

# When Science Finds a Way

## Season 1, Episode 9

### How can sleep impact on mental health?

#### **Alisha Wainwright 00:00**

Just letting you know, this episode covers themes of mental health, and mentions self-harm and suicidal ideation.

#### **Daniel Freeman 00:11**

I'd never really been taught about sleep, and the treatment of sleep. So I went away and sort of researched it and read lots of books found out about it, tried things out with my patients. And finding that actually you could really help people. You know, if you help someone sleep better, there's going to be improvements across a whole number of areas in life.

#### **Alisha Wainwright 00:33**

Welcome to When Science Finds a Way - a podcast about the science changing the world. I'm Alisha Wainwright, and on this series, I'm meeting with scientists and researchers who are actually making a difference, as well as the people who have inspired and contributed to their work.

On this episode we're talking about sleep.

You might be thinking "what can I possibly learn about sleep?" I get it. It's something we all do. And everyone knows it's essential to health. Because, when you aren't getting good sleep, you feel it. I think we all know how a bad night's rest can ruin the rest of your day – feeling tired and sluggish physically, and mentally.

So it would seem obvious that sleep problems are linked to poor mental health – whether a symptom, a cause, or both. The worse you sleep, the worse you feel – and vice versa.

Daniel Freeman is Professor of Clinical Psychology at the University of Oxford, and he's been researching this link between sleep and mental health. Specifically, he's working with people experiencing psychosis, to see how improving their sleep could have an impact on their symptoms.

When someone is experiencing psychosis, that means they've lost some contact with reality. They might see or hear things that other people can't, or have delusions, which means they can believe things that are not actually true.

Working with these patients, Daniel heard repeatedly about disrupted sleep patterns. He had the idea that treatment to improve their sleep could be an effective intervention for people with serious mental health problems.

He laughs about it now, but says in the past, he struggled getting his research funded.

That seems to be changing. Daniel has run some smaller, pilot studies, with promising results – we'll hear an amazing story from one of the participants.

**Ryan 02:41**

When it comes to improvement of day-to-day activities where my sleep improved. It was vast.

**Alisha Wainwright 02:46**

And now, he's preparing for a larger trial that, he hopes, will build a more definitive body of evidence to show the effectiveness of sleep treatment for the symptoms of psychosis.

**Alisha Wainwright 03:02**

Daniel, I have to start by asking you, How did you sleep last night?

**Daniel Freeman 03:07**

Um, yeah, actually, I - probably not so well. I was doing a meeting until quite late at night. And then I stayed up a bit later. So actually, yes, I've not had my best sleep - and I like my sleep.

**Alisha Wainwright 03:23**

Are you generally, do you generally have trouble sleeping, or are you a pretty good sleeper?

**Daniel Freeman 03:27**

No, I'm pretty good. I have to say, yeah. I like my sleep.

**Alisha Wainwright 03:30**

You study sleep, and you're good sleeper. So you're a top student. I will ask you to take us back to the early days of your career when you were treating people with psychosis? When did you first have that a-ha moment that sleep was something you wanted to explore further?

**Daniel Freeman 03:49**

Yeah, I can remember, I can remember being in a sort of very dingy room on a psychiatric ward, asking in detail about a patient's day. And then asking them - how was your evening? At which point - telling me how difficult it was, how they were pretty much lying in bed not doing very much, sometimes hearing voices. And in fact, finding out their sleep pattern was generally pretty disrupted. And, you know, this is something I was hearing repeatedly. And I'd never really been taught about sleep, and the treatment of sleep. So I went away and sort of researched it, and read lots of books, found out about it, tried things out with my patients, and finding that actually, you could really help people sleep better - that there were clear psychological principles, could work really well. And that it actually reduced some of their other issues that - improved their mood, it lowered their paranoia. And then I was doing that for a few years. And it suddenly occurred to me that I wasn't reading about this in the literature. And yet, it seems so obvious in a sense that, you know, if you help someone sleep better, there's going to be improvements across a whole number of areas in life. It's almost been hidden in plain sight in mental

health problems, I think. It's so ubiquitous that everyone thinks, well, it can't be that important because it doesn't define a disorder.

**Alisha Wainwright 05:10**

Right, it tends to be a symptom, right? So -

**Daniel Freeman 05:14**

So that's one thing. So people will then say - it's probably a symptom of depression or a symptom of PTSD. But also, it's a contributing cause to these sorts of issues. Sleep is important in determining our psychological health, because I think most of us know if we're not sleeping very well, we don't feel so good the next day. But what's, of course, also interesting is that we talk about sleep or insomnia, but there's a whole range of different sleep disorders. And it's not even just about the total amount of sleep you get. I suspect you sleep better, when you've, your sleeping - altogether - it's not disturbed, not broken up. When we have what's called consolidated sleep, altogether, that tends to be better quality. So you could have six hours sleep, but if you're, if you keep waking up all the time, then you may not feel so good. And then some people are having nightmares. Some people are just sleeping at the wrong time of day, and then you get poorer quality sleep, and it affects what you can do. So there's, there's a whole range of different sorts of sleep presentations, which require tailoring and in the treatment, but sleep is, obviously it's a very fundamental restorative process for all of us. And likewise, it can go wrong in in several different ways.

**Alisha Wainwright 06:22**

I mean, I feel like what I'm taking away is that sleep is obvious. Sleep is ubiquitous. And, as it turns out, you know, not everyone saw eye to eye on sleep, and studying sleep, and you struggled to get funding in the early days. You know, why do you think that is? Is it because of the general perception of sleep at the time, that it was a symptom? Or -

**Daniel Freeman 06:45**

Yeah, I mean, I think it was basically because it wasn't a defining feature of disorder. So it got overlooked. If people have depression, you want to treat the mood, for example, or if people have psychosis, you want to treat the hallucinations or delusions, so it's just kind of overlooked. And I think it's also about, you know, often people looking for one answer to explain mental health disorders. And actually, the reality is there's multiple causes coming together. So sleep is one of them. It's a contributory cause - it's not the whole thing, you're not going to sleep better and everything else is gonna be okay, but it's part of the picture. And what's really good about focusing on sleep in mental health context, is that there are really good treatments for it. You know, I can help you with that - that's a really engaging and helpful thing for patients. So it's an area that I know we've got good treatments for. And you improve the sleep, and then there's all these other knock on benefits. So then you can go and work on other aspects of a mental health condition.

**Alisha Wainwright 07:44**

Okay, so while others overlooked the effect of sleep on mental health, you kept on investigating. And that led to a pilot study with 50 people, in 2020, which showed promising signs of how improved sleep

could have a big impact on psychosis symptoms. I want to play a clip here from Ryan. He's 17 and he took part in that study. Here he tells us about his mental health and sleep patterns before he joined the study.

### **Ryan 08:13**

The mental health issues that I was experiencing, when everything began, were very much low mood, depression, anxiety, some baseline psychosis here and there, it was a lot of social awareness. So seeing my friends obviously decreased, and also lockdown had a big play on that. Even, kind of, comfort in my own house dropped. I wouldn't want to eat in front of my family, I wouldn't want to shower, I wouldn't want to kind of go out and do even basic tasks, like get a coffee, or - if it was seeing anyone outside of my usual rotation of friends, I would opt out immediately, without second thought. Anxiety also followed with a lot of kind of physical repercussions, like scratching. I would itch myself raw, which was unpleasant, and my thoughts will often be very dangerous. And then those dangerous thoughts would lead to self harm. And then, of course, within those thoughts, there'd be suicidal ideation. And, even to a point where I tried to take my own life, which thankfully didn't work. My lack of sleep heavily emphasised all the other problems I was experiencing. At its worst, there'd be days where I would get no sleep. Overall, for the first two years of my troubles I was getting between two and four hours of sleep a night - four being on a very good day. More likely, the lower end of two. And, of course, the physical aspects of getting little sleep - my body was numb, you know, I couldn't play sport, and I love playing sport. I love going to the gym, I couldn't do that. My joints, I got terrible joint pain. My face sunk, my skin was dry.

### **Alisha Wainwright 10:07**

It's incredible how interlocked these things are; sleep, anxiety, paranoia. And how things can just spiral to really devastating consequences. I mean, lockdowns during the pandemic is an example of a very extreme turbulent time. But there's also things like moving away to college, big exams, if you're a young adult, that can be really rough. Is that something that you see in a lot of your patients?

### **Daniel Freeman 10:35**

Yeah, and I think the other thing that - the interaction there was very interesting, he was talking about the physical health interruption, so, difficulty sleeping affects your mental health and your physical health. And described there, I think very nicely, what we were talking about earlier, about sleep being a contributing factor - he was talking about, it heavily emphasises, it pushes on all the other problems, which I think is, is a very good description of its effects. It's not the only thing but it's making everything worse. And, you know, for some people, you know, all the things that have been happening in recent times, so for example, you know, if actually you're less active during the day, or your routines have gone, that's going to affect your night time sleep. So there's there's a whole range of pressures. But of course, there's also pressures for teenagers in sleep, in terms of, you know, having a family, they might be sharing a room. You know, there's the whole use of social media and phones, and then of course, there are some differences around sleep for adolescents, you know, they are more likely to want to stay up late and get up later. And of course, that may not fit to the demands on them.

### **Alisha Wainwright 11:40**

And in their wanting to stay up, and their not getting kind of an adequate amount of rest, it could exacerbate maybe some underlying issues that they had?

**Daniel Freeman 11:49**

Anxiety and depression, and sleep, they share some similar causes. But also, there's a bi-directional relationship, they each influence each other - that if you don't sleep well, it's going to make you more anxious, but if you get more anxious, you're not going to sleep well. And probably, it's a bit more weighted towards sleep having an impact on the others, but it's going to work both ways. So the causation here is complex. But I think his account described it wonderfully.

**Alisha Wainwright 12:20**

Hearing Ryan's story, it's pretty obvious that he was not sleeping healthfully. How do you define normal or good sleep? You know, I don't even really know, what is the recommended amount of sleep? I get seven, I got seven hours last night, which is pretty average for me. And when I don't, you know, get seven hours, I kind of hate everything around me.

**Daniel Freeman 12:46**

I'm glad you've had seven hours!

**Alisha Wainwright 12:49**

I'm not experiencing psychosis, obviously. But, you know, we can talk about the hours of sleep, but maybe it's the quality, you know, if you can just kind of talk more holistically about what is good sleep?

**Daniel Freeman 13:02**

Yeah, I mean, I think it's, in essence, in the end, whether a person feels they've got enough restorative sleep, and they wake up, and get up, and feel okay. I mean, often, people are typically sleeping between six and eight hours sleep - of consolidated sleep, that's typical. But there's variation across the population in how much people need. So there is no one answer to the length. But I think it's a combination probably of length, and how a person feels. And when people have a sleep disorder, they're often feeling like they haven't slept enough, it's impacting their day-to-day lives, or it's at the wrong time of day, is another one. And that, of course, has multiple impacts - sleep doesn't align with with the light-dark cycle.

**Alisha Wainwright 13:46**

And I've also found that, you know, if I sleep too much, I don't feel very well either. So sometimes it's not necessarily, I didn't get enough sleep, but sometimes I've slept too much. Is that something you find in your patients?

**Daniel Freeman 13:59**

Absolutely. So oversleeping, it can be a real problem. Something called hypersomnia as well, where you also feel very tired during the day. And in essence, you often end up with poorer quality sleep, you're also more likely to have bad dreams, because the more you've slept, the more REM sleep you're going to have, which you're more likely to dream in, and if actually you're not feeling too good, then you're more likely to have nightmares. So that can definitely be an issue too. And then we've got people

who are staying up fairly late, and then sleeping during the day, and therefore missing going to college or work or appointments, and then getting disconnected from people. So, timing of sleep is absolutely crucial.

**Alisha Wainwright 14:39**

What are the basic tenants of sleep treatment? You know, what are you aiming to achieve and how?

**Daniel Freeman 14:45**

Yes, three basic areas we focus upon. One is building up what we call sleep pressure. So actually that you're going to feel tired during the day, which means actually being active during the day. So ironically, a lot of our sleep treatments involve a person's day. We want them active, we don't want people napping during the day, unless there's a particular reason why they need to - you know, if it's dangerous if they're too sleepy to do something, but otherwise, you want to cut out naps. So we want to build up sleep pressure, and we want to bring down what we call hyper-arousal in the evening, we want people to get in a calm state where actually they're more likely to drift off to sleep during the evening. So we will have wind-down routines. Obviously watch caffeine intake, or smoking at the end of the day, all those sorts of things. So we want to get people in a relaxed state, and their body preparing to sleep. And then the most crucial bits really, and the bits, often we spend a lot of time with therapies is actually learning to associate bed with sleep. So, only being in a bed pretty much when you're sleeping. And that also needs to happen at the right time of day. So it's aligning bed, and sleep, and timing. So we set an appropriate sleep window. And if someone is in bed and not sleeping, after 15, 20 minutes, we want them to get up. What we don't want is people just lying in bed, basically getting more anxious - associating bed with being, you know, alert and anxious, and worried.

**Alisha Wainwright 16:10**

Let's bring Ryan back. In his nine month study, he spent the first three months working with a therapist to improve his sleep. And we're going to hear what worked for him.

**Ryan 16:24**

The first thing, which I think is the most important thing they told me, when it comes to tackling issues with sleep, is to keep a consistent schedule. Whether that be weekdays, weekends, going to bed and waking up at the same time, every day, is so helpful. It sets your body clock. So for example, if I go to bed at the same time for a week, my body will now tell me to get tired around that time, every day. So now I go to bed at 11.30 every day, even on weekends, and I wake up at 6.30 every day, even on weekends. Number two, only use your bed if you are going to sleep, no lounging during the day, you know, laying on your phone, no homework in bed, no, you know watching TV in your bed. Sit on a chair, anywhere by your bed, because that means your bed's only associated with sleep. And then the third thing I've taken away was the worry clock, as they call it. I was a big worrier - I still am. But slightly less, thankfully. Before I go to bed, I would allow all my thoughts to kind of collect and sit, because I had nothing better to do than sit, and think, and worry. So there'll be a dedicated hour of boring time from eight to nine every evening, where I would just sit and let all my thoughts out. Whether that be write down in a book, verbally kind of express what I'm thinking - get all of the negativity out before I go to bed. So when I went to bed, I was thinking about sleeping, and nothing else. I started seeing a difference definitely within those first three months of therapy. As soon as I got that rigid structure in

place, I noticed a significant change in my body, as I was actually getting tired before midnight, which was something I hadn't had in two years. But it was notable for someone who has had two hours a night for a year and a bit. For that to suddenly double, triple to you know, four or five hours a night was amazing. And then it got better from there. And now I'm sitting somewhere between five and six hours of sleep a night which I guess, you know, isn't as much as most people would get, but for me it's - ahh, it's so refreshing, after years of issues, to be able to be there now. When it comes to improvement of day-to-day activities, where my sleep improved, it was vast, it was so, so noticeable. I was playing sport again. I was going to the gym. You know, I would be up for anything my friends would throw at me. I wasn't as lethargic, and then school as well. I really, really struggled with school over lockdown. My Grades flumped, I flumped. I was able to focus on lessons, take more in, better my grades - ultimately do well on my GCSEs, which I was very happy with, all because my sleep improved.

**Alisha Wainwright 19:29**

I see you've got your doctor hat on because you're taking notes on Ryan's story, what have you got written down?

**Daniel Freeman 19:37**

Well he's a fantastic sleep educator, isn't he? And his description of the changes is just fantastic, about the importance of the schedule, and associated bed with sleep. And he talked about the worry clock, in a sense bringing this calming time. But mostly what, what I think is fantastic there is he's understood it, he's got it. So we've got an intervention, psychological intervention that actually teaches the person techniques, where he's nailed it. And he's got the principles, and he can apply them if they're at times of stress, because of course, all of this will, like him on occasion, he will have difficulties. He'll know what to do. But also think, you know, there's a good illustration that actually he's gone from two hours to six hours. So you know, these interventions can be really effective. And I think that's right.

**Alisha Wainwright 20:19**

It's incredible. I think one thing that I might have to start implementing in my own life is this concept of worry time, which is a designated prescribed hour to invest in your own thoughts and worries. Because, when I was younger, maybe around Ryan's age, and I was at university, I would go to sleep, and my brain would just cycle through math problems, and I would just go to sleep doing math problems in my head, and I felt like I never got a good night's rest. I think if, maybe, younger version of me had taken the time to just let myself do it, rather than fight it, and then persist in it, I might have let my mind quiet in order to relax and have that calm state for sleep. So Ryan's definitely taught me something.

**Daniel Freeman 21:07**

Worry is a really interesting one, because it's a bit like sleep, it's often overlooked, but it's another central driver of numerous mental health problems. And it's one of the things where people worry because they think it's really serving a purpose. It may be the thing that's preparing them or keeping them safe, or, you know, working through problems. And the issue with worry is, it just gives a very skewed view of the world because you only see the negative sides. So it's not the best way of dealing with this. So we use worry periods to allow people a bit of time to do that. But the rest of the time, actually, we want them to find more productive ways to deal with the issues to work through. And the other thing is, sometimes we encourage people to do is just to write some stuff down, too many of us

often live our lives in our heads. You know, we're keeping lists of things to do, or worries. And actually, when one writes them down, that actually can be really helpful in processing them. When you're anxious, you're hyper-aroused. And, of course, that's the opposite of sleep, where you should have low arousal. So these states are competing. So to get good night's sleep, you've got to bring anxious arousal down.

**Alisha Wainwright 22:15**

Okay, so now people are waking up to your research – I'm sorry, I had to – and the Wellcome Trust has funded your next big clinical trial. Which is interesting, because they turned you down for funding before, right?

**Daniel Freeman 22:28**

Well, who hasn't? They wouldn't be alone in that, I'm sure.

**Alisha Wainwright 22:35**

Well, you mentioned before that the effects of sleep were overlooked when it came to researching and treating mental health. But, if your studies are being funded more easily now, that must be changing, right?

**Daniel Freeman 22:48**

It feels like now people are beginning to realise the importance of this issue. And the Wellcome Trust have just funded us to do a really definitive trial in patients with psychosis, with 1000 patients at the early stages of psychosis. And that's incredibly exciting. So now, you know, we've got the funding to actually really nail this issue. I'm sure we can treat the sleep in our patients but, you know, what are all the other effects that actually are good for our patients, but also will mean that services are more likely to then go and use these treatments? So it's taken a while, we've had to build the case for it. But doing clinical trials is the hardest work in mental health treatments, really. They're a huge endeavour, and they do cost quite a lot of money. So we're rather delighted that actually, we've, we're going to do a huge trial to really understand this.

**Alisha Wainwright 23:41**

So as we speak, you're preparing this new big clinical trial. What is your desired outcome?

**Daniel Freeman 23:47**

Well, we want to really nail the issue of what are the added benefits of treating sleep in people at the early stages of psychosis. So we're also going to make sure we've convinced people that we can improve sleep - we kind of know that, we're pretty sure from our pilots, so we're confident about that. But we really want to demonstrate, well, what are the effects on depression, anxiety on psychotic symptoms, and attention, and memory, and everyday functioning? You know, Ryan described how actually getting sleep improved his schoolwork. So we want to look at those sorts of effects too. We want to look across the board, a really large trial. So we can look at multiple different areas to see where actually does sleep create the benefit. And also to see, you know, for people who don't have psychosis, but are young and vulnerable for later mental disorders, can we actually reduce the risk of



other things developing later? So you know, this trial is going to have enough people, we can look at many different outcomes. So that's incredibly exciting.

**Alisha Wainwright 24:49**

There's just so much stigma around mental health and psychosis in particular. And do you think the fact that everyone wants to get good sleep is just a way to cut through that?

**Daniel Freeman 25:02**

Yes, I do. I mean, I think what we hope for, or one of the impacts at the end of this is that actually, mental health services routinely may assess for sleep problems and offer sleep treatments. And I think that will help reduce problems for people. It will also help with engagement and services where people do need some extra help, and other treatments, that they might be more likely to take them, because they've had good interactions with services. And maybe, of course, more likely to go to the services if they get that sort of help. Because the beauty here is that this is a real concern for any of us if we've got - we're sleeping badly, we have some psychological treatments here that are really effective. So let's use them and have all these knock on benefits. And as you said, it is an area that's much less stigmatised.

**Alisha Wainwright 25:47**

Simple question for you - is sleep the answer to cracking the global mental health crisis? What potential could it have? And what do you hope for the future?

**Daniel Freeman 25:56**

I think sleep is a good route. Globally, I think that makes sense that that's a very sensible target. Because, you know, clearly, it's a problem everywhere. And it's a contributory causal factor, it's something that actually means that people are more likely to end up having other problems or worse outcomes. So it's a very sensible strategy. But of course, it's not for everyone - mental health is too complex for one answer. And it's a bit like, worry is another factor. So you can build up this whole range of processes - low self esteem is another one, you can think of very common psychological processes that drive a lot of mental ill health, one could target. So I think also, for me, sleep is an exemplar of how you can develop services by focusing on very plausible mechanisms, common in most people with mental health problems, that will have knock-on effects in other areas, and are treatable. If you get that, you can develop really, really good mental health services that get good engagement and good outcomes.

**Alisha Wainwright 26:54**

Okay, so a multi-layered approach, but in that approach is an emphasis on sleep. And what would the world look like, if everyone lived their life according to a good quality of sleep? I mean, what if governments or employers valued quality of sleep in their employees or citizens? Do you think we would find, you know, better outcomes if there was some sort of mandate on sleep? I'm curious, what do you think about that?

**Daniel Freeman 27:24**

I mean, I think for me, it's about revision of people who are experienced difficulties and want some help. But of course, where it does play in more is thinking about - how do you organise employment for people who perhaps have different sleep timings and things like that? So I think there does need to be flexibility. And thinking about shift work, and all those sorts of things. There's lots of implications about thinking about how sleep affects jobs, for example, and how those are set up. So I think there is, you know, that is clearly a factor that should be considered.

**Alisha Wainwright 27:53**

I mean, you gave some specific tips to improve sleep before. But do we also need a broader perspective shift here, where we think of sleep differently as a society?

**Daniel Freeman 28:03**

Yeah, I think it's a general conversation about psychological wellbeing. And that's gonna comprise of many elements, including social cohesion, and how we relate to each other. And it's conversations around that I think are very helpful. I mean, I think, I did some work around, around this - in essence around happiness. And actually, you know, it's around asking family and friends what made them happy, which is conversations strangely, never actually explicitly had with people. And having that conversation was actually rather helpful. And I think, really, it's about often meaning in life. It's helping people find the right meaning in life. And that's so core to feeling good, psychologically.

**Alisha Wainwright 28:49**

Oh, man that's such a beautiful way to end this conversation. Thank you so much for your time, and I hope you get a beautiful night's rest tonight.

**Daniel Freeman 28:58**

I will - you too. A pleasure to meet you.

**Alisha Wainwright 29:05**

Thanks for listening to this episode of *When Science Finds a Way*. And thanks to Dr. Daniel Freeman and Ryan.

Hearing Ryan speak so honestly about his journey really put this into perspective for me. It's so exciting to hear about the potential benefits of sleep treatment from someone who has actually experienced them. And I think I've also picked up some tips on getting a good night's sleep for myself.

If you've found any of the topics discussed in this episode upsetting, you can go to [befrienders.org](http://befrienders.org) to find a support service local to you.

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Next time, we'll be talking about the impact of climate change on the food we eat – and learning how indigenous crops could help.

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