MOODMETRIC

The Moodmetric Smart Ring Measures **Electrodermal Activity (EDA)**

- *The Moodmetric smart ring is developed and owned by a Finnish company Vigofere Oy.*
- *The Moodmetric smart ring measures electrodermal activity in real time. Electrodermal activity (EDA) is also known as skin conductance (SC) and galvanic skin response (GSR).*
- *The ring is used for weeks or months of stress monitoring.*
- *Two recent research studies have examined the quality of the Moodmetric measurement signal. Both studies concluded that the accuracy of the signal produced by the Moodmetric smart ring is very close to that of laboratory devices. (Torniainen et al., 2015; Pakarinen et al., 2019).*

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 level indicates arousal on a scale of 1-100

The Moodmetric 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 levels 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.

Measurement accuracy

The quality of the Moodmetric measurement has been examined in two separate studies. The measurement signal corresponds to the level of laboratory equipment and has been found to be well suited for field studies (Torniainen et al. 2015; Pakarinen et al. 2019).

According to the preliminary results of an ongoing study at the University of Jyväskylä, a correlation has been found between the Moodmetric level and cortisol hormone (Tanskanen-Tervo, M., Faculty of Sports Science).

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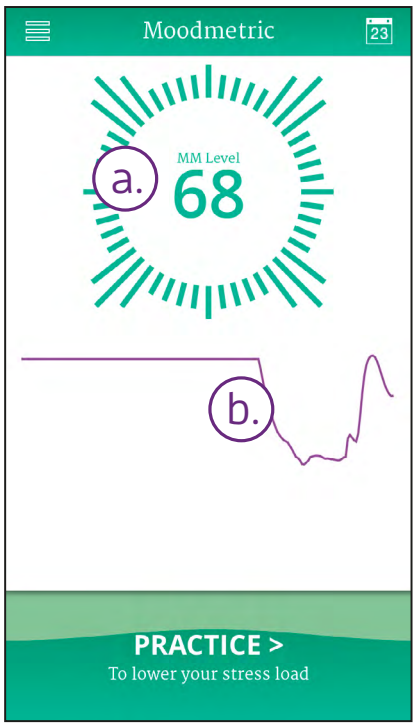


Picture 1. The real-time Moodmetric level indicating arousal on a scale of 1 to 100 (a.) and the raw signal curve (b.) can be viewed on the smartphone app.

The accuracy of the Moodmetric measurement signal compared to a laboratory device is 83%. (Torniainen et al. 2015; Pakarinen et al. 2019)

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

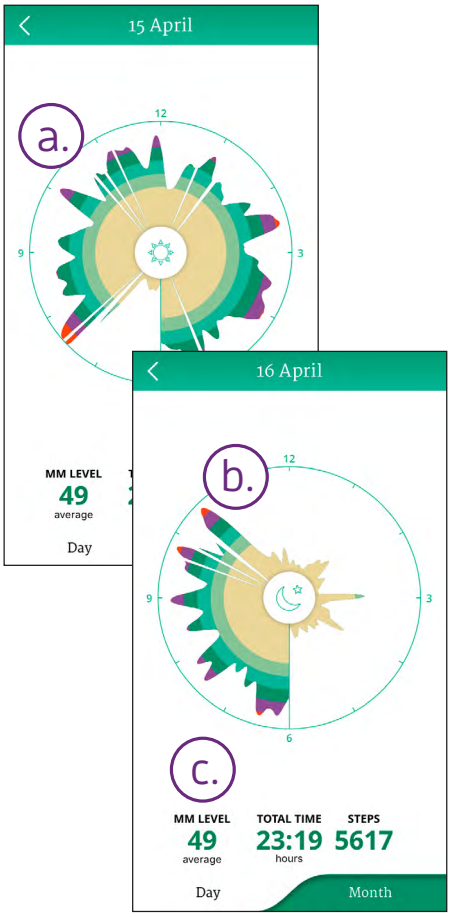
Long-term tracking is needed for two essential reasons:

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.



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.

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Moodmetric services:

Sales of
the Moodmetric smart rings

Training services

More information:

Niina Venho
niina.venho@moodmetric.com
+358 40 710 4087

Henna Salonius
henna.salonius@moodmetric.com
+358 44 309 6997

moodmetric.com