**A person sitting on a chair with a device attached to his knee

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This protocol is a study of the correlation between depression, anxiety, and stress, and mechanism-based outcomes from pain profiling with cuff pressure algometry. It is written to demonstrate the capabilities of LabBench to automate experimental protocols, providing guidance to operators and subjects, and for automatic processing and export of experimental data.

Introduction to LabBench

**Kristian Hennings**

Logo

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# Introduction

# Experimental Setup

# Protocol

# Using the protocol

The protocol can be installed from the (labbench.io) repository, which is available by default when LabBench is installed.

## Required devices

Before the protocol can be installed a LabBench I/O device must first be added to the LabBench installation (see Figure X). First start the LabBench Designer, to check that a LabBench I/O device is present or to add such a device if it is not, and then: 1) Select the Protocols Page, 2) Select the LabBench I/O device, 3) check that a LabBench I/O device is installed and available.

If a LabBench I/O device is not installed, then install one by first ensuring that the device is connected to the computer and then clicking on the (+) add device button.

A screenshot of a computer

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Figure 4: Illustration of how to check if a LabBench I/O has been added to the LabBench system.

## Installing the protocol

To install the protocol; 1) Select the Protocols page, 2) Select the labbench.io repository, 3) Select the Alloknesis protocol, and 4) click the (+) add protocol button.

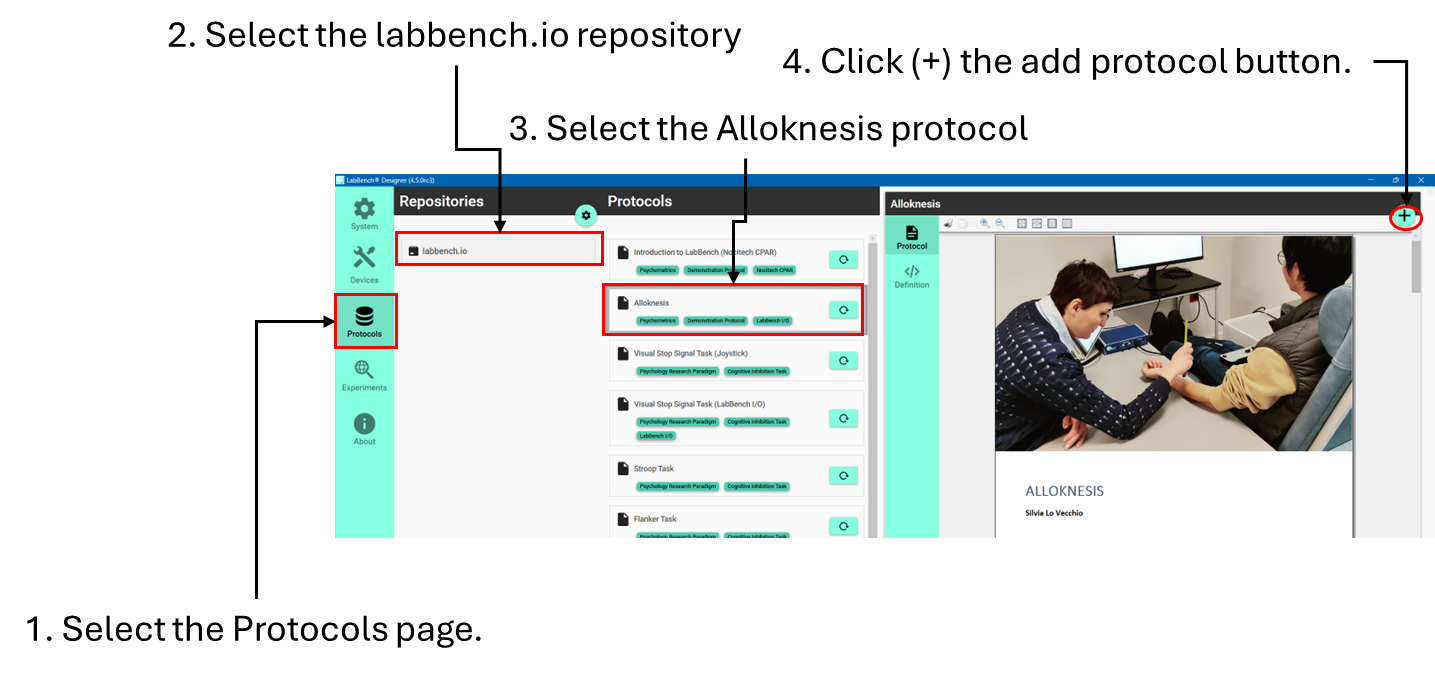


Figure 5: Procedure for how to install the protocol.

# Results

Data is saved automatically by LabBench during the experiment as three NRS values between 0 (no itch) and 10 (maximal itch) or three VAS values between 0cm and 10cm; one for each measurement that is performed in the experimental procedure.

# Discussion

Measurement of itch intensity is essential to evaluate the severity of a pruritic disease, or to assess the efficacy of a treatment 15. Different types of scale are available to measure pruritus intensity, and the most used are mono-dimensional scales such as the visual analog scale (VAS) and the numerical rating scale (NRS) 16,17.

The VAS consists of a 10 cm horizontal line with one endpoint on either side corresponding to 0=no itch, and 10=worst imaginable itch. The subjects are asked to mark on the line, the point in between these endpoints or on them that corresponds to their feeling 15–17.

The NRS are essentially VAS, but with tick marks every centimetre that create an 11-point scale ranging from 0 to 10. Subjects can rate the itch severity by assigning it a number between 0 and 10 15–17. Recently, a score cutoff for the two scale has been proposed so that the scoring can be translated as showed in figure 6 15,18–20.



Figure 6: Proposed score cutoff for VAS and NRS scales. Between 0 and 3=mild itch, between 3 and 7= moderate itch, between 7 and 9 =severe itch, and above 9=very severe itch.

Although, these two scales have been initially developed for assessing pain intensity, they are also widely used to assess itch severity, even though their validation for pruritus assessment have only been explored recently, proving both scales valid and reliable for itch assessment and correlated with each other (correlation coefficient above 0.85) 15,16,18,21,22. However, even if the two scales present many similarities, NRS showed lower missing values compared with the VAS in the validation study, so it is recommended to have the participant familiarize with the VAS scale before starting the study, to decrease the number of missing data 16,17,21 . Moreover, NRS is associate with slightly but significant higher score values than VAS, so it is recommended that the two scale are not used interchangeably when assessing itch intensity 15. Lastly, it is important to underline that VAS are ratio scales, while NRS are ordinal scales, so parametric statistics are more appropriate for the VAS outcomes because they have ratio scale (and therefore interval scale) properties, while are considered less appropriate for NRS 23.

# License

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A close up of words

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