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# Exploring electrodermal activity differences during acute episodes of bipolar disorder (BD) with wearable devices

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## INTRODUCTION

Current BD evaluation: Clinical interviews, questionnaires, scales

Mainly depends on physicians' assessment

There is a need for objective biomarkers!

Electrodermal activity (EDA):

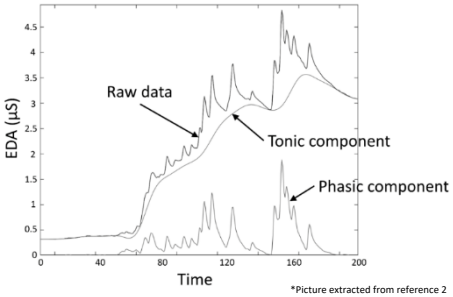
Changes in the potential of the skin due to the activity of sweat glands, which are responsive to psychological stimuli

↓ EDA in unipolar depression

Potential biomarker

EDA data decomposition:

**mEDA** = mean
**pmEDA** = peaks per minute
**pmaEDA** = peaks mean amplitude




*Picture extracted from reference 2

## AIM

1. Compare inter-subject EDA in BD patients during acute maniac or depression episodes, euthymia and controls.
2. Assess intra-subject differences before and after an improvement of the acute episode in BD patients.

## METHODS

1 Recruitment:

38 BD patients:
- Inpatients
- Home-treatment
- Outpatients

19 Controls

2 Assessment:

Wear Empatica E4 wearable device for ~48h

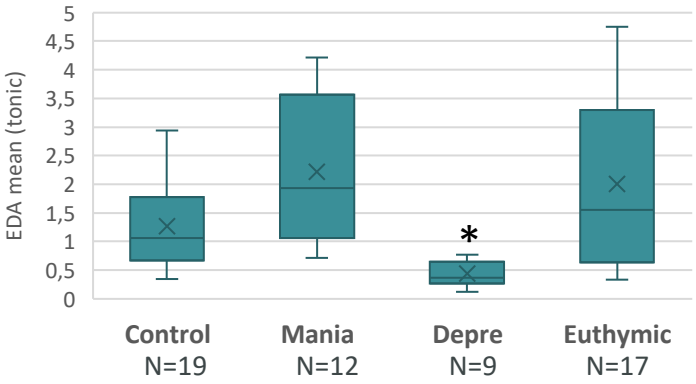
➢ Measures EDA, accelerometery, blood volume pulse and skin temperature.

3 Data analysis:

- Pre-processing: Looff et al. (2022) R package
- Normality assessment: Shapiro-Wilk test
- Inter and intra-subject comparisons: one-way ANOVA, paired T-test and Kurskal-Wallis H test

## RESULTS

### 1. Inter-subject differences




Both tonic ($\chi2(3) = 18.438$ p = 0.001) and phasic (pmEDA) ($F(3,53)= 9.204$, p=0.001) EDA measures showed significant differences between depressed BD patients and other groups.

### 2. Intra-subject differences

Significant differences were found between baseline and post-symptom improvement in manic and depressive episodes.

1. mEDA ($t(8) = -0.661$, p =0.033), pmEDA ($t(8) = -1.006$, p =0.002) and pmaEDA ($t(8) = -0.177$, p <0.001) was higher in T2 in depressed patients.

2. pmaEDA ($t(11) = 1.299$, p <0.001) was lower in T2 in manic patients.

## CONCLUSION

Both tonic and phasic EDA measures showed significant differences between depressed BD patients and the rest of the groups. Likewise, significant differences were found between baseline and after symptoms improvement in manic and depressive episodes. These results highlight EDA potential to serve as an objective **biomarker for assessing illness activity in BD**. Further research is needed to fully establish the reliability and validity of EDA.

## References

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**Conflict of interest:**
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