completecoherence

white paper

Getting to the heart of performance

The significance of Heart Rate Variability for leadership performance

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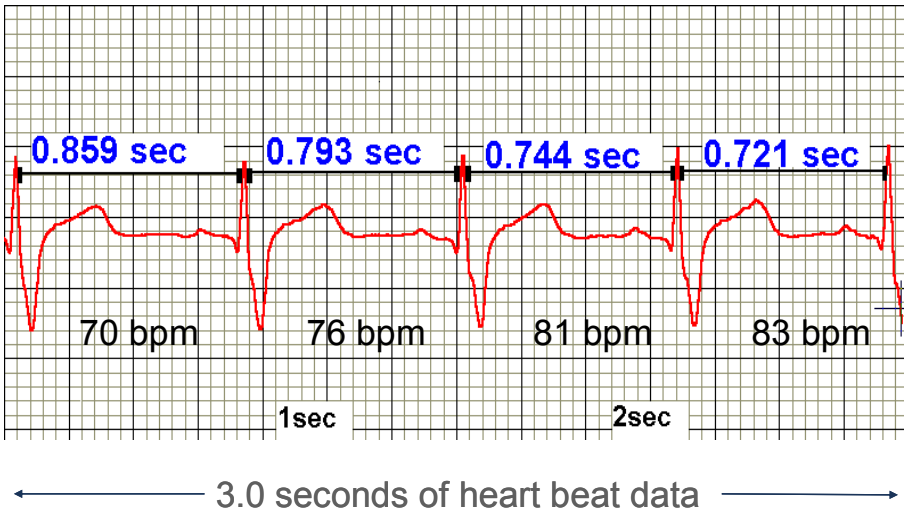
Believe it or not, your heart is not just a pump; it is directly relevant to business performance and results. This white paper explains the connection between Heart Rate Variability (HRV) and performance. It also reveals how you can take advantage of this knowledge.

What is Heart Rate Variability?

Although most of us are not aware of it, our heart is beating at a slightly different pace all the time which means that the distance between one beat and the next is constantly changing (Figure 1).

Figure 1. Changes in the inter-beat interval



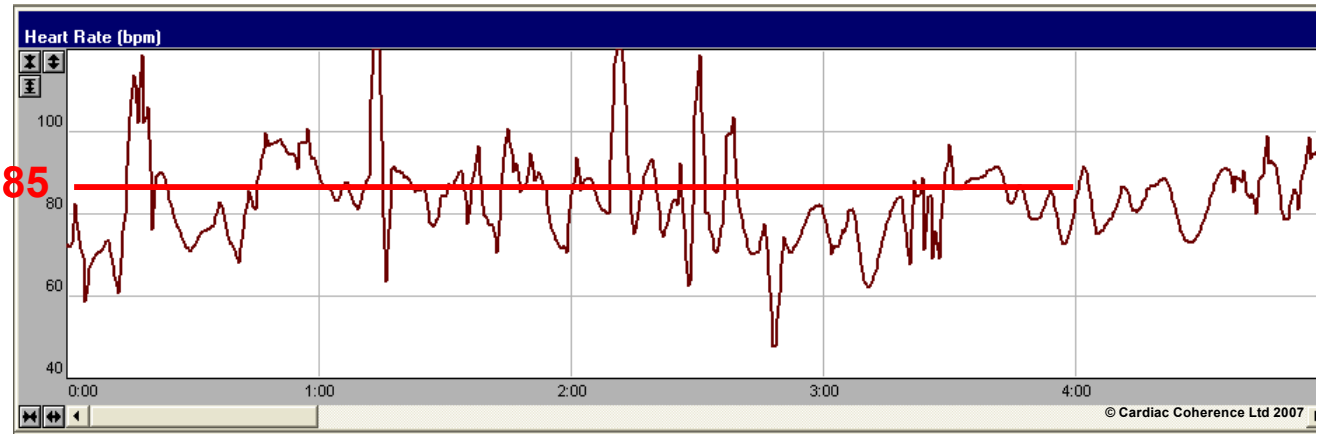
This variability or perpetual change in the interval between each individual heartbeat can be measured as Heart Rate Variability (HRV).

HRV has been used in medicine since the 1960s, initially in obstetrics. HRV is what is measured in 'foetal monitoring' and indicates the wellbeing of the baby, particularly during labour, and a loss of variability is often the primary reason why an emergency Caesarean is required.

HRV is based on the pattern of heart rate variations and the information contained within a 24-hour HRV analysis can reveal a significant amount of detail about an individual's performance. For example, 24-hour HRV analysis can reveal a wealth of data about our energy levels and exactly what we need to do to improve performance[1,2]. Such insights may be completely unknown to the individual.

We normally think of our heart rate as an average number measured by a doctor with a finger on our pulse, but it is the pattern of the moment-to-moment variation in our heartbeat that contains the really valuable performance data. Figure 2 (next page) shows just how much our heart rate varies.

Figure 2. Variations on heart rate over five mins



In figure 2, we can see that the number of heartbeats per minute fluctuate between 60 beats per minute (bpm) and 120 bpm – there is continuous variability even though the average heart rate is a simple 85 beats per minute.

What can HRV reveal?

There are now some 19,000 published scientific papers that explore the different aspects of HRV[3]. But why it is important for a leader to know about HRV? For four critical reasons:

- HRV can predict illness and death[4,5], crucial for succession planning
- HRV quantifies energy levels and levels of dynamism[6,7], crucial to performance
- HRV is intimately linked to brain function[8], crucial to effective decision making
- HRV relates to individual identity[9],[10], which is highly relevant to authentic leadership

HRV and energy

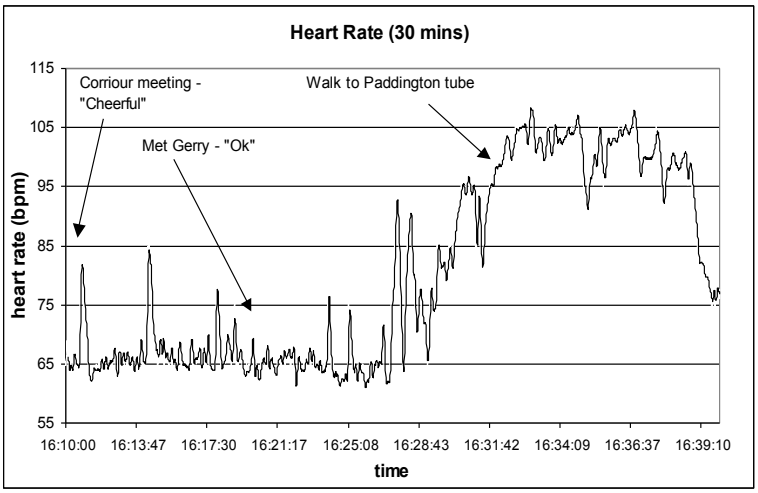
Energy can be measured by looking at the efficiency of our physiology or body, through our HRV. This isn't about physical fitness, although the two are related, but rather the energetic efficiency of our physical system.

Generally speaking most leaders are relatively poor at estimating how much energy they have. And they over and under estimate their energy levels in equal measure.

An example

A 24-hour HRV assessment can reveal whether a leader's main problem is motivation or endurance, how much energy they have, whether they are wasting energy and feel exhausted and whether they are using their energy efficiently.

Figure 3. An example 24-hour tachogram



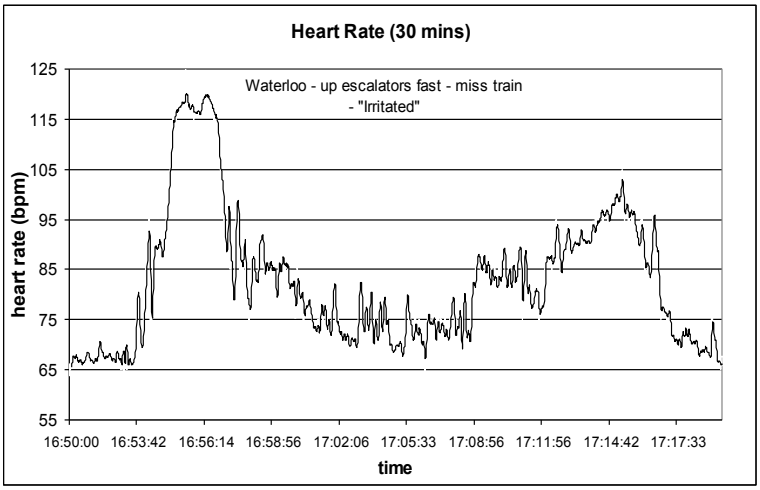


Figure 3 is an example of the information generated from a simple tachogram of a busy executive. Notice that while the executive was in meetings his heart rate was fluctuating around 65 bpm. Then he left work and his heart rate leapt almost immediately as he walked quickly to the train station, reaching 105 bpm, falling slightly as he reached the station.

In the second tachogram, we can see when the executive runs up an escalator. Again his heart rate nearly doubles from a steady 65 bpm to 120 bpm before dropping back to a higher resting level of 75 bpm. But then something interesting happens – he realises he's missed his train!

He's not walking fast or running up escalators and yet for the next 10 minutes his heart rate remains elevated, reaching up to 100 bpm. Being frustrated at missing his train clearly has a direct effect on his physiology, causing him to burn energy at a much higher rate than necessary for at least 10 minutes. This not only explains why people who have endured a very frustrating day come home feeling exhausted, but it also illustrates the critical importance of energy management of our physiology and emotions.

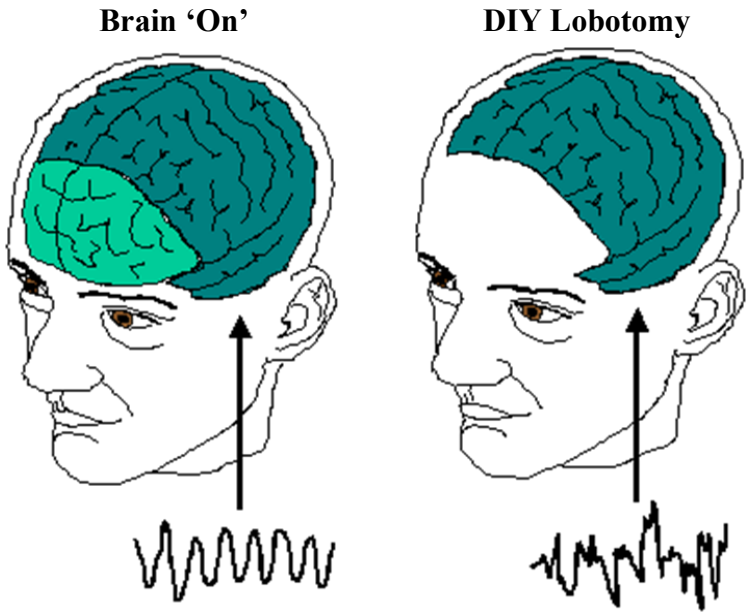
HRV and brain function

Not only are there established links between HRV and our energy levels, including the adrenaline in our bodies, there is also a link between HRV and our brain function[11].

Companies need people who can think high quality thoughts on a consistent basis. They need innovators, able to generate great ideas, spot opportunities and define the things that provide a competitive advantage. So the way we really get ahead and stay ahead is to become smarter than everyone else. And that starts with physiology[12].

Under pressure people don't think straight. Everyone has experienced this at some point or another. It's a primitive internal system that evolved in response to the threats human beings faced from tigers, bears, wolves and hostile tribes. In an emergency, human beings unconsciously shut down all the clever thinking parts of the brain to leave only two options: fight/flight (adrenaline driven) or play dead (acetylcholine driven). In the face of real danger our brain goes binary to save our life.

Figure 4. Schematic of the effect of physiology on brain function



The problem is that here we are 200,000 years later still using the same mechanism. Only the animals threatening us today are demanding bosses, difficult colleagues, agitated partners and angry customers. Simplistic 'pre-set' survival responses may have saved our life once upon a time but in the modern world they often impair our success and our ability to deliver results.

Very often we are not even aware that we have stopped thinking, so it can be bewildering. But when we understand what is happening in our bodies, it makes absolute sense. The human brain is constantly receiving signals from all our bodily systems, and in particular from the heart via the vagus nerve. When we are under pressure our heart rate variability (HRV) becomes super chaotic, which causes 'cortical inhibition'. This means the frontal lobes of the brain shut down. You can see this 'brain shut down' happen live with the willing volunteer in Dr Alan Watkins' TEDx talk (http://www.complete-coherence.com/tedx/).

How can we influence our HRV?

Given the evidence for the impact of our HRV on our energy levels and our ability to think clearly, the natural question to ask is: *Can we do anything about it?*

The short answer is yes. We can learn to influence our HRV and, as a result, think more clearly and retain more energy[13].

As the above tachogram of the executive who missed his train revealed, frustrated emotional reactions to an event caused his heart rate to spike and he used more energy over the following 10 minutes than he needed to. Had the executive been able to control his response to missing the train he still would have missed the train but he wouldn't have then compounded the error by leaking valuable energy.

With some practice, we can learn to create a coherent HRV signal so that we become dynamically responsive instead of reactive. This can be achieved via our breathing. If we want to impact performance we must optimise our physiology so that we can respond flexibly to the demands of any situation. By far the quickest and easiest way to alter HRV is to consciously alter our breathing.

Generating a rhythmic breathing pattern creates cardiac coherence. The rhythmic changes in intrathoracic pressure caused by rhythmic breathing result in the heart rate varying in a consistent way with each breath, which is a more efficient use of energy. As our cardiac physiology becomes coherent the power output of the heart increases and this drives other biological systems to synchronise with the heart causing physiological entrainment.

The conscious control of our breath is not a new concept indeed many disciplines such as public speaking, playing a musical instrument, sport, yoga, martial arts and meditation all teach people the importance of correct breathing. In total there are 12 aspects of our breathing that we can learn to control.

When it comes to generating cardiac coherence there are 12 different dimensions to the breath that we can learn to control. Fortunately only the first three really matter. Just focus on:

- Rhythmicity – fixed ratio of in:out breath
- Smoothness – even flow rate in and out
- Location of attention

Rhythmicity

The single most important priority in breath regulation is rhythm. First we need to make our breathing rhythmic (not deep) so that there is a fixed ratio between the in breath and the out breath.

For example you may decide to breathe in for the count of 4 and then breathe out for the count of 6, then repeat. All that matters is that whatever ratio you choose you maintain that ratio consistently - 3 in 3 out or 4 in 6 out or 5 in 5 out.

Smoothness

The second step is the smoothness of the breath. Technically we could breathe rhythmically but in a staccato 'jumpy' fashion. Coherence requires a smooth rhythm. This means we need to ensure a fixed volume of air is going in and out of our lungs per second.

Location of attention

Finally the third important aspect of our breathing is our location of attention. It's important to focus on our heart, or the centre of our chest for three reasons:

1. The heart is the main power station in the human system and generates considerably more energy than any other human organ or system.

2. When we feel most chaotic and our breathing and mind are scrambled there is usually a great deal of 'noise' in our head as we wrestle to regain control of our thoughts. The very act of moving our attention away from all the noise and dropping it into our body seems to be beneficial.
3. When we focus on our heart or the middle of our chest we are more likely to experience a positive emotional state because the heart is where most human beings experience their positive emotion. We say 'I love my wife with all my heart', we don't say 'I love her with all my brain'. So when someone has a positive emotional experience it's usually felt in the centre of the chest and consciously shifting our attention to that area can actually facilitate positive emotional experiences.

Conclusion

Heart Rate Variability has a direct impact on many aspects of our lives, many of which impact our performance at work. Our ability to think clearly and the energy we bring to our work are critical factors in our performance. They can make the difference between a stellar and a mediocre career. The good news is that we gain more energy and think more clearly if we learn to influence our HRV through rhythmic, smooth and focused breathing. This sets the stage for accelerated development using even more advanced techniques outlined in the books below.

Further reading

For more on the science of HRV and links to performance, read Dr Alan Watkins' books:

- Coherence: The Secret Science of Brilliant Leadership
- 4D Leadership: Competitive Advantage Through Vertical Leadership Development

About Complete Coherence

Complete Coherence is a consultancy that specialises in developing enlightened leadership through individual and team development. We were founded in 2004 by Dr Alan Watkins, drawing on his background as a physician and neuroscientist. Our approach encompasses multiple lines of development based on human performance research, integrated with insights from neuroscience, biology, complexity theory and other diverse fields. We believe that with the right coaching and development, human beings can be brilliant every day.

www.complete-coherence.com

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