

THE SCIENCE BEHIND THE SCIENTIST'S JOB

Prof. Roman Cieślak from the SWPS University of Social Sciences and Humanities talks about the emotional challenges of pursuing a career in science.

ACADEMIA: Are teams of scientists often subjected to the kinds of tests that Prof. Andrzej Królak and Asst. Prof. Michał Bejger talked about in *Academia* 1/2016 (see opposite)?

ROMAN CIEŚLAK: Frankly speaking, I have never encountered a similar situation in science before. Even so, I can say that if psychologists, social scientists, or doctors start any research that involves humans, they must first obtain the approval of the ethics committee and the informed consent of the individuals who participate in the experiment, because such tests are after all a type of an experiment. They should be aware that

they are undergoing a test, that someone might be manipulating them, to put it brutally. If a boss checks, without establishing rules first, how employees work when they write publications based on falsified data that have been supplied to them, that is an abuse of trust. At the very least.

In that case, the team knew. But doesn't that eliminate the element of surprise?

No. After all, the employees consent to a general rule. In other words, I know I work on a team where such things can happen, but I still don't know which signals

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are genuine and which aren't. I can react in different ways, but I'm aware of the organizational or cultural norms.

What if I'm not aware? What could that lead to?

Frustration. In psychology, we talk of frustration when an individual has a certain goal, say a publication or another scientific achievement, and it suddenly turns out that it is impossible to reach this goal for reasons beyond his or her control. In the example we are discussing, that was the fact that the data were false, so all the work put into processing them went to waste. The mechanism worked fine, but the results could only be trashed. The trouble is that frustration very often leads to aggression, sometimes passive aggression, towards the organization or the boss. Also, such aggression may be redirected to other objects such as coworkers or family.

That didn't happen in the case we are discussing. But don't such tests make people care less about what they do? After all, if everything could turn out to be false...

Indeed, in such cases we can observe what is referred to as habituation, or a process in which certain stimuli, even strong ones, become irrelevant, once the individual becomes accustomed to them. Responses are no longer equally strong or accurate. This is indeed a serious problem. Implementing a scientific project requires alertness, commitment, and coordinated action. If we are subjected to pointless tests or trials too often, we may start thinking "that must be false, again" at a crucial moment. For example, the reason why evacuation drills are not conducted very often is to make sure people don't ignore them.

You've mentioned commitment. Could it be hampered by the excessive burden placed by the awareness of working on something that may prove a groundbreaking discovery?

That is very subjective. Psychologists, doctors, and pharmacologists who are working on a drug that may cure millions of people are also under stress. These scientists also sense that the findings of their studies will determine not so much the quality of knowledge as the future, well-being, or even lives of many people. Many researchers who make no groundbreaking discoveries will say that their job places a great burden on them. Their responsibility is of a different nature: they are responsible for their staff, their budget, their projects.

All these inconveniences are often offset by the fact that the pursuit of science is fascinating. You are discovering things no one has discovered before. You are trying to understand the world, describe it, notice that there is something more here that meets the eye. I couldn't possibly imagine anything more beautiful than that. Of course, if you ask someone else, say a gar-

At some point, the team of scientists working on the discovery of gravitational waves received false signals. Asst. Prof. Michał Bejger said in *Academia* 1/2016: "This is often done to test research methods..."

The point is to test the instruments and computer programs, as well as being an experiment in sociology to find out how the large team interacts. Effective work requires that people split into small groups – some individuals become leaders, others write the text, others check the code and others still make corrections. Everything is tested in all conceivable ways. The text is written by several people but all participants in the project read it and submit comments and ideas. It's also important to assign managerial roles – the LIGO project has around a thousand participants, Virgo approximately three hundred."

denner, what working means to them, they might give you the same answer and say that this is something fascinating. As a matter of fact, we are saying that job satisfaction and the sense of a job well done essentially involve adjusting who we are to what we do. Not everyone wants to be a scientist, much in the same way not everyone wants to be a gardener. If these people swapped jobs, they would probably be unhappy.

Unhappiness is often treated as a personal issue. Does it have a tangible impact on professional life?

Yes, this negative impact is called job burnout. It usually occurs when working on something you don't believe in or no longer believe in, when there's no reward or the reward is phony or delayed. Simply put, you feel your job is losing its meaning. Incidentally, if members of the team who worked on gravitational waves did not feel demotivated, that was a success in organizational terms and a success of their superior, who was able to keep motivation at an adequate level.

Job burnout also occurs when doing tasks that are at odds with your individual goals. Such a condition is linked to permanent stress, because it leads to painful dissonance between what you're trying to achieve at work and what you would like to actually achieve. Burnout has two major components. One of them is emotional exhaustion: you no longer enjoy what you do, you are fed up. The other is, generally speaking, disengagement, withdrawal: you'd like to do something else, you come to work, but you don't know what you'll be doing or why, or you'll just do it as a matter of routine.

Are scientists likely to be affected?

Yes, we go through different stages of job burnout. It usually affects young people, more or less three years after they change jobs. When we apply this rule to academic conditions, we can see that exhaustion may occur if no substantial change takes place shortly after doctoral studies. Wise leaders of scientific organizations try to provide relevant stimulation to young re-

searchers, give them new goals, show them new ways to develop. Maybe the situation we talked about at the beginning of our conversation was a way to keep the team in a state of constant readiness? Is that effective? We would have to conduct an experiment. We would need an organization that works according to such rules and another organization that operates according to a different model. We would have to test which method is better in terms of expected results. It might turn out that the quality of tasks is better in one group, but the staff feel better in the other one. In the long term, however, we know that people need to feel well to engage in what they do. This is why such initiatives as HR Excellence in Research are so important.

What traits of character make a scientist less likely to experience job burnout? Courage? Patience?

Your question includes a hidden, preconceived argument: you can avoid occupational burnout if you have certain traits. But that doesn't work this way. Of course, personality matters, but the environment is important, too. Telling people that they are responsible for becoming burnt out professionally is like blaming them for that. That will make it very difficult for them to recover from this condition. Meanwhile, job burnout is about the interaction between the situation and the person, in which both resources and expectations matter. Expectations are what workers are required to do, the quantity and quality of what is expected of them, the difficulty of the tasks, and their repetitive character. Resources are what they have at their disposal to meet these expectations: qualifications, knowledge, social skills, internal motivation as well as financial resources, equipment, the qualifications of the team, and a favorable organizational culture. Stress, and by the same token job burnout, result from situations in which the expectations are high and the resources are low. Polish scientists continually work under such conditions: the expectations are always high, the resources are almost always too low, especially on the part of the institution.

Does that always end badly?

In most cases, especially for those with low hardiness or endurance. One of the components of this trait is control: you can manage in a situation, because you know how to influence it to lower the requirements and make optimum use of the limited resources or increase their pool. The remaining components of hardiness are commitment, or the ability to persevere in difficult situations, and the ability to view difficult situations as challenges, not threats.

Another trait responsible for effectiveness and the attainment of goals is self-efficacy, or belief in one's ability to succeed. It is one of my areas of study. Incidentally, Albert Bandura, the author of social learning theory, recently received the prestigious National

Medal of Science from President Barack Obama. Thanks to a series of studies inspired by Bandura's theory, we know that engaging in difficult and ambitious goals depends on whether we believe we can attain them. As scientists, we must be therefore convinced that we can overcome emerging obstacles or challenges, for example by processing complex information quickly and correctly or taking care of the problem posed by a lack of resources. Without a strong sense of self-efficacy, we don't take up ambitious projects, which are the essence of science. When looking after the removal of external obstacles to the development of science, we should also remember individual hindrances. Fortunately, self-efficacy can be modified. As psychologists say, if you want to change anything in the world that surrounds you, you need to change behaviors and convictions, including your own.

In what ways?

There are several mechanisms for enhancing self-efficacy. One of them is called modeling. It involves observing people who have coped well in a similar situation – "You can do it, I can do it. They can do it, we can do it." Another mechanism, called mastery experience, involves recalling one's own achievements and focusing on them.

In Polish culture, we tend to play down achievements, make them seem less important than they are.

Unfortunately, that's true. What do we, Polish researchers, talk about especially frequently in informal conversations? What do we think of ourselves? We say: someone has failed, I have failed, the study did not yield the expected results, this presentation was bad, that paper was not good, and so on. If that is how we are building our image, how can we believe we can overcome challenges? After all, it is not true that we have no successes, we're just treating them selectively. We should avoid such cognitive distortions.

Another source of a strong sense of self-efficacy is physical fitness. It boosts not only energy but also self-confidence: if I can run 10 km, I believe I can overcome other difficulties, too. I know very good researchers who start their day with exercise, physical activity. And that makes them believe that another day may end in a success.

Indeed, that resembles the way warriors are trained.

That's a good analogy. There is also a fourth source of self-efficacy, namely positive persuasion. Superiors often lack it. The question "Is the paper ready?" causes fear. It may be mobilizing, but this is mobilization through fear. Telling people "You can do it. Why don't you try a different way? You are a good researcher" gives them the courage and energy to act.

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These days, scientists increasingly have to rely on grants they have won, they increasingly need to be mobile. Do the methods you've mentioned apply to business-oriented scientists and nomadic scientists in this new reality?

There are different models of doing science. The one we are talking about is currently one of the world's most popular models. Personally, I have great faith in this model. It is difficult, but why should science be for people who look for easy ways? Doing science requires certain sacrifices, but what doesn't? Instead, we should ask ourselves, what is the purpose of these sacrifices? One of the consequences that affects many scientists is work-life balance. The job of a researcher does not end at 4 p.m. It lasts 24 hours a day, seven days a week. Even if we are not at university or in the institute, we look for information, we process it. In a word, we integrate work and life. Of course, not everyone is good at handling that. Everyone will probably have his or her own model. However, unless we find a way to combine private and professional goals, we will ultimately run out of certain resources: family and friends, who are an important source of our well-being. Professionally, researchers can rely on their own qualifications, but they need help in other aspects of life. If they sacrifice everything for their work, they may lose a lot one day, because they have not invested in the resources that should stimulate this work. That is a very shortsighted policy.

I myself once wondered why mobility is a universal and proven model. I concluded that routine was something we needed in running day-to-day scientific activity. But in order to manage our careers and development, we need different points of view and new impulses. The fact that we are mobile, that we have to work in different institutions in different countries, sometimes also with different researchers, allows us to redefine our interests, seek adaptation, and reinvent ourselves. Sometimes, if we are strong enough, we have good achievements, we can also infect other research teams with our interests. That is how we disseminate knowledge, research models, organizational culture, and so on.

Polish scientists are often afraid to work abroad, because they believe they will be underappreciated there because of their country of origin.

Right now, looking at someone's country of origin is increasingly rare, sometimes even forbidden. What matters is how many grants a scientist has obtained, what papers he or she has published. In recruitment for post-doctoral positions, rivalry is strong, but it is within reach for those who have studied in Poland and hold doctoral degrees, at least in my field of science. I think that if you have the courage to be a scientist, you will probably have enough courage to pursue research opportunities abroad, too.

Polish scientists often eliminate themselves from such rivalry. As Prof. Paweł Rowiński explained in *Academia 1/2016*, they tend to give up when their applications for ERC grants are rejected for the first time.

Successes and failures are inherent parts of applying for grants. There are often more failures than successes. Many researchers are not used to the fact that their work is constantly subject to critical scrutiny. Before we submit our project for review, we think about it for several months or years, we become attached to it, we want to use it to conduct studies we find important, to educate young scientists. However, we must bear in mind that peer reviews give us a chance to make our project more credible as a good research proposal. If the reviewers point out significant flaws in our work, we should treat that as feedback and encouragement to try again. For that reason, the problem does not lie in negative peer review conclusions as such but in a badly written review that includes no suggestions how we can improve the project and modify our narrative or what additional information we should take into account. Unfortunately, some reviews in Poland are badly written, their tone is unpleasant and they include personal attacks. That is unacceptable. A substantive review, even a highly critical one, is invaluable.

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Maybe we don't like being lectured.

No. We don't like to feel worse, which means being subject to condescending or unfair criticism. But if someone teaches us, without lecturing us, and lets us keep our dignity and value, that is a fantastic and encouraging experience. All scientists in Poland need courses in both taking and giving feedback. A coaching program for scientists, if you will.

Being a scientist is largely about learning. Do scientists also learn something about themselves?

Yes, that's the only way to become a good scientist. Personally, I love professionalism. If I see it also in science, that is a fascinating, encouraging experience.

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