

The Moodmetric Smart Ring Measures Electrodermal Activity (EDA)

- The Moodmetric smart ring measures electrodermal activity in real time
- The technology is developed and owned by a Finnish company Vigofere Oy
- Electrodermal activity (EDA) is also known as skin conductance (SC) and galvanic skin response (GSR).
- The accuracy of the measured signal is comparable to laboratory devices and the research by the Finnish Institute of Occupational Health (Torniainen et al. 2015) has found the ring valid for field research



Electrodermal activity is an indicator of the sympathetic activity of the autonomic nervous system

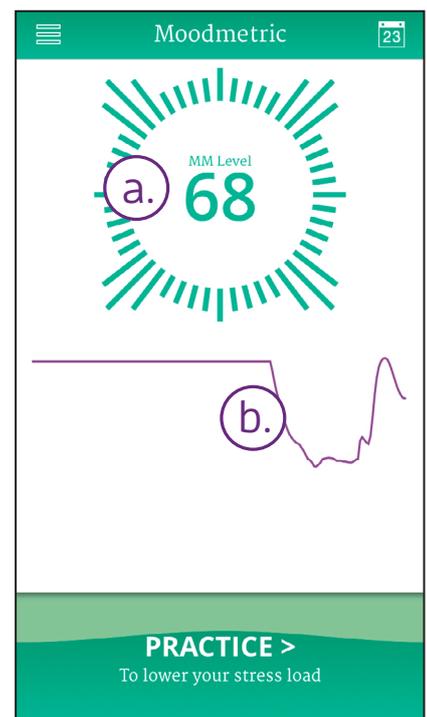
Electrodermal activity (EDA) is one of the most studied psychophysiological markers of the various functions regulated by the autonomic nervous system and it has been applied in psychophysiological research for over a 100 years (Boucsein 2012). EDA is an indicator of the sympathetic activity of the autonomic nervous system, which is associated with emotion, cognition, and affection (e.g. Critchley 2002). Measuring electricity from the surface of the skin requires moisture to act as a conductor. The density of the eccrine sweat glands is the highest on the palmar and sole skin, making the ring an efficient and easy way to measure EDA (e.g. Boucsein 2012). The eccrine sweat glands are innervated by the sympathetic nervous system and play a part in the fight-or-flight response.

The Moodmetric index/level indicates arousal on a scale of 1-100

The Moodmetric index, otherwise known as the MM level, is calculated by an algorithm developed by Vigofere Oy. It indicates an individual's mental alertness on a scale of 1 to 100 (Picture 1.). High alertness can be both positive and negative, for example being enthusiastic or distraught. This results in the sympathetic nervous system being very active. When the index figures are low, the parasympathetic nervous system is working to enhance recovery. The daily average figure of the Moodmetric index (Picture 2. ja 3.) illustrates how well in balance the autonomic nervous system of an individual is. This balance is important when the target is to prevent chronic stress.

The Moodmetric measurement is widely applied in research. Studies including clinical validation:

- Research at University of Jyväskylä, Finland: The Moodmetric index correlates with the stress hormone cortisol (preliminary results, 2019)
- The Personal Health Informatics research group at Tampere University, Finland: the Moodmetric smart ring can provide information on the stressfulness of work-related situations almost as accurately as respective laboratory equipment designed to measure EDA (Pakarinen et al. 2019).



Picture 1. The real-time Moodmetric index indicating arousal on a scale of 1 to 100 (a.) and the raw signal curve (b.) can be viewed on the smartphone app.

The Moodmetric measurement is intended for continuous arousal level monitoring in long term

Long-term tracking is needed for two essential reasons:

1. To understand whether high stress load is momentary or has been going on for weeks or months, indicating chronic stress, or
2. to motivate a person to take action to manage stress efficiently, with the help of real-time feedback.

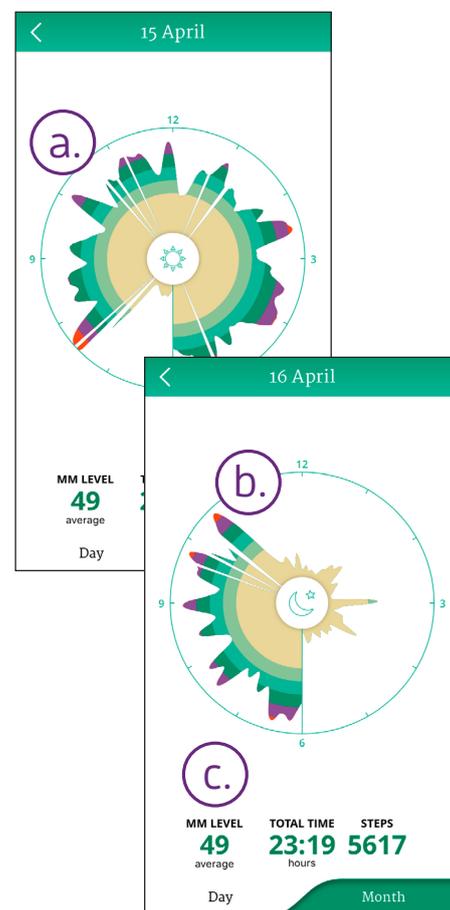
The Moodmetric smart ring fits both these purposes well. Read more about measuring stress in our series of five articles: <http://www.moodmetric.com/long-term-stress-measurement/>

The possibilities of applying EDA in clinical patient care and research

Certain diseases, especially ones associated with the functions of the autonomic nervous system, may have an affect on electrodermal activity. Patients with hyper- or hypothyroidism have been recorded to have unusual EDA activity (e.g. Dolu et al. 1997; Dolu et al. 1999). Within a variety of anxiety disorders (such as panic disorder and posttraumatic stress disorder), increased electrodermal activity and reactivity has been observed (Braune et al., 1994; Hoehn et al., 1997, Lader & Wing, 1964; Blechert et al., 2007). However, electrodermal activity is often reduced in persons suffering from depression (Argyle, 1991; Ward et al., 1983) and EDA is considered a potential biomarker for depression (Sarchiapone et al., 2018). It is not until now, with the introduction of wearable devices, that measuring electrodermal activity can be applied in a much more diverse way in clinical research, outside of laboratory conditions.

References

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Pictures 2. and 3. Day time view from 06am to 06pm (a.) and night time view from 06pm to 06am (b.) indicate the moments of stress load and recovery. The daily average level (c.) indicates balance of the autonomic nervous system during the past 24 hours.

Moodmetric services:

Sales of
the Moodmetric smart rings
Training services

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