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DATA PAPER

Data from 'Critical Slowing Down as a Personalized Early Warning Signal for Depression'

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We present a dataset of a single ($N = 1$) participant diagnosed with major depressive disorder, who completed 1478 measurements over the course of 239 consecutive days in 2012 and 2013. The experiment included a double-blind phase in which the dosage of anti-depressant medication was gradually reduced. The entire study looked at momentary affective states in daily life before, during, and after the double-blind phase. The items, which were asked ten times a day, cover topics like mood, physical condition and social contacts. Also, depressive symptoms were measured on a weekly basis using the Symptom Checklist Revised (SCL-90-R). The data are suitable for various time-series analyses and studies in complex dynamical systems.

Keywords: ESM; time-series; depression; critical transition; psychopathology

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(1) Overview

Context

Collection Date(s)

The data were collected between August 13, 2012, and April 11, 2013.

Background

We present a dataset of a single participant, with a history of major depressive disorder (MDD), whose daily life experience was monitored over the course of 239 days [1]. The participant, who initiated the experiment, wanted to obtain more personal insight during a period in which the anti-depressants were gradually reduced. The aim of the participant was to know whether or not he would become more vulnerable to develop a new depressive episode when the anti-depressants were reduced, and whether this vulnerability could be detected in the data. The study design was set up at the initiative of, and in collaboration with, the participant, who agreed upon the set of items that was selected and added some items that were relevant to the participant. The participant had also found a pharmacist who provided a dose-reduction scheme that was randomly chosen out of several dose-reduction schemes

that were designed in collaboration with the participant. The chosen dose-reduction scheme was unknown to both the participant and the researchers involved in the experiment. The participant was monitored on a momentary basis during a baseline period, a period of dose-reduction and a post-reduction period. The participant also initiated a follow-up measurement period in which his daily life experiences kept being monitored.

(2) Methods

Sample

The participant is a 57-year old male with a history of major depression. The participant has been using antidepressants for 8.5 years [2]. The participant completed on average 6.2 assessments per day ($SD = 1.9$).

Materials

The dataset consists of items that were measured momentary, daily, and weekly.

Momentary

Momentary items (no. items is 50) were collected using the *experience sampling method* (ESM; [3]). Items were selected based on previous experience with these types

of items regarding within-person variation, loading on a negative or positive affect component, the relevance for the current type of psychopathology and specific personal characteristics of the participant. The momentary assessment questionnaire consisted of items pertaining to mood states (e.g. feeling relaxed, feeling irritated etc.), self-esteem, the company the participant was in at the moment of assessment, the pleasantness or unpleasantness of being in company, physical condition, the activity that the participant was doing at the moment of assessment, and to an important event that had occurred since the last assessment.

33 items were measured on a 7-point Likert scale, ranging from 1 (not) to 7 (very). The items concerned with feeling down, lonely, anxious and guilty were measured on a 7-point Likert scale, ranging from -3 (not) to 3 (very). This scale differs from the majority of the items as a pilot trial showed that the participant reported more variation with a 7-point Likert scale ranging from -3 to 3 than a 7-point Likert scale ranging from 1 to 7. Items with respect to the company the participant was in, the activity the participant was enrolled in or any event that had taken place since the last assessment were categorized accordingly. Two items concerning the pleasantness and importance of the event were measured on a 7-point Bipolar scale, ranging from -3 (unpleasant/unimportant) to 3 (pleasant/important).

Daily

Two separate sets of items were completed daily: a six-item set after waking up (item labels start with 'mor'), with which information is collected on the quality of sleep. The other set consists of six items and were asked to be filled out right before the participant went to sleep (item labels start with 'evn'). This set of items was concerned with the quality of the day the participant had. At both occasions, the participant was asked whether or not he took his medication either yesterday (morning item), or today (evening item). Three of the morning items were categorized accordingly. Two of the morning items and four of the evening items were measured on a 7-point Likert scale, ranging from 1 (not) to 7 (very). The medication items together with one evening item was measured dichotomously (yes/no).

Weekly

Once a week the participant completed 13 items of the depression subscale of the Symptom Checklist Revised (item labels start with SCL-90-R; [4]). Each item is scored on a 5-point Likert scale, with 0 meaning that the participant wasn't bothered by that specific thought or feeling at all, and 4 meaning that he was extremely bothered by it.

Missing Data

Missing data for momentary items

Each day, 43.4 items were filled out on average (SD = 1.3) per day at each assessment. In total, out of 1478 assessments, only five were aborted before completion. At 1478 assessments, items were completed on average 1280.4 times (SD = 378). Supplement "MissingnessMomentaryItems.pdf" gives a more detailed description of the missingness per assessment, day and item.

Missing data for daily items

During the entire study, 59.7% of the set of morning items and 81.5% of the set of evening items were completed. Each day, either the entire set of morning/evening items was answered, or none. On average, 3.6 (SD = 2.9) of the morning items and 4.9 (SD = 2.3) of the evening items were completed.

Missing data for weekly items

The study lasted for 34 weeks. During this period, depressive symptoms were measured on a weekly basis. This weekly questionnaire was completed 28 times (= 82.4%). On each of these occasions, all items were answered.

Procedures

The entire study comprised 5 phases: (1) a baseline measurement period that lasted four weeks, (2), a double-blind period in which the anti-depressant dosage was not yet reduced, which lasted between zero and six weeks, (3) a double-blind period in which the anti-depressant dosage was gradually reduced from 150 mg (venlafaxine) to 0 mg, which lasted eight weeks, (4), a post-assessment period in which the anti-depressant dosage was not changed, which lasted again eight weeks, and (5), a follow-up period that lasted twelve weeks.

The dose-reduction scheme issued in phase 3 was set up by the pharmacist who provided the anti-depressants during the study. Several reduction schemes were developed, which varied with respect to the length in weeks before the dose reduction started (phase 2). During the experiment, the participant and the researchers involved were unaware of the dose-reduction scheme, although they did know that the anti-depressant dosage was going to be reduced. The participant reported after the experiment that he had not been able to figure out which eventual dose-reduction scheme had been used.

At the start of the experiment, the participant received a PsyMate (a digital device with touch screen, [5]), which was set up to send out a beep-signal at random moments within each of ten 90-minute intervals between 07.30 AM and 10.30 PM every day. At each beep-signal, the participant completed a 50-item questionnaire. Each beep-signal was accompanied by a ten-minute window in which the questionnaire was available to the participant. Assessments were started on average within 2.16 minutes (SD = 21 seconds). At the beginning and ending of each day, the participant was asked to complete an extra set of six items. On Mondays, the participant's depressive symptoms were measured using the depression subscale of the SCL-90-R [4].

Quality Control

All questionnaires were administered by means of a digital device (PsyMate). In a few cases, the SCL-90-R was completed on paper and e-mailed to the researchers, who added the scores to the dataset.

Ethical issues

The participant (the 2nd author of this paper) initiated the study and expressed that he wanted the data to be published. Approval from the Maastricht University ethical committee was therefore unnecessary and not obtained. The participant gave his consent for collecting and (re)using the data.

(3) Dataset description

Object name

The datafile is named "ESMdata.zip". This zip file contains the data "ESMdata.xls", "ESMdata.csv", "ESMdata.txt", a codebook "Codebook.pdf" and a supplement "MissingnessMomentaryItems.pdf".

Data type

All data files are primary data, with the exception of one variable called "dep". This is a mean score of the SCL-90-R items as is mentioned as such in the codebook.

Format names and versions

The data are provided in three different formats: .xls, .csv and .txt format. The accompanying codebook and the supplement are in .pdf format.

Data Collectors

Peter Groot and Marieke Wichers designed the entire study and the experiment. Frenk Peeters was involved as a psychiatrist in the design phase of the experiment, Claudia Simons was responsible for the ESM briefing and technical assistance regarding the use of the PsyMate to collect the data.

Language

English.

License

The data have been deposited under a CC-BY Attribution 4.0 International (CC-BY) License.

Embargo

Not applicable.

Repository location

<http://osf.io/j4fg8>.

Publication date

The data have been published online since November 30, 2016.

(4) Reuse potential

The dataset contains around 1500 measurements and almost 50 items. Furthermore, items have been completed

at different time scales: momentary, daily and weekly. It is a very extensive time-series dataset that can be used for several purposes. First, Wichers et al. [1] showed that the participant experienced a critical transition and that symptoms behaved conform principles of complex dynamical systems. Therefore, these data are extremely suitable for researchers to validate new methods for predicting the onset of a critical transition. Second, there have been recent developments into estimating time-varying networks. This data can be used as an empirical example to show how time-varying networks can be estimated and how the network develops over time. Lastly, since items were measured at different time scales, this dataset can aid research that aims to combine (time-series) data from different time scales.

Competing Interests

The authors have no competing interests to declare.

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