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Context to the nugget

Matthew speaks about how we sleep occurs in 90 minute cycles in the brain. He says that in that cycle there are multiple stages of Non REM sleep and REM sleep that occur in sequence. He also goes onto to talk about the various benefits of Non REM sleep (Immune system, memory storage, better blood pressure control etc.) and REM sleep (creativity, empathy, reproductive health etc.). He speaks about why sleeping 25% less in terms of hours could actually mean getting 60-90% less of REM sleep given the way the 90 minute cycles are organized.

Transcription

Deepak Jayaraman (DJ): Let's just move to a different theme that you talk about in your research and in the book Matt. You talk about two different types of sleep: REM sleep and NREM sleep and I found one of the things interesting you say that if you sleep two hours less out of eight hours you might think that you are getting 25% less overall sleep, but you might be missing 60% to 90% of the REM sleep. So, for the purpose of listeners talk to us a little bit about what these are and what the benefits of each of these types of sleep is and how we should think about ensuring that we get enough of these in our nightly sleep routine.

Matthew Walker (MW): So human beings and most all mammalian species seem to have two broad types of sleep what we call non-rapid eye movement sleep or non-REM sleep and then rapid eye movement sleep or REM sleep also known as dream sleep. And non-rapid eye movement sleep has been further subdivided into four separate stages unimaginatively called stages 1 through 4 increasing in their depth. So, stages 3 and 4 are those really deep stages of non-REM sleep. Stages 1 and 2 are the lighter forms of non-REM sleep. And those two types of sleep non-REM and REM will play out in a battle for brain domination throughout the night and that cerebral war is going to be won and lost every 90 minutes in humans and replayed every 90 minutes and what that creates is this 90-minute cycling architecture of sleep. So when you first fall asleep, you go into the light stages of non-REM, then you go down to the deep stages and then after about 70 or 80 minutes, you'll start to rise back up and then you will pop up and you'll have a short REM sleep period and then back down you go again, down into non-REM and up into REM. Now that 90-minute cycle stays constant throughout the night. However, what changes is the ratio of non-REM to REM within that 90-minute cycle as you move across the night such that in the first half of the night the majority of those 90-minute cycles are comprised of lots of that deep non-REM sleep. But in the second half of the night that seesaw balance changes, and now in the second half we get much more rapid eye movement sleep. And so, this comes back to exactly what you were saying. Let's say that you take a standard eight-hour night of sleep and you wake up two hours early to get a jump start on the day, how much sleep have you lost? Well, in terms of total amount of time, you've lost two hours out of 8, which is 25% However, there's a sting in that tail which is hidden to you, which is that yes, you've

lost 25% of total sleep, but because that's the REM sleep rich phase of your sleep you may have actually lost maybe 70%, 80% almost 90% of your REM sleep of your dream sleep. So, understanding how sleep works and how sleep is structured can really help us understand how better to manage our sleep schedules.

DJ: And from a Layman's perspective Matt, could you talk about the benefits of REM phase of sleep and non-REM phase of sleep just so that we understand what the implications of this are?

MW: So, every stage of sleep that we have is important and there are different functions that are associated with different stages of sleep. So for example deep non-REM sleep stages three and four they seem to be important for aspects of keeping our immune system healthy, helping with our cardiovascular system, for example deep sleep is perhaps the very best form of natural blood pressure medication that you could ever wish for. Your fight or flight branch of the nervous system, calms down your heart rate drops and as a consequence your blood pressure drops. But we also know that deep sleep is helpful for cementing new memories and essentially hitting the save button on your memory so that you don't forget, but we also know that lighter stages of non-REM sleep for example stage 2 non-REM sleep is also important for learning and memory, but there that type of sleep helps actually refresh our short-term memory capacity and if you are not getting that lighter stage of non-REM sleep you wake up the next day and you don't have that refreshed ability to start learning and acquiring new information. It's almost like a USB stick that the lighter stages of non-REM sleep help refresh the capacity of that USB stick. So, the next day you can start acquiring new files again. Rapid eye movement sleep however or dream sleep also has many functions. Some of those functions are to help support our emotional and mental health. In fact, REM sleep is a wonderful form of emotional first aid. And when we start to disrupt or deprive people of non-rapid eye movement sleep, we typically see changes significant changes in mood and emotional reactivity. We also know that REM sleep correlates for example with the degree of testosterone in males. And so, REM sleep seems to have associations with our reproductive health and our reproductive fitness as well. So, I can go on and on but we certainly know that these different stages of sleep they all serve vital functions for human beings but different stages of sleep at different times of night support different functions and operations of the mind and the body.

DJ: Got it. And when I read the book, I noticed you talking about the impact of REM sleep on things like empathy, creativity, judgment and so on and clearly a lot of these are elements of executive functioning. Business leaders would love to be loaded with some of these elements. Have there been any studies done around REM sleep and let's say leadership capability out of curiosity?

MW: Not leadership ability directly but one of those things that you mentioned there is creativity and ingenuity and those two things we are led to believe are the engines that drive businesses forward. And what we know is that sleep including rapid eye movement sleep or dream sleep can actually provide a three-fold increase in your problem-solving capacity. So it gives you creative insights and we know from scientific evidence that you can start to create solutions to previously impenetrable problems and it's during dream sleep that there's almost a form of informational alchemy where the brain starts to collide all the things that it's recently been learning with the back catalog of all of the information it has pre-existing and by way of that colliding of information, that marinating of all of the memory ingredients together that's the way that we can start to divine novel insights to these previously difficult problems. I suspect it's also the reason by the way that you've never been told to stay awake on a problem. Instead you are told to sleep on a problem and in just about every language that I've inquired about to date that phrase sleeping on a problem or something very much like it seems to exist and what that means is that the creative brilliance of sleep transcends cultural boundaries. It's common across the globe.

Reflections from Deepak Jayaraman

DJ: When I spoke to the Chess Legend Vishy Anand (VA) on the podcast, he spoke about how sleep played a critical role in his effectiveness as a player. When I asked him about some of the rituals he followed around sleep, this is what he said:

VA: *"I found that a ritual, a good night sleep is very helpful, especially a sleep who just disturbed, because we are not talking about the rest as much as the ability to put the more nervous energy in the emotion from the previous day away, so that when you wake up you are looking at a fresh day that works well so, and then I work backwards from that and after very tensed game I try to go for a long walk or I might even go to the gym, I am not going there for the exercise I am going there to tied up my self so that I will have a shower and just fall asleep and I will not waste energy thinking about the game, there are even players who prefer to do all their work at night, so they will work till the five or six in the morning, and then go to sleep and then wake up at 2 o clock and go straight to the game, without any further work, and what they are fighting is if you wake up at 9 o clock and your game is at 2 o clock, I can do this but if I do this he might do that and if I do that he might do this and therefore what should I do? This could go wrong, that could go wrong, and you are using a lot of nervous energy thinking about this stuff, so what they are trying to accomplish by waking up at 2 o clock as they have no time to worry about the game they have done all their work at the last night and then they have gone to sleep"*

DJ: If I go back to the case of business leaders who are pursuing early morning exercise and trading off morning sleep, it is worth reflecting on the impact of this trade off on the quality of your REM sleep and therefore your leadership effectiveness.

Thank you for listening. If you are finding this conversation purposeful, you might also like to tune into my conversation with Matt Dixon a Triathlon coach in Silicon Valley, who specifically speaks about the role of rest and recovery when you train for triathlons.

End of nugget transcription

Nugget from Vishy Anand that is referenced: [Understanding the Processor inside](#).

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Matthew Walker - Nuggets

- 55.00 Matthew Walker - The Full Conversation
- 55.01 Matthew Walker - Sleep - The Swiss army knife of wellness
- 55.02 Matthew Walker - Morning Larks and Night Owls - a hard wiring
- 55.03 Matthew Walker - Dealing effectively with Jet-lag
- 55.04 Matthew Walker - How much sleep do we REALLY need?
- 55.05 Matthew Walker - REM and Non-REM sleep and criticality of each
- 55.06 Matthew Walker - Sleep, Music and the Beatles
- 55.07 Matthew Walker - Deleterious impact of Devices on sleep
- 55.08 Matthew Walker - Getting back to sleep when wide awake

About Deepak Jayaraman

Deepak seeks to unlock human potential of senior executive's / leadership teams by working with them as an Executive Coach / Sounding Board / Transition Advisor. You can know more about his work [here](#).

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