



# Kracht door balans

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## The added value of psychophysiological stress profiling

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### Introduction

Many people visit their general practitioner because of fatigue and pain. If a medical cause is suspected, the patient is referred to the hospital and when a medical explanation cannot be found, the patient will be referred to a psychologist with the label “stress related problems”. The psychologist will look at cognition, behavior and personality and starts a therapy hoping that the symptoms disappear spontaneously as the patient learns to cope better with problems and personal pitfalls. Sometimes that happens, but often the problems remain, especially when the patient is challenged in therapy to experiment with new behavior, which causes extra stress. Part of the therapy will probably be relaxation in some form. My experience, however, is that a large percentage of patients do not profit very much from relaxation exercises. An explanation can be that relaxation exercises are given without really knowing what is going on in the body of the patient. So it can happen that a patient with a normal breathing pattern gets the advice to do daily breathing exercises and that a patient with a disturbed breathing pattern gets the advice to try progressive relaxation of the muscles. Wouldn't it be better for patients with stress related complaints if the therapist and patient are able to see clearly how the body reacts during relaxation and during stress? That is what psychophysiological stress profiling is about. By measuring body functions, like respiration, heart rate, muscle tension, hand temperature and galvanic skin conductance, the therapist gets a clear view of the way the body responds to stress and he sees whether the patient is able to relax when the stress is no longer there. Moreover, the therapist can really test the efficacy of a relaxation exercise, so he can give better advice about which relaxation exercise is best for his patient. Stress profiling makes it possible for the patient to understand his or her complaint and gives the therapist a tool to determine what kind of therapy is needed to tackle the stress related problem. In this article I show the added value of psychophysiological stress profile by means of two case studies.

### Health and inner balance

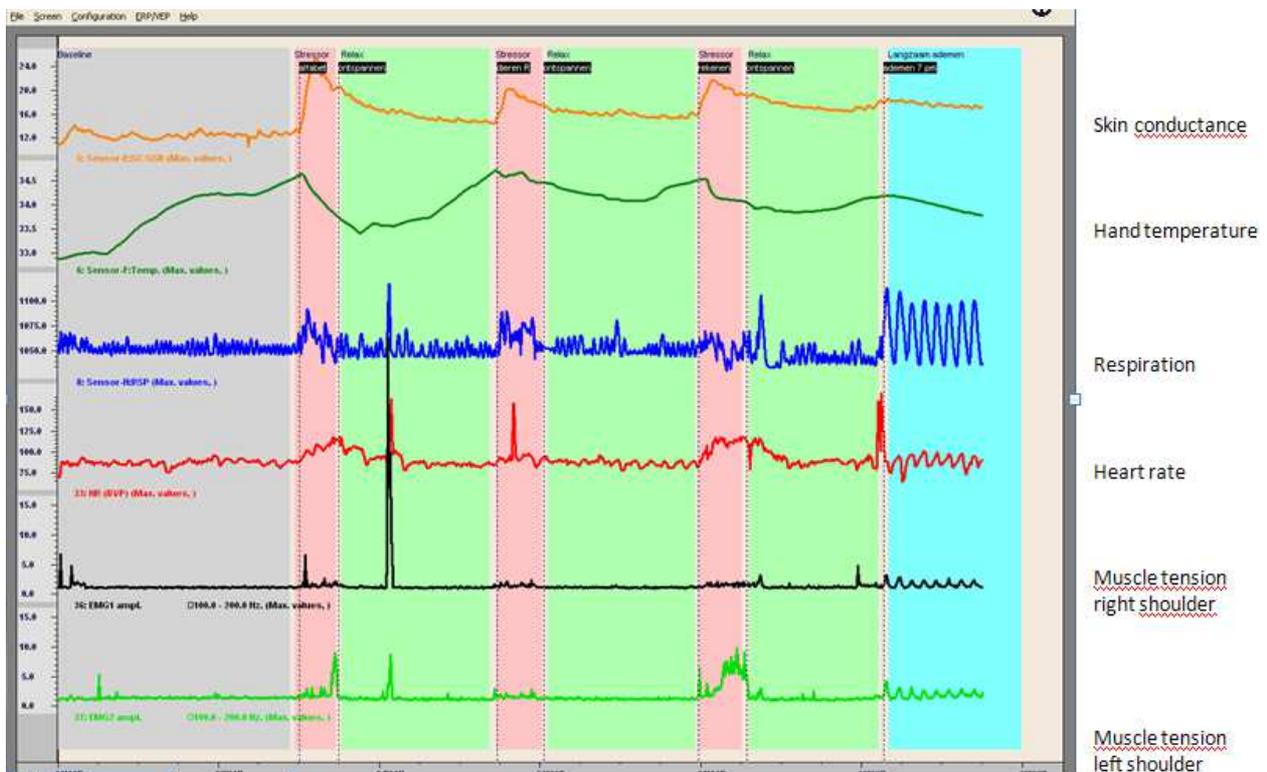
Health is all about balance. The brain, the nervous system and the heart all work together continuously to maintain body balance. If action is required by the body, these systems make sure that the body can act in the appropriate way. During this active or alert state processes of growth and recovery, such as digestion and the immune system are put on hold. This not only happens during physical activity, but also during mental effort and during the experience of danger or threat, for example in stressful situations or insecure environments. It is no problem to be in a state of alertness or activity for some time, but eventually the nervous system has to return to a more relaxed state to offer the body the chance to regenerate. Stress related problems occur when the body is too long or too often in an active or alert state, while there is not enough time to relax and to regenerate.

### The psychophysiological stress profile

If we are in a relaxed state, respiration is slow and deep, heart rate is normal, muscles of neck and shoulder are relaxed and the hands are warm and dry. When we are in a state of alertness or activity a change in these signals can be observed. This change varies within people. When a person is challenged with a mental task, for example a difficult math task, some people start to sweat, others tense their muscles and yet another group of people will start to breathe more rapidly and shallowly. It is important to know how a patient reacts on a mental task, as this would probably be the same as the stress reaction that he will show in other stressful situations in his daily life. In my practice I use a standardized stress profile, measuring muscle tension in both trapezius muscles, respiration, heart rate, hand temperature and skin conductance. The test starts with a baseline of 6 minutes, in which the patient is reading in silence. This is to avoid that the patient is too much occupied with relaxing. Then periods of relaxation, marked green in the graphs, are alternated with mental stressors, marked red in the graphs. The test ends with a particular breathing exercise, which is slow breathing at a rate of 5-8 breaths per minute, depending on the normal breathing rate of the person. The stressors used are mental stressors, in the following order: 1) saying the alphabet backwards out loud, 2) think of as much animals starting with the letter R and 3) serial seven's math task. As you will see from the following case studies this 20 minute stress profile offers a lot of valuable information for both client and therapist.

### Case study Headache

Mr. W., age 33, had been referred to my psychology practice because of headache, caused by a combination of stress and too much tension in the muscles of his head and shoulders according to his general practitioner. Mr. W. has had a stressful time with a lot of private and work related stressors. That was the time of onset of his headache about 3 years ago. At the moment he leads a quiet, non stressful life, but his headache has not disappeared, although the pain is less intense. The stress profile is conducted in the standardized way as described above, earlier in this article. See picture 1.



Picture 1: Stress profile of Mr. W. Most remarkable is the reactive skin conductance. Grey segment is baseline while reading, red segments are the stressors, green segments are the periods of relaxation and the blue segment is the breathing exercise.

The stress profile shows that Mr. W. had relaxed shoulder muscles during almost the whole test. Apart from the muscle tension in the shoulders I tested as a separate measurement the muscle tension in the masseter, frontalis and neck, but also these muscles appeared to be relaxed. Most certainly the cause of the headache could not be found in high muscle tension, as the general practitioner had suggested. The stress profile however does show that the skin conductance does not show normal values. Skin conductance is a measure of reaction/emotion. An emotional reaction creates additional perspiration on the fingertips, making the skin conductance increase. The expected pattern is an increase in skin conductance during a mental task and a decrease in skin conductance during relaxation and during recovery from the mental task. The skin conductance of Mr. W. was extremely high, about 12 micro siemens instead of the normal value of about 0-3 micro siemens and it shows continuous activity, even when the room was silent during the relaxation periods. It looks like he was reacting all the time. This he recognized. He says that his senses are active all the time, he sees and hears everything. What he did not realize was that this activity prevents his body to relax. He could understand that for his health it would be better if he could learn to put his senses to rest and to turn his attention inward. Through biofeedback training he learned which techniques were effective for him to lower his skin conductance. He combined biofeedback with mindfulness exercises at home, such as the body scan. After a few weeks of training Mr W. reported that his head felt quieter and his headache had decreased. After 5 sessions, no further treatment was necessary because the headache was gone.

### **Case study Fatigue**

Mrs. B., 46 years old, visits my practice because she feels fatigued, agitated and emotionally unstable for about 3 years now. These feelings get worse in situations when she does not feel welcome or accepted as the person that she is. That's what she experiences at work and at family meetings, where she does not feel at ease. Her stress profile (see Figure 2) shows two things: fast and shallow breathing and cold hands with the hand temperature decreasing further during the test. Also, unconsciously she tenses her shoulders. Hand temperature is determined by the amount of blood in the fingertips. When the body is in a state of alertness, the nervous system constricts the small blood vessels in the fingertips, to make extra blood available for the brain and large muscles that are needed to act quickly when there is danger or threat. Normally hand temperature decreases during mental effort and increases during relaxation and during recovery from a mental task. Cold hands may indicate that Mrs. B. approaches the world with suspicion and when I told her that, she admitted this immediately. She feels that people around her do not accept her, she feels alert, insecure and anxious. Her rapid shallow breathing can be explained by this as well, as it is a pattern associated with anxiety.

Although she previously was not aware of her breathing pattern, the stress profile made this visible for her and she wondered what would happen if she could learn to breathe deeper and slower. The therapy focused on the themes of safety and daring to be yourself. The breathing exercises gave her extra relaxation and she used the deep breathing in situations where she felt uncomfortable. She discovered that others accepted her, even if she dared to be herself, and felt increasingly comfortable in groups. She found another job, which suited better to her. After a while also her fatigue diminished. In the last therapy session we conducted the stress profile again and then her hands were warm and she responded normally during the test.

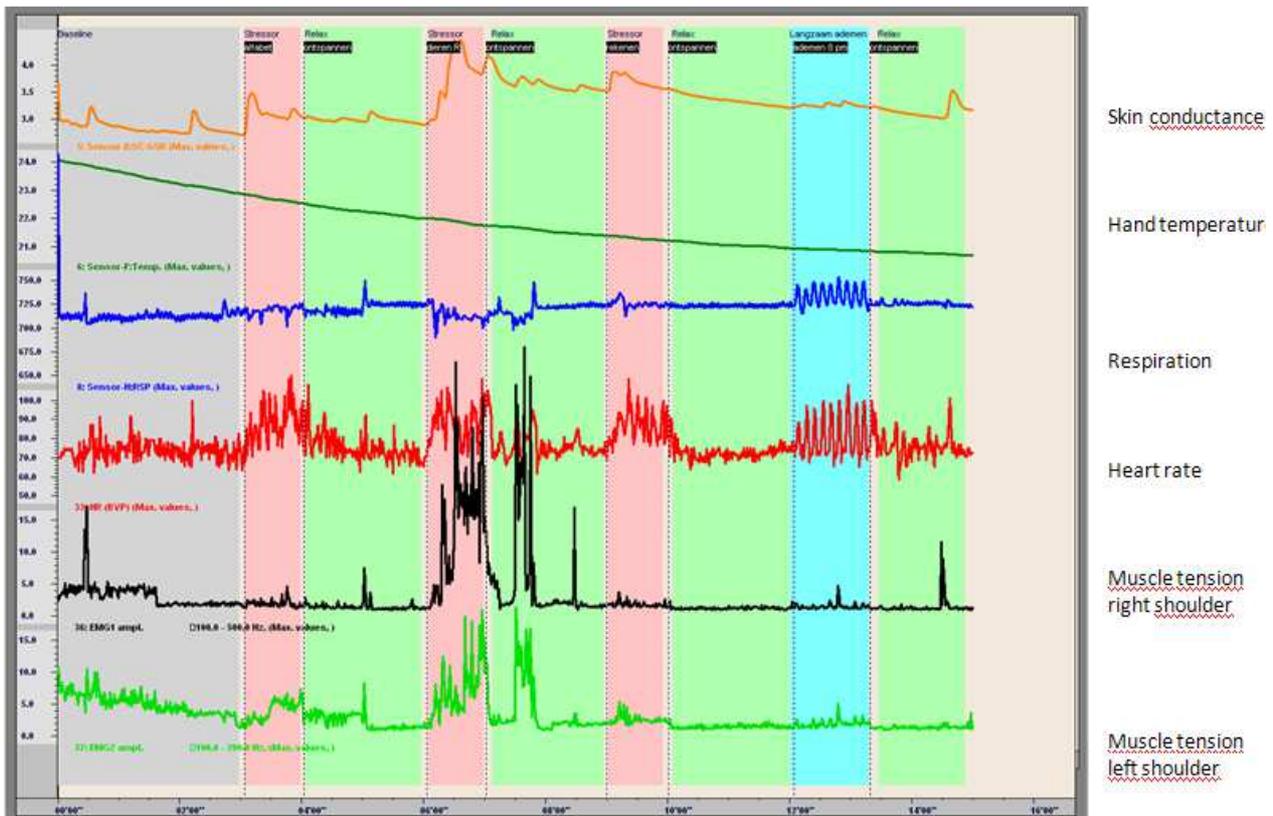


Figure 2: Stress profile of Mrs. B. Mention the continuous decrease in hand temperature and the rapid shallow breathing. Grey segment is baseline while reading, red segments are the stressors, green segments are the periods of relaxation and the blue segment is the breathing exercise

### Conclusion

The psychophysiological stress profile shows what happens in the body in response to stress and provides insight into the ability to relax and to regenerate after stress. In case of stress related problems the cause of the problems is made clearer and the treatment can be tailored better to the specific situation of the patient.