

Galvanic

Skin Response



What is it & What does it measure?

ZYTO™

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The skin is an amazing and versatile organ. It's not only smooth and often nice to look at, but also helps to regulate many functions of the body. It acts as a barrier against environmental threats, contains nerve cells that detect changes such as temperature and pressure, can heal itself, and (ideally) keeps your body at a steady 98.6 degrees.

Yet another great thing about the skin is that it responds to changes, or stimuli, in a way that can be accurately measured via galvanic skin response. The term may sound a little geeky, but we think it's pretty exciting, especially when we consider the amazing amount of information it can reveal about an individual.



## YOUR SKIN IS ELECTRIC

Your skin, and much of the rest of your body for that matter, conducts electricity. If your body didn't conduct electricity, touching a high-voltage fence or sticking a knife in an electric socket would have no effect on you. We wouldn't be alive without electricity because body functions are controlled by electrical signals.

The skin in particular is a good conductor of electricity, so even a weak electrical signal introduced to the skin can be measured. By applying a constant, unperceived level of voltage to the skin, we can get a baseline reading of the skin's conductance. Skin conductance (SC) is a term that's often used interchangeably with electrodermal activity (EDA) or galvanic skin response (GSR).<sup>1</sup>



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## A MEASURABLE REACTION

The baseline reading of skin conductance is referred to as tonic conductance. This conductance level is different for everyone, but it usually ranges from 10 to 50 very small units of conductance called microsiemens. Tonic skin conductance levels also vary based on the person's psychological state and autonomic regulation at the time the measurement is taken.

While tonic skin conductance is a baseline measurement, phasic conductance changes are the result of the body responding to external stimuli. This increase in conductance compared to the baseline can be observed shortly after a subtle stimulus such as a smell, a sound, an image, or a question is introduced.<sup>2</sup>

Phasic changes can be observed when the skin's sweat ducts fill in response to a stimulus. After the sweat is deposited or absorbed by the skin, conductance returns to tonic levels. According to Edelberg's widely accepted sweat circuit model, the extent of this increase can be measured by the amount of sweat and number of sweat glands activated.<sup>3</sup>

## THE AUTONOMIC NERVOUS SYSTEM

So now you know more about what galvanic skin response is and how it can be measured, but why are these measurements important? To answer this question, let's take a closer look at our autonomic nervous system.

The autonomic nervous system regulates a wide range of bodily functions, including:

- Heart rate
- Respiratory rate
- Digestion
- Waste elimination
- Fight-or-flight response
- Blood pressure
- Electrolyte balance
- Sexual response
- Body temperature

The body largely handles these and other functions automatically, hence the term “auto” before “nomic.”

The autonomic nervous system is further separated into the parasympathetic and sympathetic nervous systems. The parasympathetic nervous system regulates “resting and digesting” as well as “feeding and breeding” processes, while the sympathetic system regulates things like blood pressure, heart rate, and galvanic skin response.<sup>4</sup>

By measuring galvanic skin response (as well as other sympathetic responses), we can detect emotional arousal and even the level of arousal. This is significant because it's information that's gathered directly from the body. Therefore, the readings are an objective look at how we react to a given stimulus.

Because our thoughts are filtered by our conscious mind, what we think may be going on in our body may not be accurate, and we aren't able to see the full picture.



With galvanic skin response, we can bypass the filters of our conscious mind and discover what the body is really trying to tell us with a high degree of accuracy.

## TO TELL THE TRUTH

Perhaps the most well-known use of galvanic skin response is the lie detector test, formally known as the polygraph machine. Along with measuring heart rate, respiration rate, and blood pressure, the polygraph measures galvanic skin response as questions are asked. A polygrapher is trained and qualified to interpret the responses to the questions, but standardized questioning procedures must be followed to get an accurate reading.

Initially, the polygrapher asks questions that are obviously true or false, such as “Is your hair blonde?” to establish a baseline reading. Questions with answers unknown to the polygrapher are then asked and the readings are compared to the baseline to determine whether the subject is telling the truth.



Other uses of galvanic skin response allow us to discover how the body is really responding without our conscious filters getting in the way. Galvanic skin response is such a valuable way to observe how the body reacts to certain stimuli that it's been utilized in a wide variety of fields for several decades.

Some of the areas in which GSR technology is used include:

- Psychological research
- Psychotherapy
- Media and ad testing
- Usability testing
- Consumer neuroscience
- Health care



## ADDRESSING HEALTH ISSUES WITH BIOFEEDBACK

Galvanic skin response and other readings of the sympathetic nervous system can be classified as biofeedback. Devices that gather biofeedback help us gain more awareness of the physiological processes going on in our body. The idea of biofeedback is that by observing the responses we are getting, we can train ourselves to control our sympathetic responses more effectively.

The potential benefits of biofeedback have been well-researched. Some of the common health concerns that biofeedback can address include:

- Anxiety
- Insomnia
- Headaches & migraines
- Epilepsy
- Constipation

- ADHD
- High blood pressure
- Urinary incontinence
- Pain
- Raynaud's disease
- Motion sickness<sup>5,6</sup>

The key with biofeedback is that it requires active participation and engagement. Biofeedback can be thought of as a training process rather than a therapy that can help you gain a better sense of control over your health concerns, which can ultimately increase your well-being and ability to cope.<sup>7</sup>

## STRESS LEVELS CORRELATE TO GSR

We've established that a certain stimulus, such as an image, sound, word, or question, can trigger an emotional response that can be measured. When we look at emotional arousal based on GSR readings, we can easily observe how they correlate to levels of stress as well.

For example, a study conducted in 2005 found that among an electrocardiogram, electromyogram, skin conductance, and respiration, heart rate and skin conductance were most closely correlated to stress levels

in the subjects tested.<sup>8</sup> And a more recent study found that GSR sensors can be used to detect stress levels in real time.<sup>9</sup>

Additional studies show the value of galvanic skin response as both an indicator of stress and predictor of performance. One study, for instance, showed that galvanic skin response can be used to predict performance in stressful situations.<sup>10</sup>

Another study of note found that listening to hymns had a significant effect on GSR val-



ues.<sup>11</sup> Looking at this research, we can see how monitoring GSR can not only be useful for detecting stress, but finding effective ways to manage it as well.





## MANAGING STRESS FOR BETTER WELLNESS

The ability to detect stress accurately is important because it plays a significant role in our health and well-being. In fact, it is estimated that stress plays a role in 75 to 90% of human diseases.<sup>12</sup> Since we can't completely eliminate all our stress, the key is learning to manage it effectively and reducing it where we can.

The first step to managing stress is identifying what is stressing us or putting us out of balance. Observing galvanic skin responses can help us see what may be out of balance. This draws our attention to areas of abnormal responses.

Once we've discovered the areas on which to focus, the next step is to help the body handle the stressors in a more effective way.



While galvanic skin response was first used in the field of psychoanalysis in the early 1900s, acupuncturists began experimenting with the technology in the 1930s. In the early 1950s, the celebrated German physician Reinhold Voll developed a device that measured the electrical potential of skin by means of a stylus that was manually applied to an acupuncture point.

Dr. Voll developed an elaborate system of measuring acupuncture points for the purpose of diagnosis. After diagnosing a patient using this system, he would then test a variety of medicines until he found a combination that resulted in energetic balance to the acupuncture points.<sup>13</sup>

While Voll's process was effective, it was also time-consuming and invasive. So in the 1980s, American scientists and engineers began computerizing his process. The computerization process involved creating a virtual representation of a medicine and then generating a signal or frequency using the virtual representation to track the effects on the body, similar to Voll's process of moving actual medicine into the proximity of the body.

ZYTO founder Dr. Vaughn Cook was one of the early pioneers of computerizing Dr. Voll's process, which is known as electroacupuncture according to Voll (EAV). Dr. Cook created biocommunication, which further advances EAV and computerized electrodermal screening technology.

## ADVANCES IN GSR & EDS TECHNOLOGY



“ZYTO biocommunication technology can determine if the body’s response to a digital signature of an actual stimulus is in range or out of range (and by how much) compared to the baseline reading.”



## HOW ZYTO BIOCOMMUNICATION WORKS

Similar to detecting truth and lies when hooked up to a polygraph machine, ZYTO biocommunication technology can determine if the body’s response to a digital signature of an actual stimulus is in range or out of range (and by how much) compared to the baseline reading. Digital signatures of specific nutritional products, for example, are posed as questions to the body, and the body responds directly via galvanic skin response.

Because the computer communicates directly with the body, the subjectivity that occurs when questions are asked, perceived, and responded to (as with a polygraph test) is eliminated.

While ZYTO technology isn’t diagnostic, it provides a wealth of information that can be used to make better wellness decisions. Focusing on the stressor Virtual Items that are out of range as well as the biologically coherent balancer Virtual Items can greatly assist wellness professionals and their clients as they seek to better manage stress load and improve overall well-being.

“ Biocommunication technology utilizes the ZYTO Hand Cradle to gather galvanic skin response readings. The Hand Cradle offers a number of advantages over other GSR & EDS devices ”

## THE ZYTO HAND CRADLE

Biocommunication technology utilizes the ZYTO Hand Cradle to gather galvanic skin response readings. The Hand Cradle offers a number of advantages over other GSR and EDS devices, including:

- Was developed by energetic medicine pioneer Dr. Vaughn R Cook, who has 30+ years of clinical experience
- Has 6 large contact points to maximize accuracy (most EDS devices only have 2

points of contact)

- Is the only FDA-cleared wellness scanner of its kind
- Can scan items quickly—about 100 Virtual Items per minute
- Is also used with our EVOX perception reframing system—a powerful tool for addressing emotional wellness

Thanks to GSR and the way we’ve integrat-



ed it into our biocommunication systems, we are no longer limited to subjective interpretation when making decisions that impact personal wellness, and we think that’s something to get excited about.

Want to learn more about how our technology can enhance your wellness business? Visit [zyto.com](https://zyto.com)



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