

# **How to use FLUX with** **movisensXS**

## **User Guide**

## Preparing an Android Smartphone:

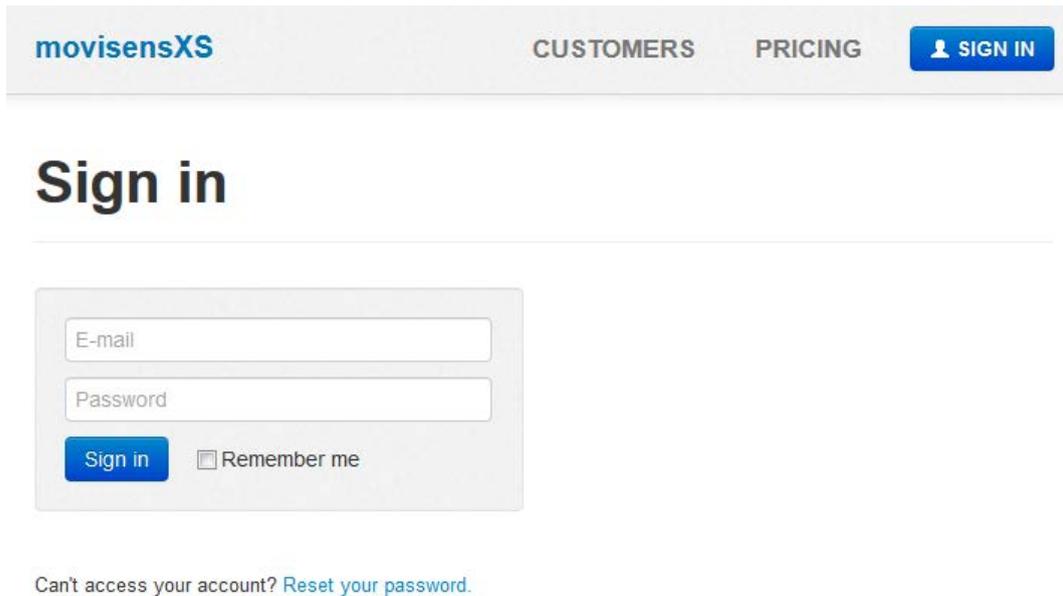
- 1) An Android Smartphone with camera and internet connection is required.
- 2) Register yourself with movisens and create a free account in order to use FLUX with the movisensXS App (<https://xs.movisens.com/register>).
- 3) Please also send an e-mail to [xs@movisens.com](mailto:xs@movisens.com) saying that you want to use the FLUX application with movisensXS. This is necessary in order to get a special account where you can configure the FLUX cognitive tasks with movisensXS. In your e-mail request, please provide the following information:
  - Host institution / organisation
  - Name
  - Address
  - e-mail you used to create your movisens account
- 4) Install the movisensXS App (available free of cost) from Google Play Store.
- 5) Register yourself with us (<https://flux.tba-hosting.de/registration>) in order to download the FLUX application from our website. Upon registration, you will receive a confirmation e-mail on your provided e-mail ID. If you do not find any e-mail from the FLUX team in your INBOX then please check the SPAM folder in your e-mail.
- 6) Once you have registered, download the FLUX application directly on the smartphone from our website (<http://flux.tba-hosting.de/download>) or if you have downloaded the FLUX application on the computer than attach your smartphone to your computer and copy the .apk file of the FLUX application to the internal or external storage of the smartphone. If you have downloaded the FLUX application directly on the smartphone you can ignore step 7.
- 7) Unplug the smartphone from the PC and find the copied .apk file with the help of the **"File Explorer"** or **"My Files"** App on your smartphone. If you don't have any "File Explorer" App installed on your smartphone, you can find and install a file explorer from Google Play Store (e.g., OI File Manager).
- 8) Next install the FLUX application. Before installation of the FLUX application make sure that you have allowed the installation from "Unknown sources" in the smartphone settings. Depending on your Android version and smartphone manufacturer, this option is accessible in different submenus, e.g.:
  - Settings → More → Security
  - Settings → Application
  - Settings → Personal → Security
  - Settings → Lock screen and security

When in doubt, use the search function in the Settings menu.

- 9) Open the .apk file of the FLUX application and install it on your smartphone.

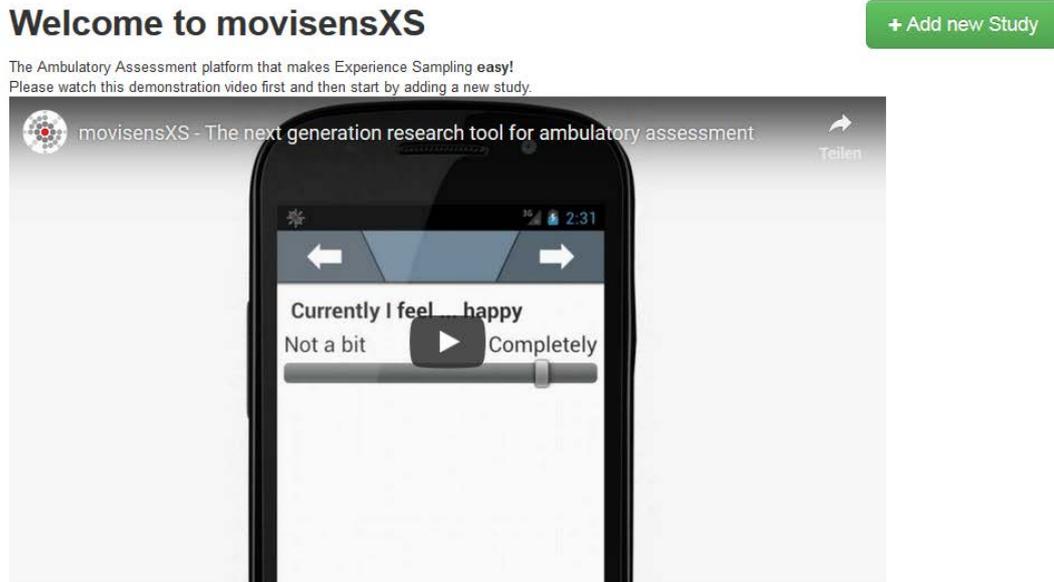
## Designing a study with movisensXS:

- 1) This and the following steps should be performed on a computer, not on the smartphone. Once you have registered with movisens, sign in with your e-mail and password on the movisensXS website (<https://xs.movisens.com/login>).



The screenshot shows the top navigation bar of the movisensXS website. It includes the logo 'movisensXS' on the left, and links for 'CUSTOMERS' and 'PRICING' in the center. On the right, there is a blue button with a user icon and the text 'SIGN IN'. Below the navigation bar, the heading 'Sign in' is displayed in a large, bold font. Underneath the heading is a light gray box containing a login form. The form has two input fields: 'E-mail' and 'Password'. Below these fields is a blue 'Sign in' button and a checkbox labeled 'Remember me'. At the bottom of the form box, there is a link: 'Can't access your account? [Reset your password.](#)'

- 2) After signing in we strongly recommend watching the short introductory video about how to design your own study.



In case you do not see this introductory video link (usually once you have already signed in or created a study with movisensXS before) please go to the "**Help**" tab (on the upper right corner of the same page). There you can watch this video any time under the "**Get Started**" tab (<https://docs.movisens.com/movisensXS/>). Before designing your own study you can also go through the "**Forms**" (How to design a Form) and the "**Sampling**" (How to design your Sampling) under the Help tab to have a more detailed look of both issues.

- 3) Once you have watched the video click on the "**Add new Study**" button to add a new study.

- 4) Select the “Start with an **empty** study” option under the main menu point “**Studies**” and click Next

## Create a study

How do you want to start?

- Start with an **example**
- Start with an **empty** study

Next »

- 5) Give the desired name to the study and click Next

## Create a study

Please name your study.

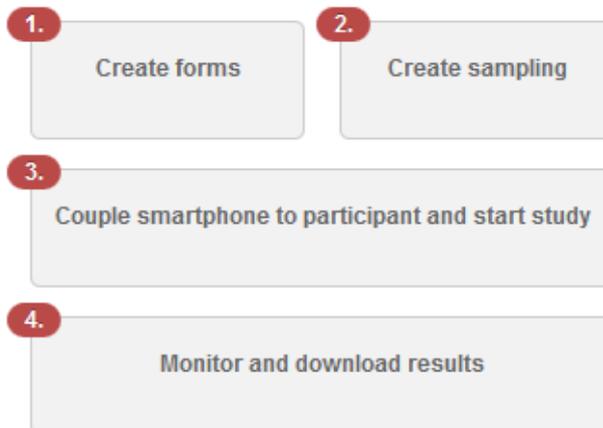
Study name:

Next »

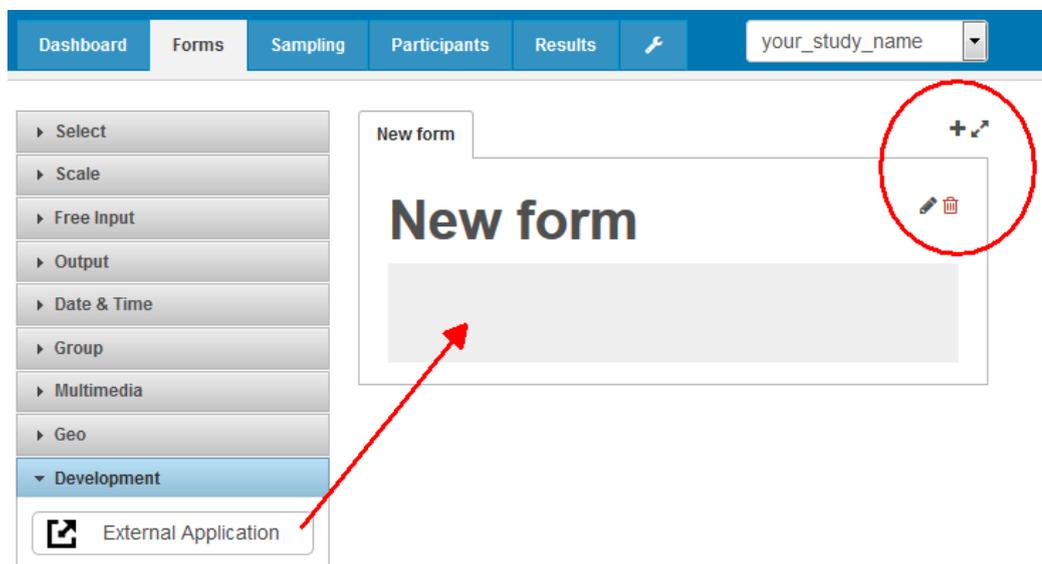
- 6) Now you see a screen with five tabs (Dashboard, Forms, Sampling, Participants and Results). The Dashboard tab highlights all four steps which you need to follow in order to design and perform a study successfully. Click on the “**Forms**” tab or the “**Create Forms**” button.



## your\_study\_name



- 7) A number of options are available on the left side under the Forms tab to create and configure forms (e.g., Likert Scales, Reaction Time Tasks etc.). New forms can be added (+/- signs), edited (pencil) and deleted (trash box) with the help of small buttons available on the right side. As FLUX is an external application which runs under movisensXS, click on the **“Development”** tab from the left side, where the **“External Application”** option can be found. Drag and drop this option to the right side under **“New Form”** in order to configure the FLUX cognitive tests. Please note: If the **“Development”** option is not available in your menu, your movisensXS account has not yet been configured to support the FLUX application. Please wait for confirmation from the movisensXS support.



- 8) As an example, here we have added two forms (first\_form and second\_form) and want to configure one cognitive test for each form. Depending upon your requirements, you can add and configure more tests under your created forms. In order to do so, simply drag and drop the “**External Application**” tab under the form. Configure each test by double clicking on it.

The screenshot displays a software interface with a top navigation bar containing tabs for Dashboard, Forms, Sampling, Participants, Results, and a search field with the text 'your\_study\_name'. Below the navigation bar, there is a sidebar on the left with a list of categories: Select, Scale, Free Input, Output, Date & Time, Group, Multimedia, Geo, and Development. The 'Development' category is expanded, showing an 'External Application' item. The main workspace shows two tabs: 'first\_form' and 'second\_form'. The 'first\_form' tab is active, displaying the form's content area. The content area has a title 'first\_form' and a sub-section titled 'External Application'. Inside this sub-section, there is a question item labeled 'Question text...?' (item\_96), which is circled in red. The interface also includes icons for saving, editing, and deleting the item.

- 9) Upon double clicking on the form, you will see the following screen with few editable fields. Edit these default values as described below.

## Edit External Application



This item starts an external application (Android activity) and stores the results.

Question	<input type="text" value="Question text...?"/>
Label	<input type="text" value="item_96"/>
	<input checked="" type="checkbox"/> Required
Activity Intent	<input type="text" value="com.yourApp.TEST"/>
Intent Extra	<input type="text"/>

(Test with Default Values)

### 10) Edit External Application Fields:

**Question:** Can be any particular cognitive task heading

**Label:** Can be left as it is (default value), it should always be unique for each test

**Activity Intent:** The constant "**Activity Intent**" value for any type of FLUX related cognitive test will be (de.dipf.tba.flux.PORTABLE). Thus, always make sure that this field contains the string "de.dipf.tba.flux.PORTABLE" (without quotation marks).

### Intent Extra:

The entry must be in the following form: {"session": "session\_name.xml"}

The key and the corresponding value need to be configured in curly braces. The key will always be "session" while the value is the name of the xml file of any particular session of a task which you want to include in this test. You can choose this value (name of the xml file) from the separate excel file which contains all the possible number and sequence (Load2 and Load3) session names that you can use in your study (see **Read Me** and **Dirk & Schmiedek (2016)** for detailed information on the cognitive tasks → <https://flux.tba-hosting.de>). In order to avoid typos always copy this value from the excel file instead of manually writing it into "Intent Extra". Do not forget to put the key (i.e., session) and the corresponding value (e.g., session\_001\_load2\_number.xml) into quotation marks. The excel file with session names can be downloaded from <https://flux.tba-hosting.de/download>.

- Click the green check mark in the upper right corner and **press the blue save button** to save the changes made.
- Repeat the same steps to configure each test under all Forms.
- After finishing with Forms, click on the "**Sampling**" Tab.

## Edit External Application



This item starts an external application (Android activity) and stores the results.

Question	<input type="text" value="number task with load 2"/>
Label	<input type="text" value="item_96"/>
	<input checked="" type="checkbox"/> Required
Activity Intent	<input type="text" value="de.dipf.tba.flux.PORTABLE"/>
Intent Extra	<input \"session_001_load2_number.xml\"}"="" session\":="" type="text" value="{\"/>

(Configured Test)

- ▶ Select
- ▶ Scale
- ▶ Free Input
- ▶ Output
- ▶ Date & Time
- ▶ Group
- ▶ Multimedia
- ▶ Geo
- ▼ Development
  - External Application

first\_form second\_form + ↗

# first\_form

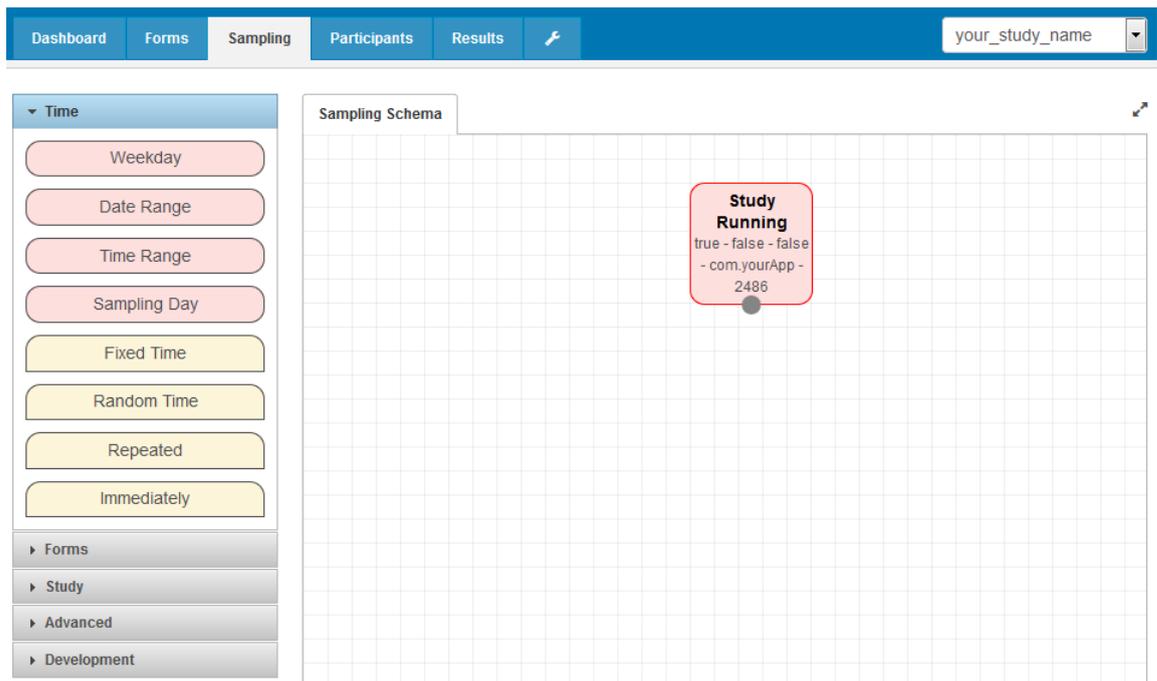
External Application

 **number task with load 2** (item\_96)



11) Under “**Sampling**” you can define when which test applies or should be executed. Below you see the default screen of the sampling. A number of options are available on the left side for sampling your tests. For demonstration purposes we will take one example here.

We will schedule our two tests (which we have configured under the Forms tab) in a way that both tests are executed on defined (i.e., fixed) days of a week at a specific time with an Alarm Alert.



(Default sampling screen)

12) Drag and drop the required nodes from the left side to the sheet on the right side and link them together as per requirement.

**Example:**

The “**Study Running**” node is there by default while you start to work with sampling. The PIN code value can be configured by double clicking on “Study Running” node. The PIN code value is used to unlock the study later (See the movisensXS Help for further detail).

Drag and drop the following nodes for this specific example:

- 1 x Weekday node from Time (to define the target days of the week)
- 2 x Fixed Time nodes from Time (to define the specific time for each day to execute the tasks)
- 2 x Alarm nodes from Forms (to alert, one for each form)
- 2 x Form nodes from Forms (to define forms, i.e., which cognitive test should be executed)
- 1 x Upload Results node from Forms (to upload results at the end)

Connect the nodes by clicking and dragging the gray juncture point of one node to the juncture point of another node. You can delete edges by clicking on them.

All nodes are configurable by double clicking on them.

▼ Time

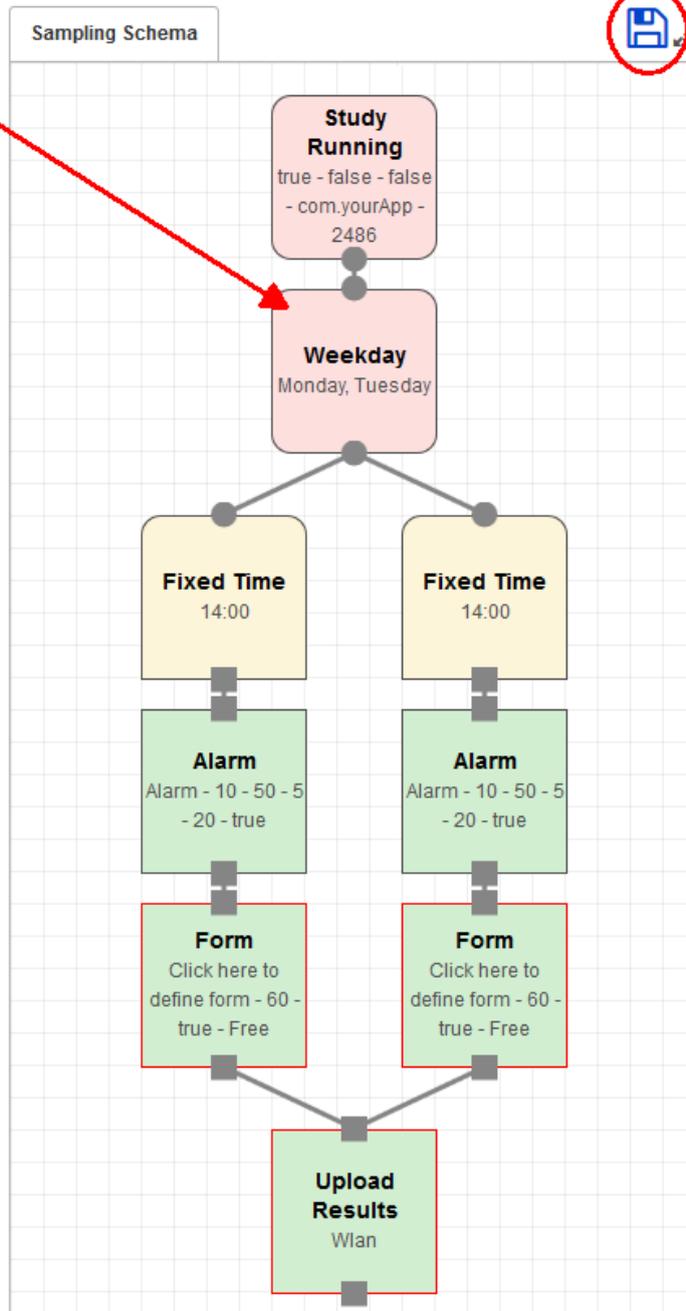
- Weekday
- Date Range
- Time Range
- Sampling Day
- Fixed Time
- Random Time
- Repeated
- Immediately

► Forms

► Study

► Advanced

► Development



13) While editing the "Form" node

- a. Select the target "Form ID" from the drop down menu
- b. The configurable value of the "Timeout Interval" should be high (e.g. 999999) in order to avoid the collision of two test executions.
- c. The "Screen orientation" should be set to "Landscape"

Do not forget to save the changes made to the sampling at the end. In case you get an error message "validation error" please check your sampling. All nodes need to be properly linked with each other. Nodes which are not yet correctly configured or connected are marked with a red frame.

## Edit node "Form"



This action runs the specified form. Place an alarm before to notify the participant about the form!

Form ID	<input type="text" value="first_form"/>
Timeout Interval	<input type="text" value="999999"/>
	<input checked="" type="checkbox"/> Display back button
Screen orientation	<input type="text" value="Landscape"/>

14) By clicking on the **“Participants”** tab, the following screen can be seen. The 1<sup>st</sup> participant is added by default. To add more participants click on the **“Add Participant”** button.

ID	Start Date	End Date	Version	Couple Date	Participant Code	Completed Forms	Missed Alarms	Download Results	Delete
1	Instantly	No end							

## How to couple the Smartphone to the movisens Participant

### Start App and Scan Code:

Start the movisensXS App on the prepared Smartphone, press **“Scan code to participate in a study”** and scan the participant code that appears when clicking on the QR code icon in the image above on your computer screen.

## Coupling



To participate in a study you need to scan the QR code provided from the study supervisor. If you want to create a study yourself, please register at <https://xs.movisens.com> and design your own study in minutes. The QR code should look like the following:



Scan code to participate in a study

Scan code to prepare this smartphone

Try the app with a demo study

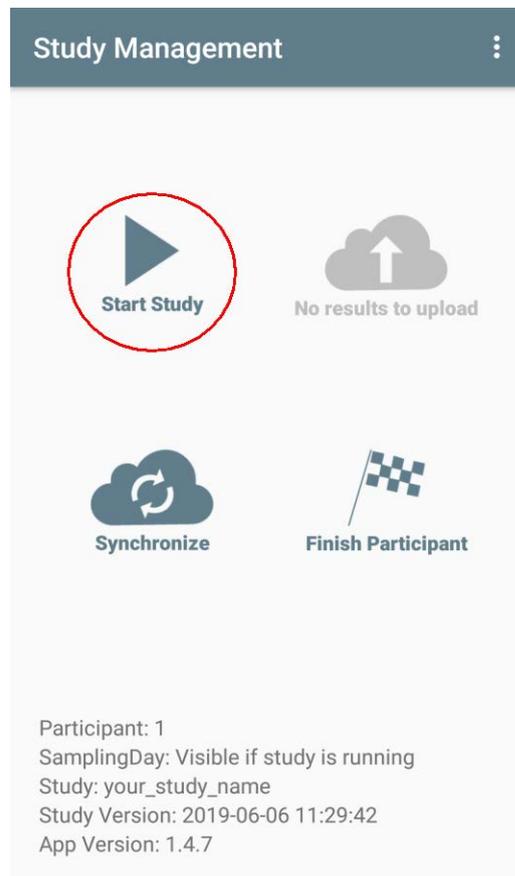
To be able to scan the QR code, the movisensXS App needs to access the camera of the smartphone. Alternatively, you can couple the smartphone via https-link.



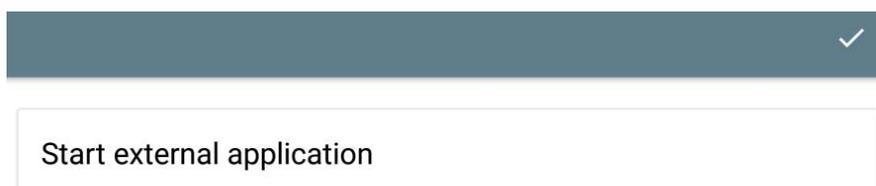
After the coupling was successful, a screen with your participant number should appear on the smartphone.

### Start the Study:

Press the button **“Start Study”** in the movisensXS App on your smartphone to begin the experience sampling. You need to consent to the conditions on data collection and storing, optionally send anonymous crash reports, and confirm the movisensXS App permissions (e.g., preventing the phone from sleeping).

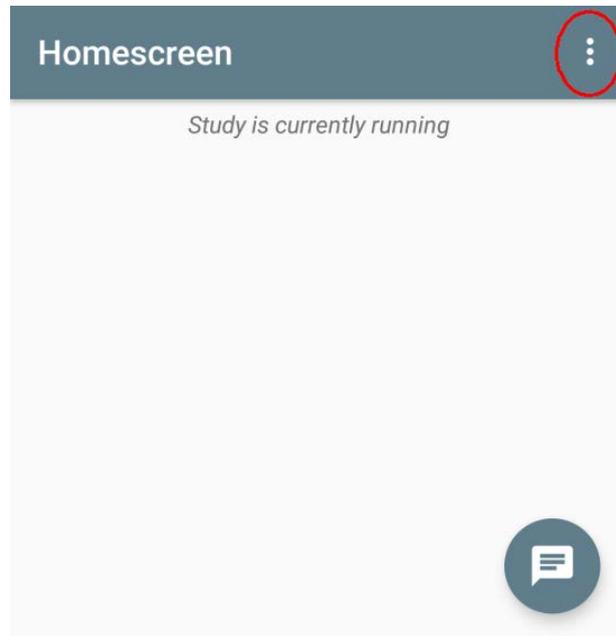


Then hand over the smartphone to the corresponding participant. The smartphone will ring or vibrate at the time of the first scheduled alarm and the scheduled tests and questions will be executed. Please note that after answering the alarm, the participant needs to click on the **“Start external application”** button as shown below.

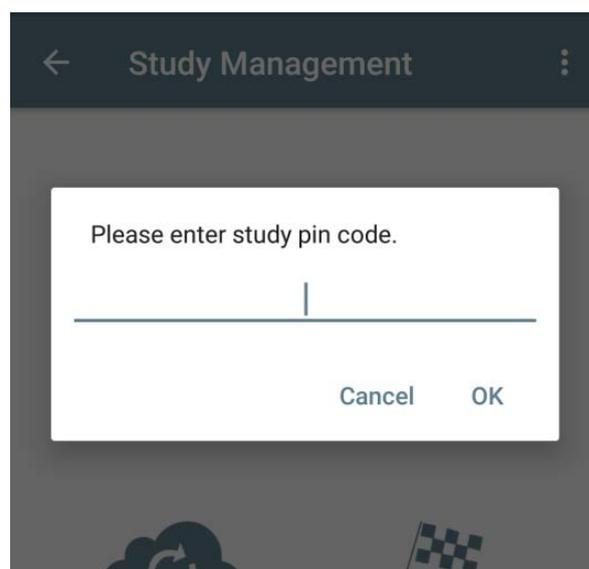


15) Results can be downloaded under the **"Results"** Tab on the movisens website on your computer.

When the participant completed the study press the **"vertical three dots button"** (Toolbox) which you can find in the movisensXS window in the upper right corner on your smartphone.

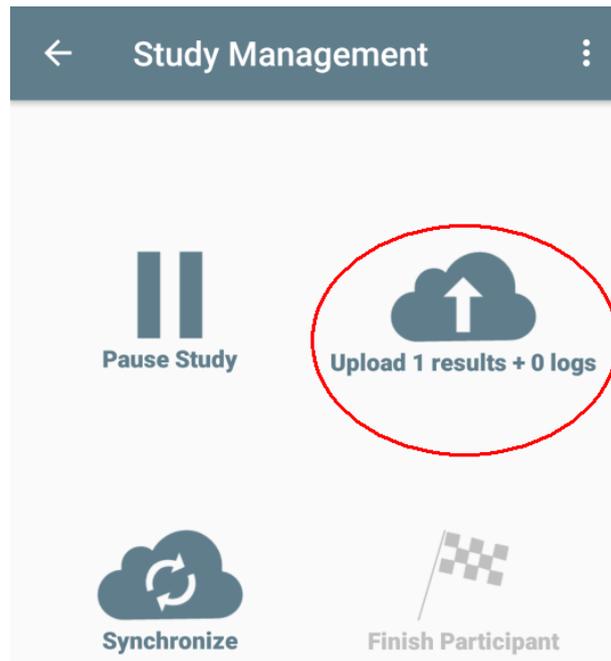


Select the **"Study Management"** option and enter the PIN code defined in the first block of the sampling (default "2486") to enter the control screen.



If the device is connected to the internet at any point while your study is running, the session results will be uploaded automatically. If all results are already uploaded, the Upload button will be grayed out.

If the results are not yet uploaded, click the **"Pause Study"** button (only necessary if the study is still running). Connect your device to the internet and select the **"Upload Results"** option. After uploading the results you can resume your study by clicking **"Start Study"** or finish with this particular participant by selecting the **"Finish Participant"** option.



When your results are uploaded successfully, login at the movisensXS website on your computer. There you can find and download the individual results for each participant under the **"Participants"** tab and the results for all the participants in one file under the **"Results"** tab.

## Last but not least:

- 1) If you receive an error message (**Sorry, ... form(s) failed to send! Error: instance XML file does not exist!**) at the time of uploading the results to movisensXS at the end, then go to your smartphone settings → Apps (depends upon your Smartphone) and click the movisensXS App icon. Select **“Storage”** and press the button **“Clear Data”** to leave the movisensXS App successfully. For further assistance you can also contact movisensXS directly.
- 2) You don't need to have an internet connection all the time during the study. You need to have this only at the time of coupling the device with the study and at the time of uploading your results to movisensXS.
- 3) Avoid using the **“Home Button”** of your smartphone during executions of the FLUX cognitive tasks. By pressing this button the current running task is canceled on smartphones with new versions of Android. If you pressed the home button during task execution you will be unable to find any result for the previously performed tasks in the result file.