Electrodermal activity (**EDA**), is also known as skin conductance **and galvanic skin response** (**GSR**), it refers to electrical changes, measured at the surface of the skin, that arise when the skin receives innervating signals from the brain. For most people, if you experience emotional activation, your brain sends signals to the skin to increase the level of sweating.

EDA can be measured in many different ways electrically including skin potential, resistance, conductance, admittance, and impedance.

EDA is traditionally characterized into two types – tonic skin conductance level and phasic skin conductance response – which can roughly be thought of as “the smooth underlying slowly-changing levels” vs. “the rapidly changing peaks.”

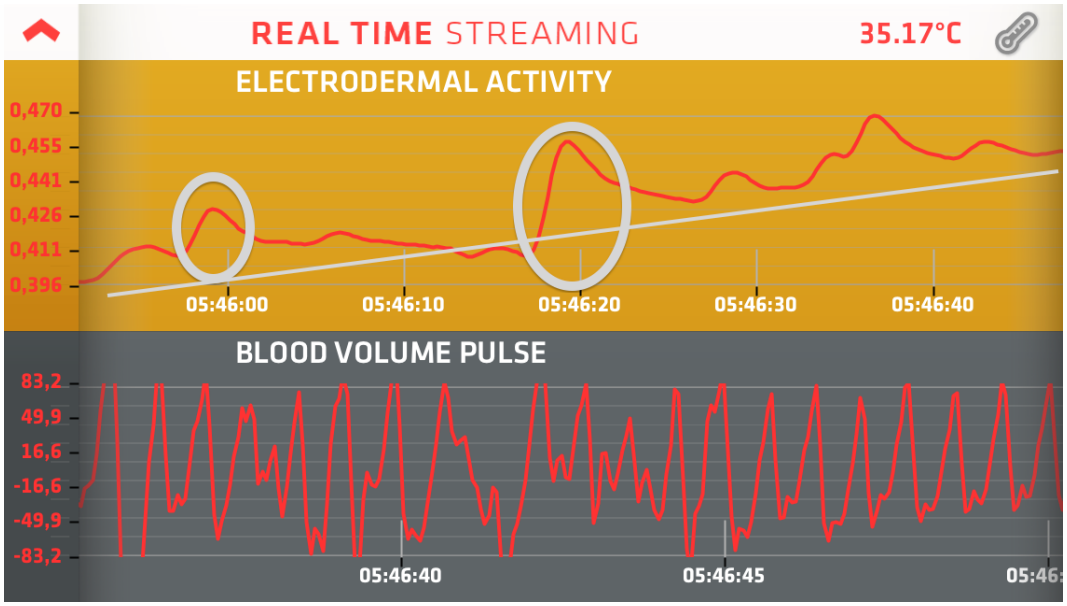

Figure 1, the top graph depicts a high quality EDA signal. Exemplary skin conductance responses (SCRs) are circled. These SCR's are examples of "phasic activations". The tonic value is the more smoothly-changing level, approximated here by the straight white line.

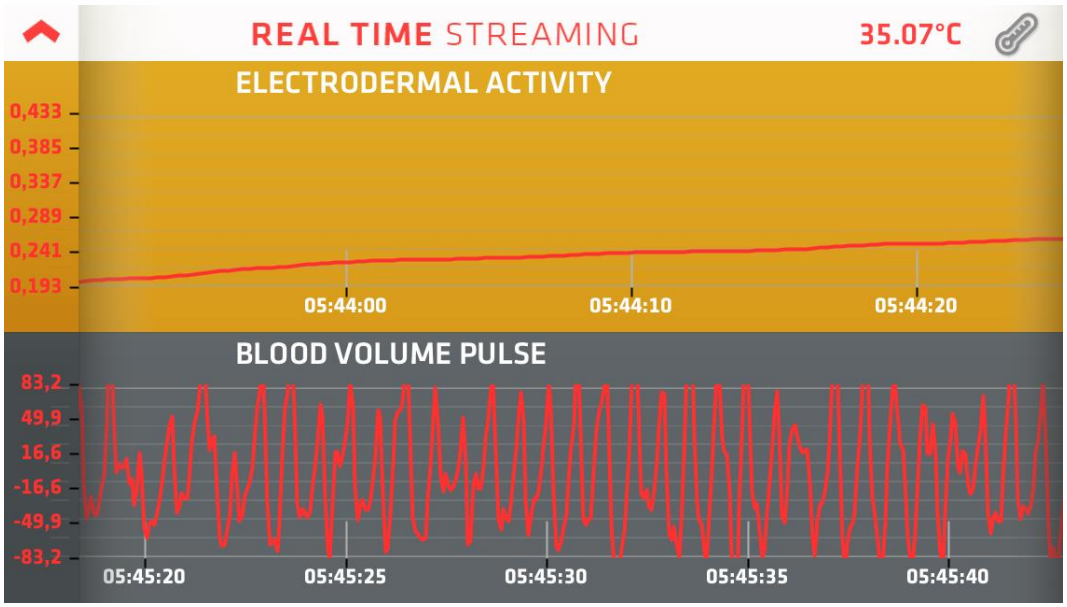

Figure 2, the top graph depicts an EDA signal which is slowly climbing and has no significant phasic activity.

On EDA response to stimuli and SCRs

Phasic – Phasic skin conductance measurements are typically associated with short-term events and occur in the presence of discrete environmental stimuli - sight, sound, smell, cognitive processes that precede an event such as anticipation, decision making, etc. Phasic changes usually show up as sudden increases in the skin conductance. These peaks are generally referred to as Skin Conductance Responses (SCRs).

What is a Skin Conductance Response (SCR)?
Skin Conductance Responses (SCRs) are sudden increases in the conductance of the skin. The big SCRs that are circled in Figure 1 illustrate their most common form: they usually have a faster rise time than decay time.

On Skin Conductance Level and Baseline:

Tonic – Tonic skin conductance is the level of skin conductance in the external stimuli. The tonic skin conductance level can slowly change over time in an individual depending upon his or her psychological state, hydration, skin dryness, and autonomic regulation. The baseline tonic skin conductance level may change from day to day. Tonic changes in the skin conductance level typically occur in a period of from tens of seconds to minutes.

What is Skin Conductance Level (SCL)?
The SCL usually refers to the raw level of conductance of the skin. It may also be computed as an average over longer intervals, typically ranging from tens of seconds to tens of minutes.

There are different levels of EDA between the person feel stressed and doing exercise.

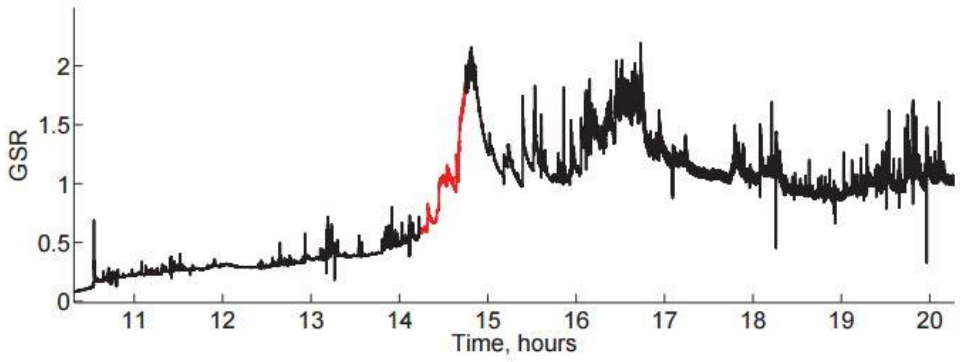

Fig. 8. After a stressful event (red-lined peak) the GSR level does not return to the level it had prior to the event. This might indicate that there is no relaxation process.

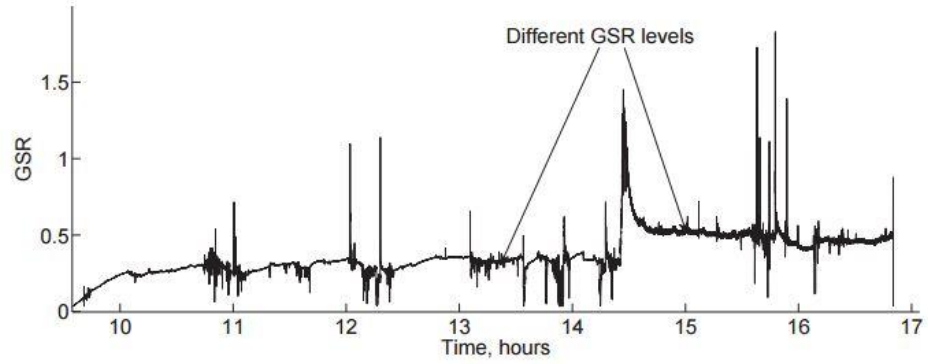

Fig. 9. After a suspected stressful event the GSR level does not return to the level it had prior to the event. This might be an indicate that there is no relaxation process or what is more like in this case - the baseline level of GSR corresponding to normal unstressed state changed.

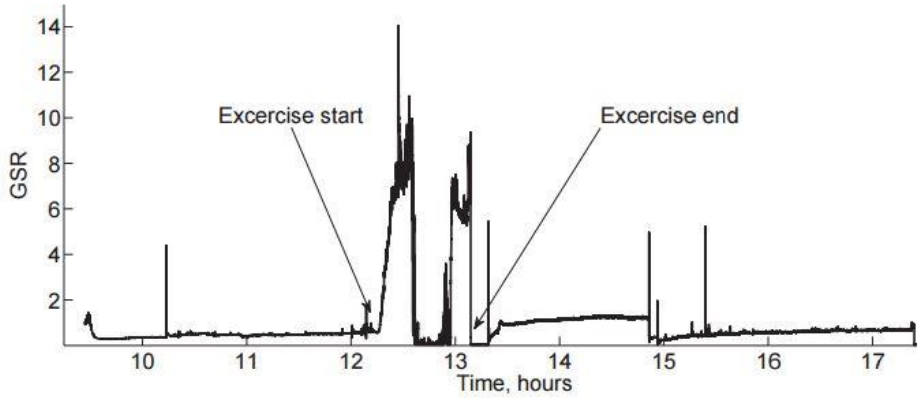

Fig. 10. Doing physical exercises results in a high GSR level, yet is not related to the emotional stress.

The figures above proved that stress will cause an increase in sweat secretion and, ultimately, measurable electrodermal activity.

References

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