

Neurograph Project

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From the research papers

present in 25 persons. Furthermore, in two persons (of which one person is familiar with autosomal dominant cerebellar ataxia) drawings were not suited for our post-processing analyses. Therefore, we chose to exclude these results and 1,912 persons were left for further analyses.

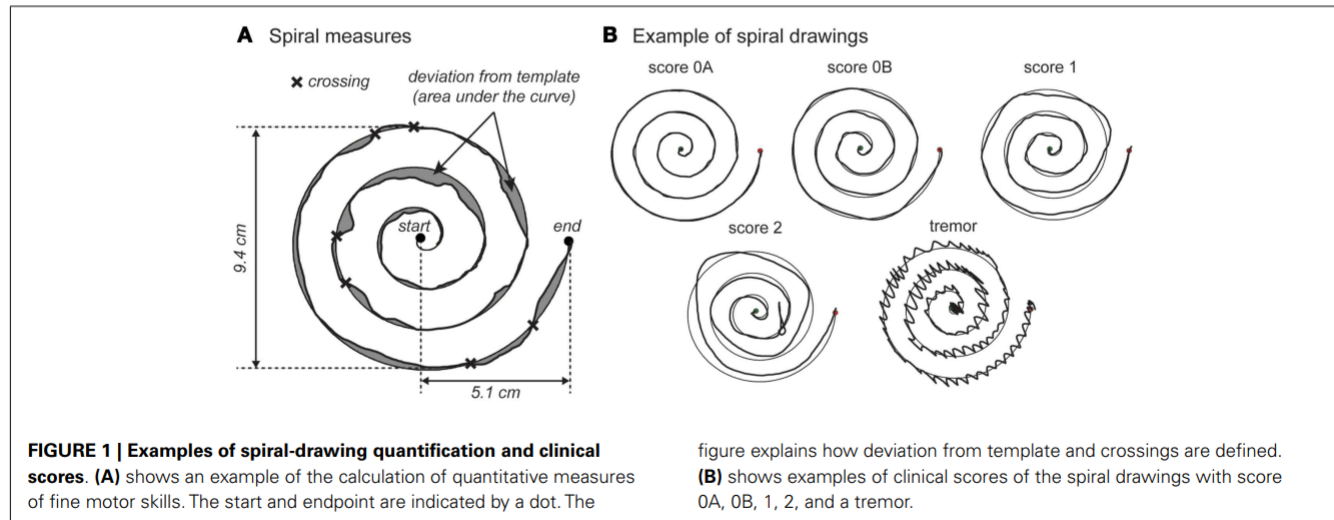
FINE MOTOR SKILL ASSESSMENT

Fine motor skill was assessed by requiring participants to trace a picture of a spiral template that was printed on a piece of paper attached to an electronic drawing board (WACOM Graphire Wireless Pen Tablet, model CTE-630BT). Participants were instructed to place the pen in the middle of the spiral before the tracing started (**Figure 1A**). They were not allowed to lean on the drawing board with their hand or arm. Participants were asked to trace the spiral as accurately and as fast as possible using their dominant hand.

Figure 1.

QUANTITATIVE ANALYSIS OF SPIRAL DRAWING

Automatic quantitative analyses were performed using custom-made software written in MatLab (version 8.1; The Mathworks, Natick, MA, USA). This yielded the following outcome measures: movement time (s), defined by the time it took the participant to trace the spiral; length of drawing (cm), defined as the length of the drawn spiral; *average speed*, defined by the ratio of length of drawing and movement time; speed variability (cm/s), defined as the SD of the instantaneous velocity; deviation from template (cm²), defined as the area between the template and the drawn spiral; and number of crossings, defined as the number of times the drawn spiral crossed the template (**Figure 1A**). A smoothly drawn spiral with a clinical score of 0A would have a length of drawing about



Use drawing to detect Parkinson's Disease

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Spiral drawing test detects signs of Parkinson's

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Neurograph, Drawing patterns and Parkinson Detection

Parkinson

Shaking, maybe?

Drawing patterns may be potentially influenced

The drawing pattern may tell us something interesting

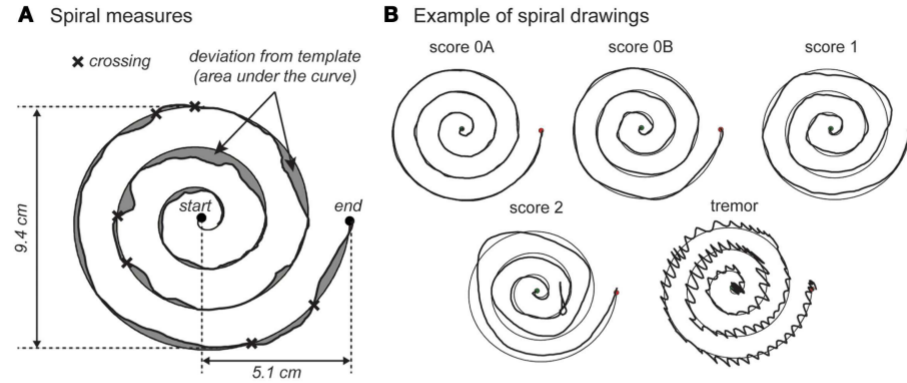


FIGURE 1 | Examples of spiral-drawing quantification and clinical scores. (A) shows an example of the calculation of quantitative measures of fine motor skills. The start and endpoint are indicated by a dot. The

figure explains how deviation from template and crossings are defined. (B) shows examples of clinical scores of the spiral drawings with score 0A, 0B, 1, 2, and a tremor.

By studying drawing patterns, such as

Drawing Speed changes

Touching pressure

Maximum differences in horizontal direction

Total drawing time

Deviation from the template image

Analyse them statistically,

We could find some drawing characteristics
that's special for Parkinson patients.

What this project contains

Two parts

Part 1: An app which captures the drawing data

Store the data into different format of data files which can be analysed

Part 2: Analyse the drawing data and study interesting features
(Done by Cathy)

Procedure of the app

A new user

Register

Do the tests

He/she can come back using the registration code (Something like an user name, it's unique)

Do the tests again to see whether the disease condition changes or not

App demonstration

The screenshot displays the Google Play Store interface. At the top, the Google Play logo is on the left, and a search bar is on the right. Below the logo, the 'Apps' tab is selected, with a sidebar menu containing 'My apps', 'Shop', 'Games', 'Family', and 'Editors' Choice'. The main content area shows the app 'Neurograph' by 'MHTI Lab' in the 'Health & Fitness' category. The app has a 3+ age rating and a 5-star rating from 2 users. A message states 'You don't have any devices.' Below this are buttons for 'Add to Wishlist' and 'Install'. At the bottom, four app preview cards are shown: 'Welcome to NeuroGraph' (language and font size selection), 'Account Centre' (new and old user registration), 'Full Background Test' (static background test), and 'Pentagon' (pentagon template test).

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MHTI Lab Health & Fitness

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3+

⚠ You don't have any devices.

Add to Wishlist

Install

Welcome to NeuroGraph

Please choose language

English

Please choose font size

Normal

Account Centre

New User

As a new user, you need to register first.

REGISTER

Old User

Please enter your registration code

Full Background Test

This is the static background (full screen) test. The image will be shown in full screen mode and will appear constantly.

START TEST 1

Corner Background Test

This is the static background (full screen) test.

Pentagon

A pentagon template will be

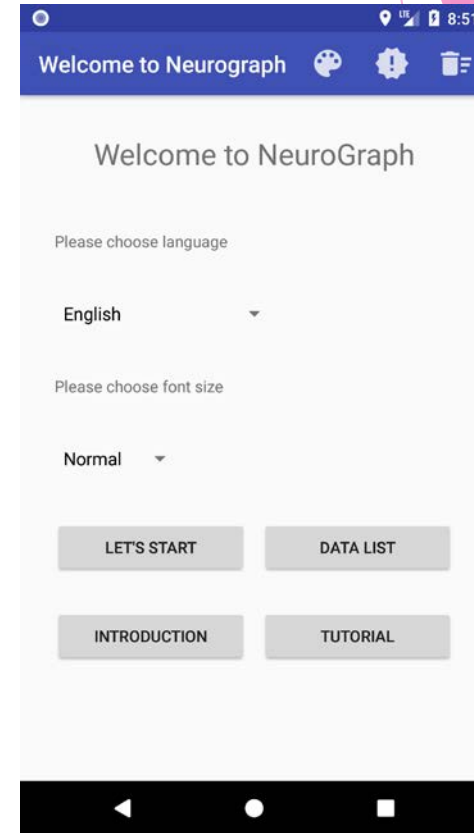
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The app

Collect information about the user

The tests

Output the data



Future TODOs

Identify Signatures

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the right side of the image, creating a modern, layered effect. The rest of the background is a solid, very light blue.

Q & A

Thank you ^_^