nmz136>

Madden, K., & Savard, G. K. (1995). Effects of mental state on heart rate and blood pressure variability in men and women. *Clinical Physiology*, 15(6), 557–569.
<https://doi.org/10.1111/j.1475-097x.1995.tb00544.x> PMID: 8590551.

- Martin, J. D., Abercrombie, H. C., Gilboa-Schechtman, E., & Niedenthal, P. M. (2018). Functionally distinct smiles elicit different physiological responses in an evaluative context. *Scientific Reports*, 8(1), 3558. <https://doi.org/10.1038/s41598-018-21536-1>
- Maslach, C., & Leiter, M. P. (1997). *The truth about burnout: How organizations cause personal stress*. San Francisco: Jossey-Bass.
- Mate, G., & Levine, P. A. (2010). *In the realm of hungry ghost: Close encounters with addiction*. Lyons, CO: The Ergos Institute.
- McClelland, L., Holland, J., Lomas, J.-P., Redfern, N. & Plunkett, E. (2017). A national survey of the effects of fatigue on trainees in anaesthesia in the UK, *Anaesthesia*, 72, 1069–1077.
- Mitchell, M. D., Gehrman, P., Perlis, M., & Umscheid, C. A. (2012). Comparative effectiveness of cognitive behavioral therapy for insomnia: A systematic review. *BMC Family Practice*, 13, 40. <https://doi.org/10.1186/1471-2296-13-40>
- Miller, W. R., & Rollnick, S. (2012). *Motivational interviewing: Helping people change* (3rd ed.). New York: Guilford Press.
- Moor, B. G., Crone, E. A., & van der Molen, M. W. (2010). The heartbrake of social rejection: Heart rate deceleration in response to unexpected peer rejection. *Psychological Science*, 21(9), 1326–1333. <http://www.jstor.org/stable/41062373>
- Moore, J., & Elliott, G. (2020). *Foundations of heart rate variability*. Elite Academy. <https://elitehrv.com/academy>.
- Murphy, J. J. (2008). *Solution-focused counseling in schools* (2nd ed.). Alexandria, VA: American Counseling Assoc.,

<http://counselingoutfitters.com/vistas/vistas08/Murphy.htm>

Nakazawa, D. J. (2016). *Childhood disrupted: How your biography becomes your biology, and how you can heal*. New York: Atria Books.

National Sleep Foundation (2019). *Lack of sleep may increase calorie consumption*.
<https://www.sleepfoundation.org/articles/lack-sleep-may-increase-calorie-consumption>.

Newmaster, S. G., Grguric, M., Shanmughanandhan, D., Ramalingan, S., & Ragupathy, S (2013). DNA barcoding detects contamination and substitution in North American herbal products. *BMC Medicine*, 11, 222.
<https://doi.org/10.1186/1741-7015-11-222>

Nicoll, R., & Henein, M. Y. (2018). Caloric restriction and its effect on blood pressure, heart rate variability and arterial stiffness and dilatation: A review of the evidence. *International Journal of Molecular Science*, 19(3), 751.

Ogden, P., Minton, K., & Pain, C. (2006). *Trauma and the body*. New York: W. W. Norton and Company.
Passmore, J. (Ed.) (2016). *The Wiley Blackwell handbook of psychology of occupational safety and workplace health*. Malden, MA: John Wiley and Sons.

Pietilä, J., Helander, E., Myllymäki, T., Korhonen, I., Jimison, H., & Pavel, M. (2015). *Exploratory analysis of associations between individual lifestyles and heart rate variability-based recovery during sleep*. The 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'15), Milano, Italy 25.-29.8. (Peer-reviewed).

Pizzoli, S. F., Marzorati, C., Gatti, D., Monzani, D., Mazzocco, K., & Pravettoni, G. (2021). A meta-analysis on heart rate variability biofeedback and depressive symptoms. *Scientific Reports*, 11(1), 1-10.

Porges, S. W. (2001). The polyvagal theory: Phylogenetic substrates of a social nervous system. *International Journal of Psychophysiology*, 42(2), 123-146.

Porges, S. W. (2009). The polyvagal theory: New insights into adaptive reactions of the autonomic nervous system. *Cleveland Clinic Journal of Medicine*, 76(Supplement 2), S86-S90.

Porras, S. (2020). Natural light influence on intellectual performance. A case study on university students. *Sustainability*, 12, 4167. <https://doi.org/10.3390/su12104167>

Rath, T., & Harter, J. (2010). *Wellbeing: The five essential elements*. New York, NY: Gallup Press.

Redwine, L. S., Henry, B. L., Pung, M. A., Wilson, K., Chinh, K., Knight, B., Jain, S., Rutledge, T., Greenberg, B., Maisel, A., & Mills, P. J. (2016). Pilot randomized study of a gratitude journaling intervention on heart rate variability and inflammatory biomarkers in patients with stage B heart failure. *Psychosomatic Medicine*, 78(6), 667-676. <https://doi.org/10.1097/PSY.0000000000000316>

Restak, R. (2006). *The naked brain: How the emerging neurosociety is changing how we live, work, and love*. New York: Three Rivers Press.

Rhem, J. (1999). Pygmalion in the classroom. *The National Teaching and Learning Forum*, 8(2), 1-2.

Rock, D. (2009). *Your brain at work: Strategies for overcoming*

distraction, regaining focus, and working smarter all day long. New York: HarperCollins.

Rock, D., & Page, L. J. (2009). *Coaching with the brain in mind: Foundations for practice*. Hoboken, NJ: John Wiley and Sons.

Ronayne, A. (2018). The influence of a positive or negative mindset on affect and heart rate variability (2018). *All College Thesis Program*, 2016-2019, 47.

Rosenberg, S., Porges, S. W., & Shield, B (2017). *Accessing the healing power of the vagus nerve: Self-help exercises for anxiety, depression, trauma, and autism*. Berkeley, CA: North Atlantic Books.

Ruwaard, J., Lange, A., Schrieken, B., & Emmelkamp, P. (2011). Efficacy and effectiveness of online cognitive behavioral treatment: A decade of interapy research. *Studies in Health Technology and Informatics*, 167, 9–14.

Ryan, J. M., & Howes, L. G. (2002). Relations between alcohol consumption, heart rate, and heart rate variability in men. *Heart (British Cardiac Society)*, 88(6), 641–642.
<https://doi.org/10.1136/heart.88.6.641>

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior*, 25, 293-315.

Schneider, M., & Schwerdtfeger, A. (2020). Autonomic dysfunction in posttraumatic stress disorder indexed by heart rate variability: A meta-analysis. *Psychological Medicine*, 50(12), 1937-1948.

Schwartz, T. (2010). *The way we are working isn't working*. New York: Free Press.

- Shenk, D. (2010). *The genius in all of us*. New York: Doubleday.
- Siebert, A. (2005). *The resiliency advantage*. San Francisco, CA: Berrett-Koehler Publishers.
- Siegel, D. J. (2007). *The mindful brain*. New York: W. W. Norton and Company.
- Siegel, D. J. (2011). *Mindsight: The new science of personal transformation*. New York: Bantam Books.
- Siegel, D. J. (2016). *Mind: A journey to the heart of being human*. New York: W. W. Norton and Company.
- Stanley, E. A. (2021). *Widen the window: Training your brain and body to thrive during stress and recover from trauma*. New York: Avery.
- Stulberg, B., & Magness, S. (2017). *Peak performance: Elevate your game, avoid burnout, and thrive with the new science of success*. New York: Random House.
- Sutton, R. (2010). *Good boss, bad boss*. New York: Business Plus.
- Tak, Y. J., Lee, J. G., Kim, Y. J., Lee, S. Y., & Cho, B. M. (2014). 25-hydroxyvitamin D and its relationship with autonomic dysfunction using time- and frequency-domain parameters of heart rate variability in Korean populations: A cross-sectional study. *Nutrients*, 6(10), 4373–4388.
<https://doi.org/10.3390/nu6104373>
- Tamkin, J. (2020). Impact of airway dysfunction on dental health. *Bioinformation*, 16(1), 26–29.
<https://doi.org/10.6026/97320630016026>
- Tedeschi, R. G., & Calhoun, L. (2004). Posttraumatic growth: A

new perspective on psychotraumatology. *Psychological Inquiry*, 15(1), 1–18

Totsuka, M., Soh, Z., Sasaoka, T., Yamawaki, S., & Tsuji, T. (2018). Towards objective olfactory evaluation based on peripheral arterial stiffness and heart rate variability indices. *Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 2018, 5618--5623. <https://doi.org/10.1109/EMBC.2018.8513577>

University of California Davis Health (2015). *Gratitude is good medicine: Practicing gratitude boosts emotional and physical well being*. https://health.ucdavis.edu/medicalcenter/features/2015-2016/11/20151125_gratitude.html

University of Texas Southwestern Medical Center (2010, April 1). New brain nerve cells key to stress resilience. *ScienceDaily*. <http://www.sciencedaily.com/releases/2010/03/100331080859.htm>

Van der Kolk, B. (2014). *The body keeps score: Brain, mind, and the body in healing trauma*. New York: Penguin Books.

Voss, A., Schroeder, R., Heitmann, A., Peters, A., & Perz, S. (2015). Short-term heart rate variability–influence of gender and age in healthy subjects. *PLoS One*, 10(3).

Wagner, R., and Harter, J. K. (2006). 12: *The elements of great managing*. New York: Gallup Press.

Walker, E. D., Brammer, A., Cherniack, M. G., Laden, F., & Cavallari, J. M. (2016). Cardiovascular and stress responses to short-term noise exposures–A panel study in healthy males. *Environmental Research*, 150, 391–397. <https://doi.org/10.1016/j.envres.2016.06.016>

White, L. H., & Bradley, T. D. (2013). Role of nocturnal rostral fluid shift in the pathogenesis of obstructive and central sleep apnoea. *The Journal of Physiology*, 591(5), 1179–1193.
<https://doi.org/10.1113/jphysiol.2012.245159>

Wienecke, E., & Nolden, C. (2016). Langzeit-HRV-analyse zeigt stressreduktion durch magnesiumzufuhr [Long-term HRV analysis shows stress reduction by magnesium intake]. *MMW Fortschritte der Medizin*, 158(Suppl 6), 12–16.
<https://doi.org/10.1007/s15006-016-9054-7>

Williamson, T. J., Thomas, K. S., Eisenberger, N. I., & Stanton, A. L. (2018). Effects of social exclusion on cardiovascular and affective reactivity to a socially evaluative stressor. *International Journal of Behavioral Medicine*, 25(4), 410–420.
<https://doi.org/10.1007/s12529-018-9720-5>

Wolynn, M. (2016). *It didn't start with you: How inherited family trauma shapes who we are and how to end the cycle*. New York: Viking.

Wright, H. N. (2011). *The complete guide to crisis and trauma counseling: What to do and say when it matters most!* Ventura, CA: Regal.