





aXbo research 3.Xthe little sleep laboratory

-  With aXbo research you can evaluate the movement data which is saved in your aXbo and view it graphically to become better acquainted with your own sleeping pattern.
-  Furthermore aXbo research also enables you to upload new sound packages.

Technical improvements

- aXbo research 3.X is now running in a 64- as well as in a 32-bit version.
- aXbo research 3.X has been completely reprogrammed, however most of the control elements of the previous version were retained.
- The optical characteristics have been completely reworked and now appear in a new, modern outfit.



The newest version of the software aXbo up2date is required in order to be able to take full advantage of the aXbo research 3.X. You will find further information about the driver in the [aXbo Software-Center](#).

Main features

- Import & analyze movement-/sleep data
- Upload sound packages
- Delete movement data on aXbo
- Refresh date & time
- Show serial number / hardware version / firmware / RTC (calibrating value)
- Execute a "Reset"

Before importing your sleep data for the first time, we recommend deleting all previous records. Otherwise it is possible that data information from before the first date setting will be evaluated and therefore lead to unclear results.

Importing & analyze movement-/sleep data

In advance – personalize your sleep data

Personalize your sleep data by giving both sensors a name.

Click on *File/Preferences*, enter your name(s) and click the save button.

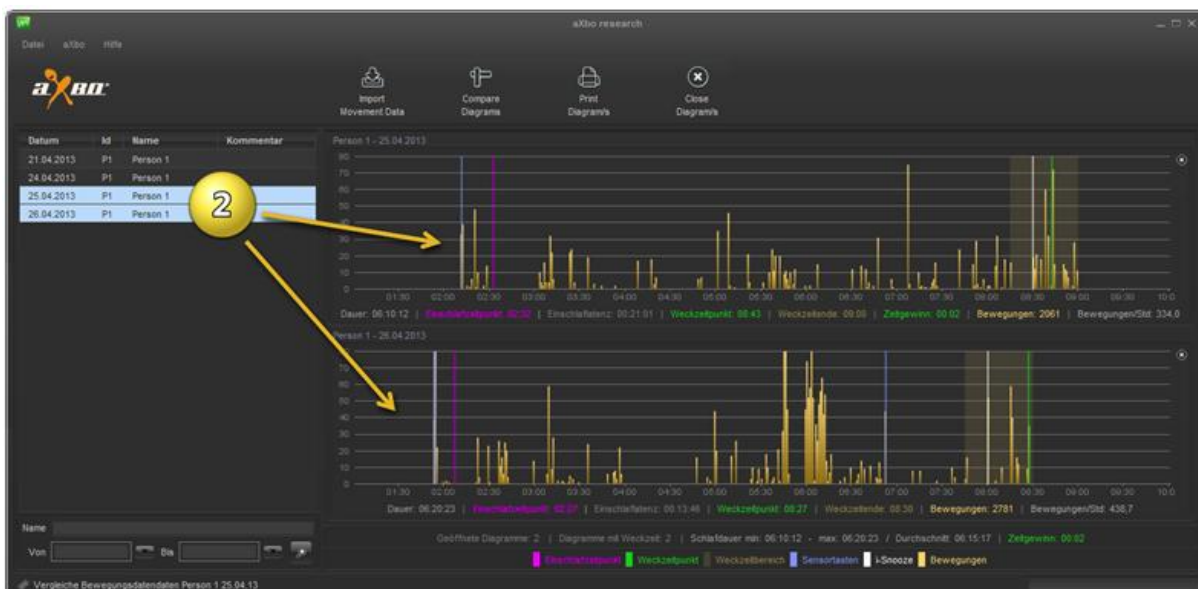
1. Transfer movement-/sleep data from your aXbo to your computer

- Connect your aXbo to your computer with the USB cable supplied.
- Click on *“Import Movement Data”* and wait briefly until aXbo research has loaded your data from your aXbo.



2. Show sleep-/movement data

To display your sleep data graphically, select the desired files.



You also can compare several graphs – in this case both the time axis and the motion frequency will be coordinated.

Note

With the help of the control or shift button, you can select several files at once and via *File*, or respectively the right mouse-button / *View Diagram/s* you can show only this/these graphs.

Analysis features – graphical illustration of the sleep data

Brief explanation of sleep

- Everyone goes through several sleep cycles in a night.
- Each cycle, which lasts approximately 90 to 110 minutes, consists of alternating deep, light, REM sleep phases and almost-awake moments.
- Both deep sleep phases and REM phases are marked by an increasing lack of movement.
- When movement increases, it is typically a sign that you are entering or leaving a REM sleep phase.

The reality, however, shows that the “Standard Sleep” as explained above is rather an exception.

- For some people the “brain switch” that is responsible for immobility in certain states of sleep does not always function correctly or at least not 100% . In this case movements can be detected over a longer period during sleep, even if they are only slight.

The evaluated aXbo movement data will in any case help you to better understand your sleep behavior.

With the help of aXbo research you can view the following data:

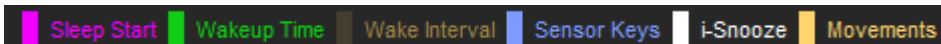
- when you fell asleep (*sleep start*)
- how long it took until you fell asleep (*sleep latency*)
- the “latest possible” waking time which was set (*latest wake-up*)
- when you woke up (*wake-up time*)
- how long you slept (*duration*)
- the time saved by being woken up at the right time (*time-saving*)
- how often you moved during your sleep (*movements*) [*shown: movements/min.*]
- how often you moved per hour (*movements/h*)

Duration: 06:54:35 | Sleep Start: 01:53 | Sleep latency: 00:08:27 | Wakeup Time: 08:48

Latest Wakeup: 09:15 | Time Saving: 00:26 | Movements: 2031 | Movements/h: 293.9

In keeping with the legend, you can read the following data:

- when you fell asleep – Sleep Start (*pink line*)
- when you woke up – Wake-up Time (*green line*)
- Wake-up time period (*transparent, orange area*)
- when you switched the light on in the night, possibly by touching the sensor keys (*blue line*)
- when and if you “i-Snoozed” (*white line*)
- Movements (*orange bar*)

 Sleep Start | Wakeup Time | Wake Interval | Sensor Keys | i-Snooze | Movements

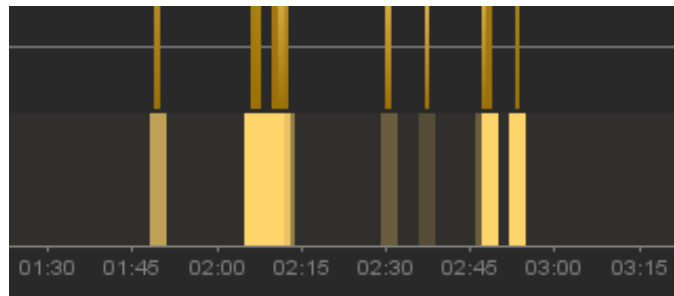
If you have opened multiple sleep data, you can read the following additional data:

- Number of *open diagrams*
- Number of diagrams with *wake-up time*
- Minimum sleep duration (*min*)
- Maximum sleep duration (*max*)
- Average sleep duration (*avg*)
- Total time saving (*Time Saving*)

Open Diagrams: 3 | Diagrams with Wake Time: 3 | Sleep Duration min: 06:54:35 - max: 06:54:35 / avg: 06:54:35 | Time Saving: 01:20

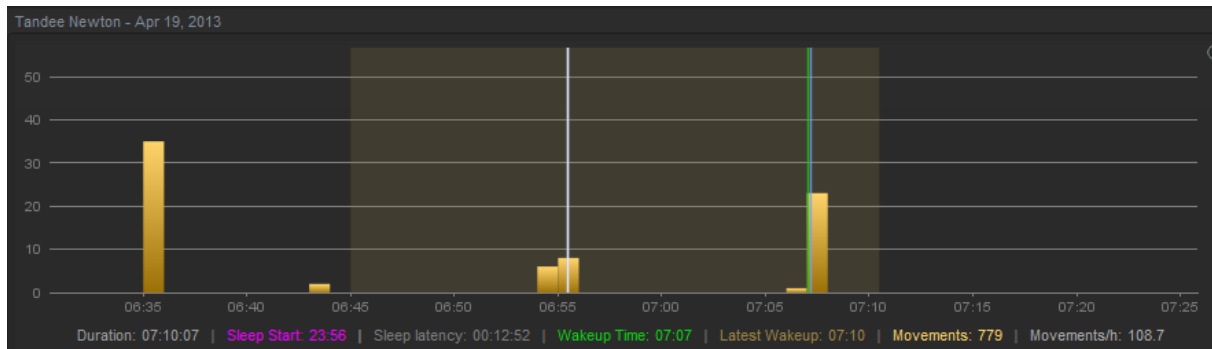
Compressed movements

From version 3.0.13 there is a "compressed form" of the movements below each graphic. This is only a visual help to make it easier to see an accumulation of movements.



Detailed graph

You can zoom in on the graph by grabbing the selected area from the left to the right.



You can zoom out to the original size by grabbing from right to left.

Innovations compared with the former aXbo research version (V2):

General improvements

- Separate activities within the sleep data are presented more clearly (e.g. sleep start, wake-up time, or sensor buttons)
- The display management, when several graphs are opened at once, has been optimized (e.g. the same color is used for the same data).
- When comparing graphs, the time axis as well as the number of movements are adjusted to match each other (so that it is possible to compare not only the time but also the frequency of the movements).

Presentation of new aXbo-features

- The new "iSnooze" feature (Firmware-version V230 – HW 11⁺, respectively V208 – HW 10) will be displayed (Note: this will extend the respective wake-up time window!).
- The additional "variable wake-up time window" feature of 15 minutes, launched in autumn 2014, is now displayed correctly (Firmware-version V234 – HW 11 or higher).

Convenient usability

- The control elements have been "cleaned up".
- aXbo will be recognized more easily by the software system.
- aXbo is recognized automatically when the "import movement data" button is pushed.

Improved sleep-/movement data management

- The automatic cutting out of any irrelevant movement data has been improved (this refers above all to movements which have been accidentally recorded during daytime).
- The names of people or respectively the sensor/s can now also be changed retrospectively.

Sound packages part of aXbo research 3.X

- The sound packages "Original" and "Feeling" are already supplied with aXbo research 3.X
- The respective sound packages can easily be uploaded via "File/Upload Sound Package"*.

- Uploading the sound package is now considerably faster.

*... for some aXbo-models the feature "Upload Sound Package" will not be available before the end of August.

2 more languages

- o **French (new)**
- o **Russian (neu)**
- o Japanese (since version 2.0)
- o English (Standard)
- o German (Standard)

Tip

- Depending on the size of the screen, the movement data from about 4 days will be visible on the main screen (8 days on a raised monitor; 1920 px). All further graphs are "docked" at the bottom, and the previously opened diagrams are shifted upwards, but can of course be scrolled.
- If you mark several days/nights, you can open all these diagrams with a right mouse click and "View Diagram/s". (If this or that diagram is no longer required, you can use the right mouse button and select "Delete Files"...directly from the hard drive.)

The individual files are stored in the following folder:

PC: (C:) User/Name/aXbo/projects

MAC: \$home/aXbo

Note

- It is only possible to compare sleep data when there is also a wake-up time. For example, if you should wake up before the wake-up time or period and the alarm is turned off, then no wake-up time will be recorded for this day/morning in aXbo research.
- The times of opened diagrams will be aligned with each other via "compare diagrams". Each newly opened diagram will not be synchronized with the other diagrams until you again click on "Compare Diagrams".
- If a diagram does not state any "Time Saving", it can be assumed that – due to the use of iSnooze – the last "wake-up time" was after the original "latest possible alarm time" which was set.

"We hope you enjoy using the software version!"

aXbo R&D Team, Vienna/Brighton 2014