## Cognitive Battery - Moving Dot

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# Purpose

This protocol contains procedures for using the Moving Dot task in the Cognitive Battery.

Moving Dot is set up to test time-constrained decision-making models where a subject must select among 2 competing options. It is constructed to access decision-making and perceptual processing speeds, with a particular focus on signal-to-noise dynamics as the subject extracts the dominant signal among distracting information.

On each trial, the subject is presented with a circular field which contains dots moving in many directions. The subject's task is to indicate, quickly and accurately, whether more dots are moving right or left by pressing the interface (keys or touchscreen) in that direction.

Each trial presents a different ratio of dots moving right and left in the horizonal directions (termed "coherence"). This coherence varies from trial to trial from 0 (no dominant direction) to 1 (all horizontally-moving dots are going in the same direction). High-coherence trials are relatively easy, since a clear majority of the dots are moving in one direction. Low-coherence trials may be quite difficult, as they require quickly estimating the populations of many moving stimuli.

Zero-coherence trials are a special case, since neither "left" nor "right" are correct. To keep the response set consistent with the rest of the trials, a direction is arbitrarily chosen to be "correct". In this sense, zero-coherence trials approximate an extremely-low- coherence trial, where there is technically a correct answer, but it is effectively impossible to detect it.

Data saved out from the task includes responses, correct/incorrect info, coherence and dominant direction of the stimuli, and reaction time data.

# Terminology

* The [**Cognitive Battery (or CogBat)**](https://osf.io/8mdfy/wiki/home/) is a set of computerized tasks for the Android operating system, running on the [SMILE experiment-writing library for Python](http://smile-docs.readthedocs.io/en/latest/).
* **The Cognitive Battery Moving Dot task** is a task within the CogBat.
* **Coherence** is the ratio of dots moving in the dominant direction to the dots moving in the secondary direction. A coherence of 1 either means all the horizontal-moving dots are moving left or all the horizontal-moving dots are moving right. A coherence of 0 means there are exactly the same number of horizontal-moving dots going each way.

# Required credentials/training

No special qualifications required.

# Required equipment and supplies

* Android phone or tablet set up with the [Cognitive Battery app](https://osf.io/g7e3x/).

# Methods and procedures

## Setting up the subject.

Open the CogBat and enter the subject ID at the appropriate screen. Select the Moving Dot task from the task-selection menu.

Review the on-screen instructions with the subject and ask if they have any questions.

# Revisions

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| --- | --- | --- |
| **SOP Revision #** | **Date** | **Description of change(s)** |
| 170919 | 09/19/2017 | First version |
| 171003 | 10/03/2017 | Added links to other CogBat protocols |
| 171009 | 10/09/2017 | Updated task rationale |