

## Study Information

|                                 |  |
|---------------------------------|--|
| <b>Study Name:</b>              | Breathing Exercise for the Detection and Improvement of Subclinical Depression and Anxiety (BEDDA) |
| <b>Conducting Person:</b>       | Gisbert Wilhelm Teepe  |
| <b>Time and Place:</b>          | Start: 01.06.2022, End: 1.10.2023, in app  |
| <b>Contact Project Team:</b>    | Gisbert W. Teepe, ETH Zurich, gteepe@ethz.ch   |
| <b>Data Protection Officer:</b> | Tomislav Mitar, tomlav.mitar@sl.ethz.ch  |

*Please read the text below carefully and ask the conducting person (gteepe@ethz.ch) about anything you do not understand or would like to know.*

**General Information:** In this study, we aim to improve the detection and prevention of subclinical depression. Detection and prevention can help to offer help before the subclinical depression becomes a full-blown depression. Improving this detection and prevention is important because more and more people are suffering from subclinical and clinical depression.

**What is the purpose of this study?** With our study, we aim to (a) develop an algorithm for breathing detection, (b) develop digital biomarkers for mood, agitation, and anhedonia, (c) develop a digital biomarker for subclinical depression, and (d) evaluate a playful app to improve mood, anxiety, and stress. As recent studies have shown especially students but also a substantial number of other individuals suffer from different symptoms related to depression and anxiety. We are, therefore, interested to what degree an app could be used to support students and other individuals in times of need. To achieve this, you will interact with an app for 30 days and answer short questions about how you are currently feeling.

**What is investigated and why?** To improve the app, we are developing an algorithm for breathing detection. This detection of breathing is necessary for the biofeedback incorporated in the app. We are also interested whether changes in your answers can be connected to acoustic changes in your voice or breathing. These measurements could help to adjust the breathing cycles to individuals and provide feedback for possible changes.

**Who can participate?** Individuals that are at least 18 years old, are not currently in treatment for a mental health disease, do not suffer from Asthma, COPD or any other lung or respiratory tract disease, and are not pregnant can participate in this study.

**Will I be compensated for participating?** For your participation you will receive a voucher for 40 CHF. Furthermore, if you complete the study in 35 days or less you have the chance to win vouchers with a value of 100, 200, or 300 CHF. If you are randomly allocated to the smartwatch group, you can win the smartwatch if you complete the study and provide sufficient data.

**How much time will I be expected to invest?** To answer the question before and after the exercise you will need approximately 1-2 minutes. The exercise itself will take 3-5 minutes to complete. The daily interaction should therefore not take longer than 5-8 minutes. At the start, after two weeks and at the end of the study you will have to answer some further questions, taking approximately 10-15 minutes.

**Are there any risks or benefits?** There are no studies indicating a risk for breathing exercises. On the contrary several studies and reviews have shown that the breathing exercises are very beneficial. How am I insured? Adverse health effects that are directly caused by the study and can be demonstrated to be attributable to fault on the part of the project team or ETH Zurich are covered by ETH's liability insurance (Basler Versicherungen, policy no. 30/4.078.362). You are responsible for insuring yourself against any other adverse health effects such as might occur, for instance, accidents when interacting with the app while moving.

**What are my rights during participation?** Your participation in this study is voluntary. You may cancel your participation at any time without specifying reasons and without any disadvantages.

**Which data are collected?** During the study, information about your age, gender, and occupation will be collected. Furthermore, over the course of the study you will regularly answer questions regarding your momentary mood, anhedonia (tiredness), and agitation (calmness). Furthermore, while you perform the breathing training, your device's microphone will capture your voice commands and breathing sounds. All data will be screened before further processing happens and sounds other than your voice command or breathing will be irreversibly removed (e.g., any conversations or other sounds that may allow your identification). During the breathing training, additional sensors may also collect data if accessible, such as your device's accelerometer, gyroscope, magnetometer, light sensor, ambient temperature sensor, humidity sensor, pressure sensor, and step counter (only steps since the app was started). We will also collect information from the app such as reaction time to the chatbot.

**How are my data treated?** The data obtained from you will be stored safely on General Data Protection Regulation (GDPR)-compliant servers. They will be reported in an anonymous form only, for example, as part of scientific publications. Only the responsible investigators or the members of the Ethics Commission will have access to the original data under strictly observed rules of confidentiality. Moreover, your anonymized data may be published in a publicly available database according to the principles of the open research data initiative of the Swiss National Science Foundation. Also, your anonymized data may be used commercially for product development by a company founded by members of the research team. Finally, any personal information such as your name, your email address, or your mobile number (e.g., information that you provide to register for the study) will be deleted irrevocably after the study has been finished.

**What are my rights to the data?** You may request comprehensive information about the personal data that were collected from you in the study at any time. You also have the right to have them corrected, handed over to you, barred for processing, or deleted. You may revoke your consent to the processing of your personal data at any time without giving reasons. However, since all data, except the data related to the monetary compensation, is anonymized before further processing, it is not possible anymore to identify your data after the study is completed. Your contact person for related requests is given above.

**Who funds the study?** The study is in part funded by CSS Health Insurance. However, CSS Health Insurance played no role in designing the study, will not have access to the data, and will not be included when analyzing the data. For further questions please contact Gisbert Teepe (gteepe@ethz.ch).

**Who examined the study?** This study was approved by the ETH Zurich Ethics Commission as proposal EK-2022-N-31.

**Download Study Information:** You can download the study information here [bedda.me/study-information](https://bedda.me/study-information). This information will also be available in the side menu of the app.