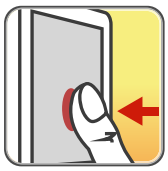
PVT-Touch manual

Psychomotor vigilance task for Android



1. Introduction

PVT-Touch is a touchscreen version of PVT (psychomotor vigilance task) implemented on Android. We have evaluated four different touchscreen input techniques for PVT and found that for smartphone users, the familiar *touch down* technique is comparable to the physical button used in traditional PVT for several measures associated with sleepiness and was preferred by a majority of participants [1]. We have also conducted an initial validation study of PVT-Touch against PVT-192, finding a high correlation in scores (r=0.902) [2].

This package contains the current version of PVT-Touch. This version is configured by default to use the 5 minute version of PVT with the *touch down* input technique as described in [1], but these parameters are configurable as described in the next section.

1. M. Kay, K. Rector, S. Consolvo, B. Greenstein, J. O. Wobbrock, N. F. Watson, & J. A. Kientz (2013). "PVT-Touch: adapting a reaction time test for touchscreen devices", in *Proceedings of PervasiveHealth 2013: The 7th conference on pervasive computing technologies for healthcare*.

2. M. Kay, M. Grandner, J. Bauer, R. Lang, N. F. Watson, & J. A. Kientz (2013). "Initial validation of an Android-based psychomotor vigilance task", in *SLEEP* 36: *Abstract supplement*, A108.

2. Configuration

Several parameters of PVT, including test duration and ISI (interstimulus interval or foreperiod) are configurable on the main screen, in case the version of PVT you need differs from the default configuration. These parameters are:

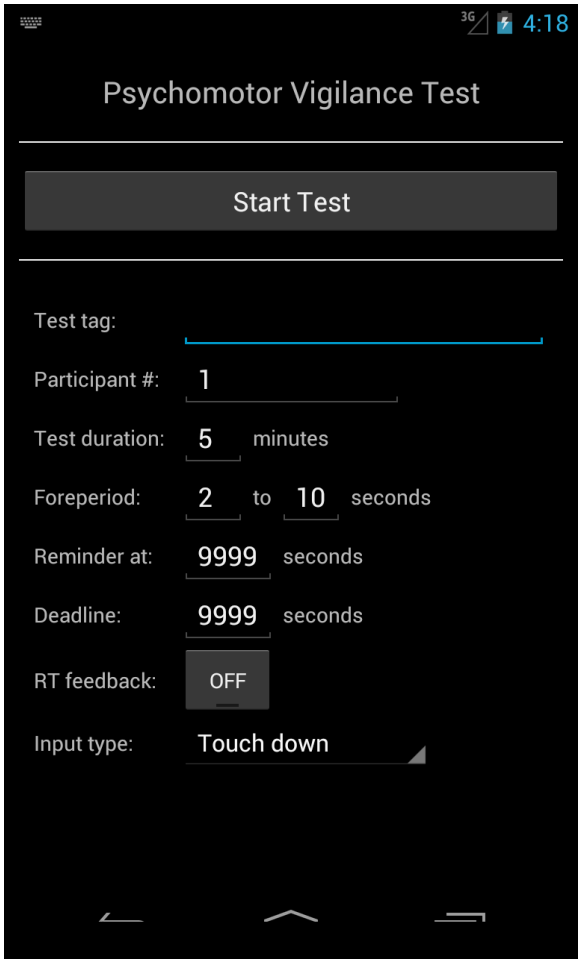
- **Test tag:** A user-input tag that can used to tag tests with arbitrary text.
- **Participant #:** A number that can be used to identify subjects.
- **Test duration:** Duration of a single test, in minutes.
- **Foreperiod:** Also known as interstimulus interval, a range from which the delay until the stimulus is shown will be randomly drawn for each trial.

- **Reminder:** Causes a reminder tone of 1000Hz to played after *n* seconds if the participant hasn't responded. By default this is set to 9999 seconds to disable the tone.

- **Deadline:** Causes trials to timeout after *n* seconds after which a new ISI is set. By default this is set to 9999 seconds to disable the timeout.

- **RT feedback:** If enabled, the participant is shown their response time after each trial. By default this is disabled.

- **Input type:** Allows selection of input type for providing the response to the stimulus. Default is *touch down* (i.e. touching the screen with a finger). This is the technique we have been using in our validation [2].



Main screen showing test configuration. This screen may look slightly different on different versions of Android.

3. Data format

The results of each test are stored as a CSV (comma-separated values) file on the sdcard of the device, in `sdcard/Android/data/com.pvt/files/default_study`. These files can be loaded in Excel and most stats packages.

Each CSV file corresponds to a single PVT test, and is named for the date and time of the test, e.g. `2013-06-03_22.30.54_test26.csv`. Each row in the CSV file corresponds to a single trial, and has several columns. The columns include:

- **subject:** The *Participant #* entered on the setup screen.

- **trial:** Trial number. Within each test (a single CSV file), this is unique.

- **test:** Test number. Within each device, this is unique.

- **actual_foreperiod:** The foreperiod (ISI) for this trial.

- **response_time:** The response time for this trial. This will be negative on a false start (participant responds before stimulus is shown).

- **tag:** The *Test tag* entered on the setup screen. This can be used to tag a test with additional information. For example, if testing airplane pilots, the test tag could be used to record whether the pilot is on their day off, pre-flight, etc.

- **note:** If set, this column indicates some additional information about the trial in question. Note can be:

  = *false_start,* then the participant reacted before the stimulus was shown during this trial. In this case, *response_time* should be negative, indicating how much earlier than the end of the ISI the participant reacted.

  = *anticipate,* then the participant reacted within 100ms of the stimulus, suggesting they anticipated the stimulus rather than reacted to it.

  = *minor_lapse,* then 500ms elapsed before the participant reacted.

  = *reminder,* then the *Reminder* timeout set on the main screen elapsed before the participant reacted, and the reminder tone was played.

  = *deadline,* then the *Deadline* timeout set on the main screen elapsed before the participant reacted, and a new trial was started.

4. Experience sampling and automated data collection

We have also set up PVT for use with some experience sampling systems, such as movisensXS and ohmage, which can automate remote data collection. Contact us for more information if you are interested.

5. Contact information

If you have questions, comments, or issues with PVT-Touch, please contact:

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6. Acknowledgements

PVT-Touch is the result of collaboration between several researchers:

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