S. FISCHER VERLAGE

Alexandra de Carvalho

Mission to Feel

What space psychology can teach us for our everyday life

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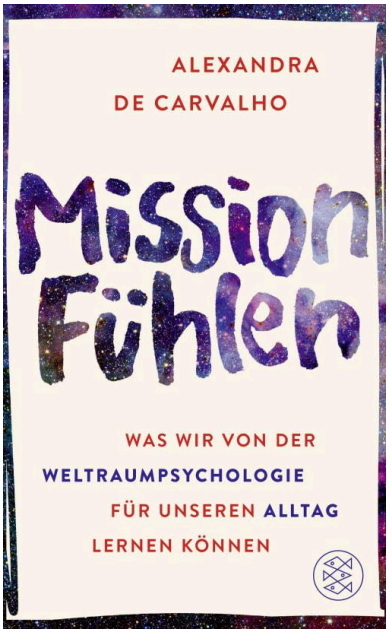

- A new perspective on resilience and crisis management
- Mankind in space - an unbroken fascination

Combating loneliness, stress and other crises with new methods from space psychology

Loneliness, lack of perspective and stress are the dominant topics in doctors' offices and therapy rooms worldwide, while basic needs such as togetherness, cheerfulness and participation seem to be receding into galactic distance. How can we bring them back to earth? What is needed to create connections despite the distance? How can we ensure good cooperation?

Astronauts experience the challenges and feelings that we on Earth also have to face every day in the most extreme situation. So why not learn from those who have to cope with a hostile environment, isolated from friends and family for months or even years? Space psychologist Alexandra de Carvalho provides us with strategies for more resilience and crisis resistance in our day to day life - scientifically sound, but told in an easy-going and catchy way.

Alexandra de Carvalho, born in 1989, is a psychological psychotherapist and conducts research in the still young field of space psychology. She investigates the feelings people experience in extreme environments, how group dynamics can change during a mission and which strategies are useful to combat boredom in a spaceship. She has led the "Human Factors" team at the Austrian Space Forum since 2015 and carries out selection and training processes in various organisations for analogue-missions. When she is not simulating trips to Mars with analogue-astronauts, she accompanies people psychotherapeutically and gives workshops and courses on the topic of "Psyche in extreme environments".

Ready for take-off?

Houston, we need to talk about feelings!

Innsbruck! A sandstorm. "Oh no!" To my left, our team doctor puts his face in his hands. "That too, now. The heat in the field is enough for me, to be honest. Please check her pulse. It's too hot out there; she needs to get back to the habitat." I slide a few centimetres to the left and look at a screen showing the telemetry: heart rate, temperature, pulse. All the values are within a range that is supposed to tell me that, around 3000 kilometres away, a so-called analogue astronaut in a spacesuit simulator in the desert is collecting rock samples and sweating. An analogue astronaut is a space traveller who collects scientific data for future astronautical space missions by simulating

a stay on the planet Mars with a team of six, with everything that goes with it: space showers, astronaut food, experiments. For four weeks, they live in a silver habitat - a kind of living dome - for sleeping, eating, and 'Earth' communication. Walks through the 'Martian desert' only take place in a heavy spacesuit. Meanwhile, I'm sitting in Innsbruck in a warehouse that serves as a mission support centre. From the window, my gaze falls on the first winter snow that I can glimpse on the mountain peaks. A completely different world!

Suddenly the door to the flight control room flies open, and the woman responsible for carrying out all the scientific experiments comes rushing in. "What's going on? I thought we were doing the experiment today. The scientists finally need their data set." The doctor next to me shakes his head: "They'll probably have to wait. It's too warm in the suit. You know: safety first! And only then science and simulation! It's always about making sure our analogue-astronauts are doing well!" The woman doesn't look very enthusiastic. "We also have feedback directly from the field," another voice joins in. "Earth Com - the person who talks to the people in the field via chat says, 'The astronaut wants to continue. She says she feels fit!'" I look into perplexed faces. Who should decide now? "That's tricky," I say. "On the one hand, we have to take the telemetry into account and protect the astronauts from overestimating themselves. But on the other hand, we also have to take into account the experience from the last two weeks in the field that the team has gathered there." I notice that tension is building up among everyone involved in the Mission Support Centre. Everyone wants the mission to be successful, but of course, every team member is also focused on their own areas: carrying out experiments, ensuring medical safety, or travelling through the desert in a spacesuit on the rover. And me? What do I want? In my role as a team psychologist, I want everyone involved in this mission to be as well as possible mentally on this analogue mission. That is quite complex under the conditions in which we work together. Communication between the simulated Mars - a habitat in the Israeli desert - and the Earth - a warehouse in Innsbruck - takes place exclusively via chat. To mimic the distance between Earth and Mars, messages take ten minutes to be transmitted. Temperature changes often upset our plans. In the habitat, it is too loud or

too cramped to sleep. Dense work schedules stress the small crew. And every now and then, someone has to go home for a real shower, or the air in the group becomes thick.

Sound familiar? You don't have to be on Mars or an analogue mission in the desert to understand. Undefined work hierarchies, an apartment that is far too small, and no reply to your WhatsApp messages? Even our own lives can sometimes feel like an extreme expedition. We juggle childcare, a job, and caring for relatives within a working day that is far too short. Some of us feel so lonely and alienated from our fellow human beings as if they were planets apart. We balance between boredom and excessive demands, engage in conflicts, and try to establish relationships with people on the other side of the world via 13-inch screens.

And outside your microcosm? There, too, crises lurk. Or as science puts it: ‘collective borderline situations’ that describe the loss of stability in our world. Let's take a look at the news pop-ups on our mobile phones: man-made crises everywhere you look, and all of them present us with new challenges every day. Pandemic, climate change, wars, inflation, and energy shortages follow one another and only marginally gloss over existing everyday problems like a shortage of skilled labour, inadequate childcare and educational opportunities for children and young people, the care crisis, rent increases, and the feeling that, despite using five different dating apps, you actually have no one to talk to. How are you supposed to cope with this? And how should you feel about it?

Just like many friends, neighbours, or work colleagues, I'm always looking for ways to cope with these times well. My book is about this search. My goal: to bring together insights from two areas that couldn't be more different - from working in space and in extreme environments and from psychology. This is essentially what ‘space psychology’ is about. You've probably never heard of it, have you? This rather unknown branch of psychology investigates how astronauts, but also people in extreme environments on Earth, behave and feel under stress. The methods of space psychology and the experiences of these people can also benefit us in our everyday lives on earth. I promise!

How did I come to be interested in space psychology? Even as a child, I was a curious nerd. From 1994 onwards, I was allowed to watch various children's science fiction programs on our TV in the living room, showing rocket launches and intergalactic encounters. In 1997, the NASA lander 'Pathfinder' arrived on Mars, and a year later, "Sarya", the first module of the ISS, was launched into space. The 'Hubble' space telescope sent images from space. I really wanted to become an astronaut but had to realise in the back seat of the Opel Corsa that my stomach didn't have the resistance I would need for a flight into space. Nevertheless, I remained emotionally attached to space travel.

What fascinates me to this day is not just that people travel into space, but above all the mentality behind it. 'That's not possible' doesn't exist here, but rather a 'Let's try the impossible' attitude. Let's just do it. In the process, I increasingly focused on the question of people and their motives. Why do people travel into space? And what do they feel? To understand this, I first studied psychology and qualified as a psychological psychotherapist. In my everyday life, I now meet people who seek psychotherapeutic support and are suffering from depression, anxiety, addiction, or life crises. For me, being a psychotherapist means helping people ground themselves and work with them to create a safe space from which they can open up new horizons for their lives. The astronautical mentality helps: 'The sky is not the limit'. Even if it sometimes seems impossible to find a way out of our worries, we can still succeed together.

For around nine years, I have also been working as a team psychologist with so-called analogue-astronauts, who test on earth what people need mentally and physically to survive and cope for a long time away from Earth. Let's start with a brief insight into space psychology and what it might have to do with our everyday lives.

How does space travel fit in with emotions and, therefore, in the broadest sense, with psychology at all? Feeling is not necessarily the first thing you associate with astronautical space travel. For astronauts, it is still very stigmatising to seek psychological help. There is a reason for this: space travel originates from military structures. *The Right Stuff*, a feature film based

on a novel by Tom Wolfe, shaped the image of astronauts in the early 1980s. Ulrich Walter describes the perception at the time in his book *Destination Space* with an 'unspoken code of bravery and macho behaviour that allowed them to fly not only military jets but also rockets whose unmanned test versions were often seen to explode on launch. Room for feelings? The way female astronauts are perceived, not really. This image still persists to this day. Chris Hadfield, a former Canadian astronaut, writes in his book *A Guide to Weightlessness* about the social image of astronauts: 'In films, astronauts do not struggle with Russian vocabulary lists. They are superheroes. Even the most level-headed among us have been influenced by this image. Although in the spaceship itself, a rethink is increasingly taking place. The German astronaut Alexander Gerst comments on the subject of risk in his book *Horizons*: 'I consider myself a rather cautious person! For me, risk is not an end in itself but rather a sometimes necessary means. Competitions, for example, which are about suppressing the fear of death most effectively, like some base jumpers or big wave surfers do, are not of interest to me.

So let's take note: the image of the fearless fighter jet pilot, who sets off into space and, in the worst-case scenario, explodes death-defyingly on the way, no longer has much to do with reality. Astronauts and people in extreme situations share our everyday problems and feelings. Some of them can even be intensified. They are not flawless heroines. Many of the stories in this book show where even the most motivated and skilful people reach their limits or misbehave. Understanding this is not only important for us to learn what an immense influence our environment and crises can have on each of us. But also that we don't have to be heroes to overcome problems and worries. If we free ourselves from the myth of the perfect astronauts, we can learn from the strategies of people in extreme situations and don't have to - in the proverbial sense - look up to them.

Our experience from longer test missions on Earth and stays in space shows that the psyche is becoming an increasingly important factor. As soon as people travel into space, they encounter physical and mental challenges such as insomnia and difficulties in maintaining cognitive performance. Or they experience feelings such as anxiety and panic. It is therefore sensible

and necessary to test as much as possible on Earth before the first mission to Mars is launched. People need to prepare not only technically but also emotionally for extreme missions.

But where is it possible to train emotional regulation for life on Mars? On Earth? Yes! With the help of analogue missions. Space psychology utilises isolated and confined environments, also known as 'Isolated, Confined, and Extreme Environments' (ICE), to study the behaviour of people in extreme, dangerous, or isolated environments and prepare them to deal with emotional crises. Since the early days of the Apollo missions, female scientists have used special habitats, mountain expeditions, or deep-sea missions to simulate conditions that could resemble life on the moon or Mars. analogue-astronauts live in isolation for weeks or months as if they were in space. During this time, they conduct scientific experiments, test technical equipment, or simulate the time-delayed communication with Earth. People who take part in analogue missions, for example, live in seclusion in a habitat - and are only allowed to leave the door wearing a spacesuit. If you want to call home, you have to account for the time delay or may even only communicate via chat. Shower water is provided in limited quantities, and food comes from the mission supply. The findings about the physical condition, behaviour, group cooperation, and performance that we gather in ICE environments can ideally be used later for long-term missions to the moon and Mars.

Nowadays, there are numerous organisations that carry out analogue missions and show us how important the human factor is in astronautical space travel. There are many projects that simulate on Earth what it could be like in space. analogue-astronauts squeeze themselves through crevasses in overalls (AMADEE-15), train in caves (ESA Caves), or try to communicate with each other underwater (NEEMO). The crew of 'Mars-500' simulated an expedition to Mars and carried out a large number of scientific experiments, which resulted in a high level of findings. The aim of the 520-day isolation experiment was to gain insights into psychology, group dynamics, but also the physical fitness and work performance of the crew. What did this experiment find out? It turned out that the team members who were better

able to regulate stress and their feelings experienced living together in a confined space as positive. They reported personal growth and described the experiment as rewarding. The test subjects with lower stress resistance recorded higher levels of anxiety.

But what leads us to either find meaningful fulfilment or develop cabin fever? In 2015, I met one of the participants of Mars-500, Romain Charles, who told me what strategies help to successfully master such a mission: ‘It helped me to have the same rhythm and routine every day. And I always tried to keep myself active and busy so that I don't get bored.’ So we learn: It can be helpful to have a few tricks and tools for challenging situations.

But can we really find out through simulation experiments and Arctic expeditions exactly what might help us when we are under stress and pressure or dealing with anxiety and loneliness? Is our everyday life even comparable with the everyday life of an analogue astronaut?

We asked an expert straight away. The psychologist Agnieszka Skorupa sits in front of her PC with a coffee cup. Now and again, her cat runs across the keyboard. An earthly, cosy atmosphere rather than galactic fascination. Agnieszka has already investigated how people in polar regions adapt to extreme situations, but also how group dynamics develop in analogue missions. Agnieszka's clear answer at this point: ‘Yes! environments on earth!’ Her reasoning: ‘Our psyche is the same.’ Terrestrial extreme conditions are even particularly instructive! Some of the conditions that we find on Earth are much more complex than those that humans currently encounter in space. Anyone who spends the winter in Antarctica cannot simply travel back home in an emergency. An evacuation from the ISS is possible within a few hours. And what about our everyday lives on Earth? She sees parallels there too: ‘Yes, of course it's comparable! Because in the end, people in Antarctica want exactly the same as you or I do in our lives. Relationships. Sleep. Good food.’

The US psychiatrist and space psychologist Nick Kanas writes about another important aspect in his book *Humans in Space*, namely that in analogue situations, we have the opportunity to control many variables. We can control the lighting conditions, the sports units, the group dynamics, and even the stress levels of the group through spontaneous tasks. These are

perfect conditions for scientific studies. But of course, there are also limits: Aspects such as weightlessness or the feeling of being far away from Earth we cannot simulate. This is where we encounter the real reality of life, just like with earthly crises. Even on Earth, in everyday life, we don't always have a plan when we have to face challenges.

How do people deal with this? During the corona pandemic, many reacted to the perceived loss of control and isolation with depression, stress, sleep problems, or unhealthy eating habits. The current global political situation, the wars in Ukraine and the Middle East, make us look to the future with concern. Added to this is the climate crisis, which unleashes yet other kinds of feelings within us. The term ‘eco-anxiety’ describes the emotional soup of fear, sadness, and powerlessness that we feel when we realise that large parts of our planet could become uninhabitable for future generations. We know from studies that when we are bombarded with too much stressful information, we get tired of it. There are even theories that suggest that people cannot have too many worries at once: it's called the ‘finite pool of worry’ - loosely translated as the ‘limited contingent of worries’. Many crises at the same time overwhelm us. People choose what causes them headaches. We react when a crisis affects us personally, when changes happen quickly, they shake our moral values, and their consequences have an immediate impact on us.

This is why psychotherapist Fabian Chmielewski, in his book *Global Crises in Psychotherapy*, emphasises the importance of paying attention to crises and naming them in our interactions because they can affect us on different levels. So-called existential needs describe our urge to survive, to nourish ourselves, and arise when we ask ourselves what happens when Putin presses the red button. Psychological needs, for example, for exchange and belonging, can be violated by isolation. And we encounter epistemic needs. We want to be able to categorise the world around us: Who can I trust? What is true? All of this makes one thing clear above all: crisis-induced feelings are real. And: intense topics can induce intense feelings.

So what does this mean for my mission to bring together globe-trotting psychology and crisis management together in our everyday lives? People in

analogue missions and extreme situations face similar challenges to those we face in everyday life - only more concentrated. Above all, however, the missions provide studies and data that allow us to draw conclusions about feelings and behaviour in times of crisis. That's why we can learn so much more from Antarctica or space than it might seem at first glance.

Let's take another trip to the Israeli desert - and to the warehouse in Innsbruck. The doctor decides to bring the analogue astronaut back. Even though he knows that the assessment in the field is different and the analogue-astronauts may not understand his decision. He bears the responsibility and does not want to risk the health of the person on the mission. His decision entails a lot of necessary dialogue between the warehouse and the desert and new planning to relieve the stress that has arisen, as well as a 'thank you' in the field that conveys our appreciation for the work done. Working in extreme environments often means walking a tightrope between risk assessment and a thirst for adventure. Realistically speaking: The perfect solution does not always exist. Some situations are so complex that a simple answer is not possible. Quick decisions cause frustration and simply don't fit the reality of life for those who work thousands of kilometres away. That is the reality. But what we can learn is how we can deal with such dead ends, bottlenecks, and low flights.

What can you expect now? This book offers you a change of perspective which, at best, will help you to stay grounded in turbulent times.

It is part of my profession and my most passionate interest to talk to many people about dealing with feelings, crises, and challenges. These include those who live for months on end in the field of astronautical space travel from the earth for months on end or are researching just that. Or those who live in extreme environments like Antarctica. Just like people on Earth who have had to develop at least as many skills as an astronaut. Because my clients in psychotherapy have done it too, with existential experiences such as loneliness, living with few resources, distance from family and friends, living together in confined space, war, violence, or conflicts, and always finding hope again. With them, I learn every day how to overcome major

challenges. Spoiler: We can't eliminate all the problems around us, but we can practise dealing with the associated feelings in a self-care method.

I would like to find out exactly how to do this: How can I cope when life hits me like a meteorite, how can I keep a cool head and keep myself emotionally safe? That's not so easy because dealing well with your own feelings is at least as complex as the structure of the universe.

While this book offers insights about coping with stress and crises, it is not meant to replace psychotherapy. And its goal is not to provide you with a detailed manual for all of life's challenges. Our basic conditions and life circumstances are so different that it would not be possible to directly copy ideas and strategies from other people. Yet, I am sure: At the interface with the universe, we can learn a lot from each other. With this book, I want to invite you to become familiar with the solutions and thoughts of other people, but also encourage you to explore your own creativity and decide for yourself which ideas are right for you.

The stories and the knowledge collected should neither exert pressure nor give the illusion that you can navigate every emotion without deviations from now on. Because this is also important: Even years of astronaut training do not protect against the nausea of entering weightlessness. Just as the job title of astronaut does not grant a person the ability to always have everything under control, to be able to repair broken objects without instructions, and never to be afraid. And even those who have stayed on the ground will always experience crash landings. Let me tell you how it is: Even my Master of Science in psychology and my state certification as a psychological psychotherapist do not free me from my own deep feelings such as sadness, shame, or the ignorance that life sometimes brings with it. It can happen to any of us that crises knock us off our orbit. Accepting this can help us face difficult situations with a little more ease.

In astronautical space travel, but also on Earth, it is about getting to know our own limits every day and overcoming some of them. Confronting ourselves in an extreme environment quickly reveals where our limits lie. We

face them brutally, and some of them are non-negotiable. Because no matter how much we know or practice: Some things - typically human - will remain. We will always need to breathe, sleep, and eat. And we will always feel.

The great thing is that we can work together to figure out how to handle crisis well. Irvin Yalom speaks of the universality of suffering. We always think that we are isolated and not good enough on our own - but in conversation with others, we learn that we often perceive many issues similarly. I am firmly convinced that especially when we face scarcity of resources, fear of the future, and other global turbulence, it is important to form a team with other people. Just like in space.

So the next time you are lying awake at night, feeling alone and overwhelmed by the world out there, it might be worth opening the window wide and looking up into the night sky. There, at an altitude of about 400 kilometres, there's someone who also sometimes feels lonely, misunderstood by others, or stressed by other people - and perhaps shares one or two other experiences with you: an astronaut!