

# EncephalApp Stroop Download and Instructions

Jasmohan S Bajaj, MD

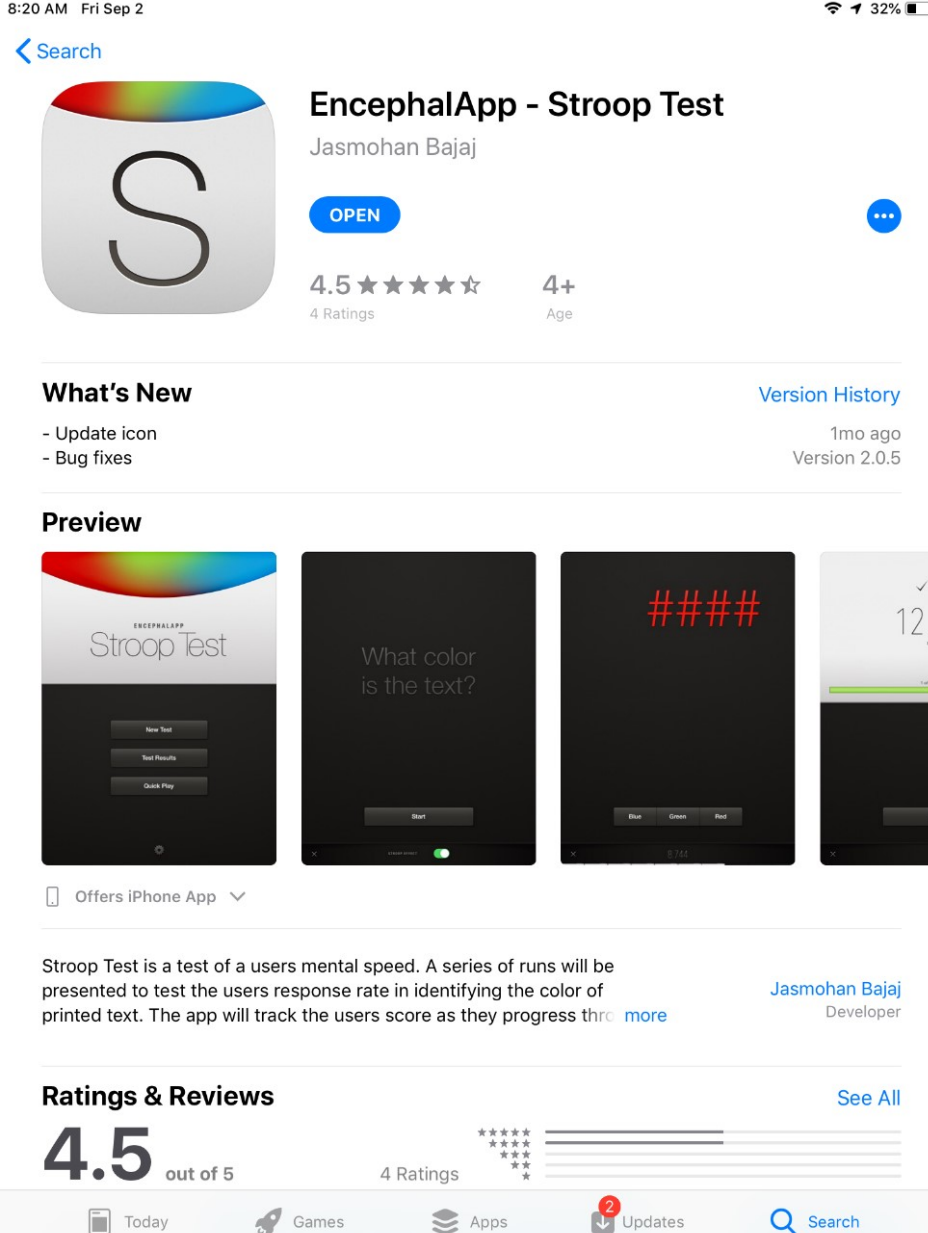
Division of Gastroenterology, Hepatology  
and Nutrition, Virginia Commonwealth  
University and McGuire VA Medical Center,  
Richmond, Virginia

# Things to check before downloading

- **Equipment required**
  - iPad, iPhone, or Android phone
  - WI-FI connection or 3G/4G only needed for transmitting results
  - Once the App is downloaded, multiple administrations can be performed without Wi Fi or 3G/4G connections
- **Examiner**
  - Should be trained in administration of the task
- **Subject**
  - Alert and oriented without active neurological issues
  - Without red-green color blindness
  - Should be able to understand the written language
  - Ensure the appropriate language has been downloaded


# App Download

- In the App Store search for “Encephalapp Stroop”
- The following will screen will appear
- Download it free of charge



8:20 AM Fri Sep 2 📶 32% 🔋

[← Search](#)



## EncephalApp - Stroop Test

Jasmohan Bajaj

[OPEN](#)

4.5 ★★★★★  
4 Ratings

4+  
Age

[⋮](#)

---

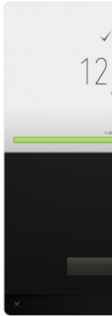

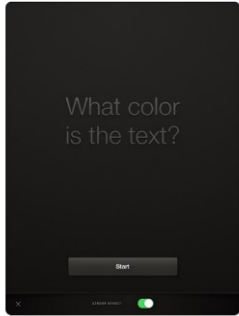
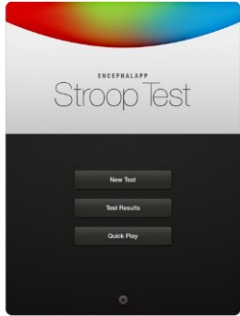
**What's New** [Version History](#)

- Update icon  
- Bug fixes

1mo ago  
Version 2.0.5

---

**Preview**



[📱 Offers iPhone App](#)

---

Stroop Test is a test of a users mental speed. A series of runs will be presented to test the users response rate in identifying the color of printed text. The app will track the users score as they progress thro [more](#)

[Jasmohan Bajaj](#)  
Developer

---

**Ratings & Reviews** [See All](#)

**4.5** out of 5 4 Ratings

★★★★★

★★★★★

★★★★★

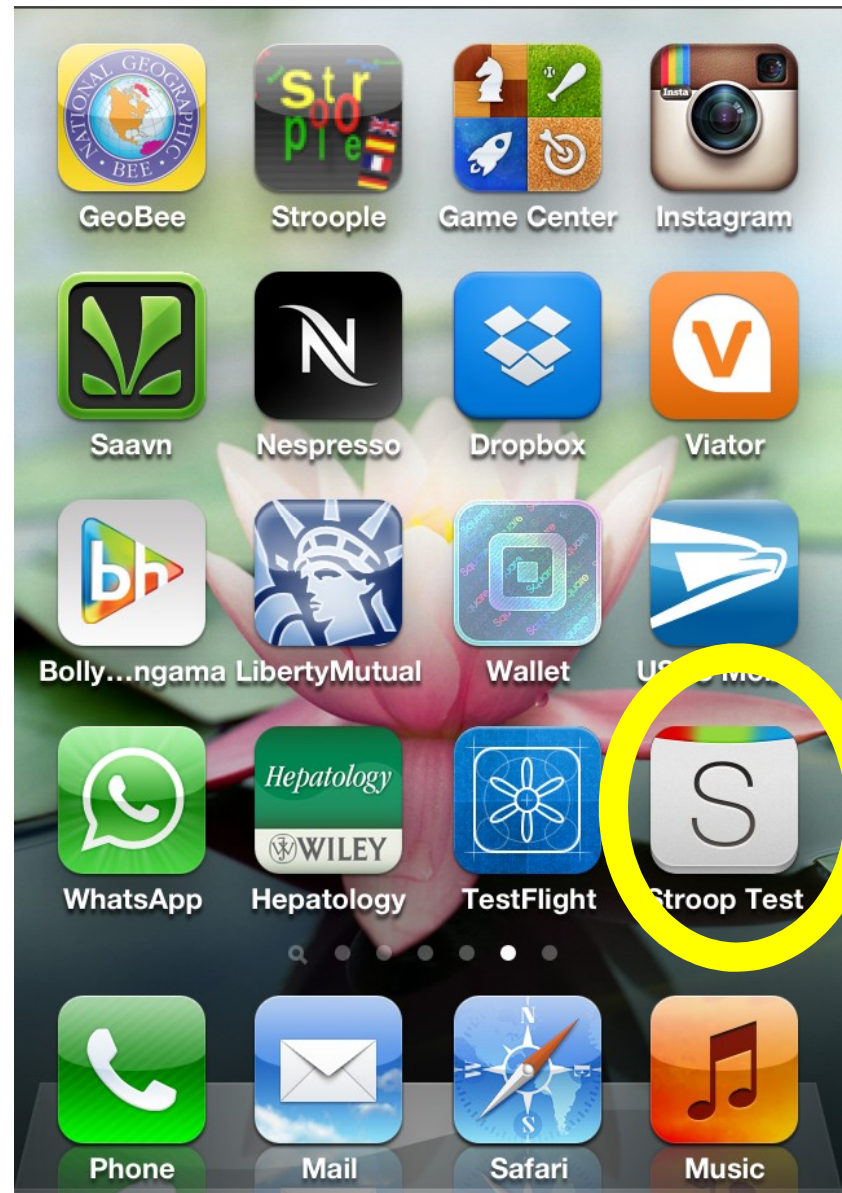
★★★★★

★★★★★

📅 Today 🚀 Games 📁 Apps 📥 Updates <sup>2</sup> 🔍 Search

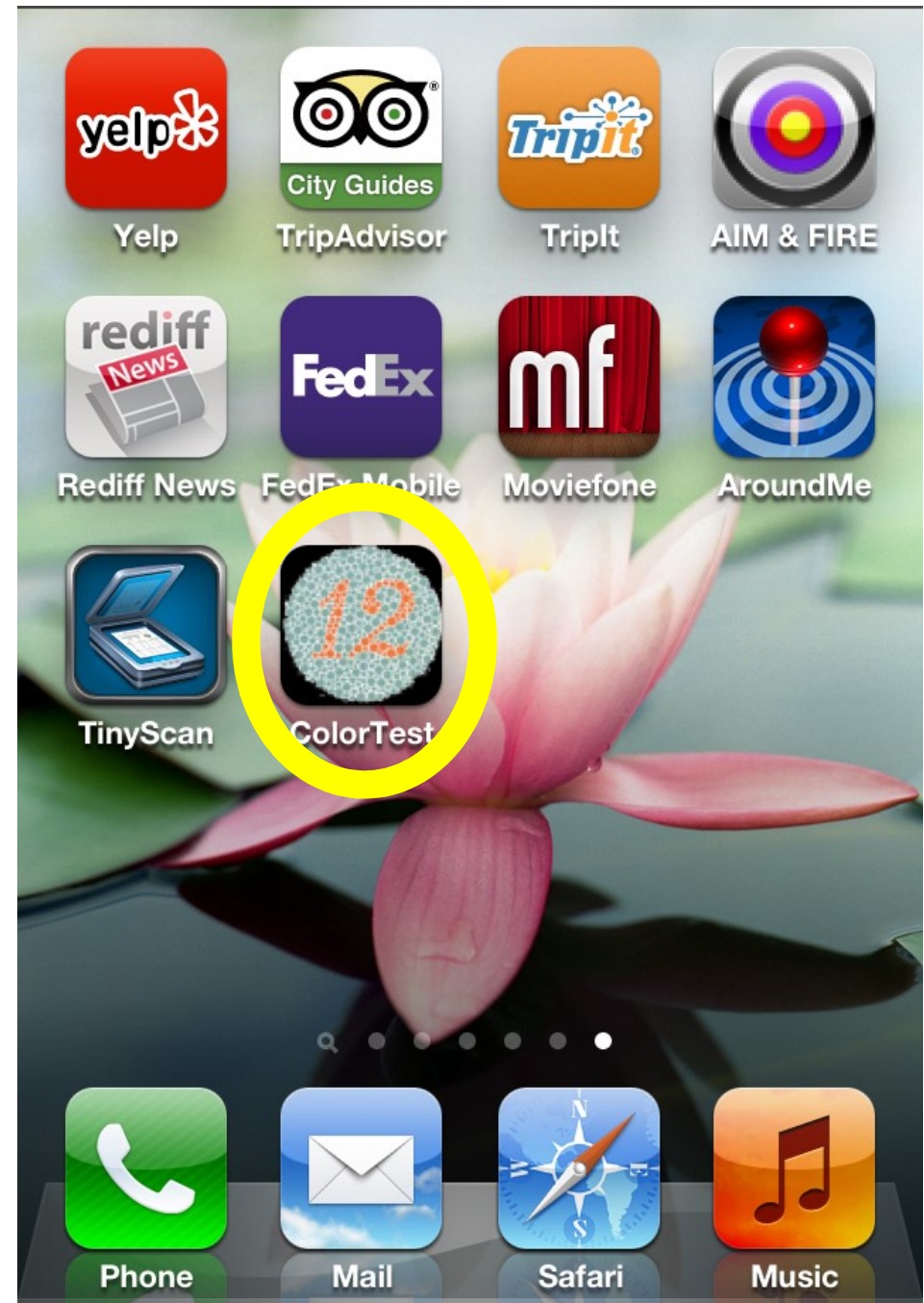
# App Icon on an iPhone or iPod

- The icon for the App will appear like the circled one on the photo



# Testing for red-green color blindness

- If it is not known, it is useful to formally check for red-green color blindness before administering the EncephalApp
- There are several Apps to check for it but we have used the “pseudochromatic Ishihara test” App
- One can give 4-5 screens of this App and ask the subject’s response to the numbers seen in order to check for color blindness
- If color-blindness is detected, then the patient should not be tested using EncephalApp

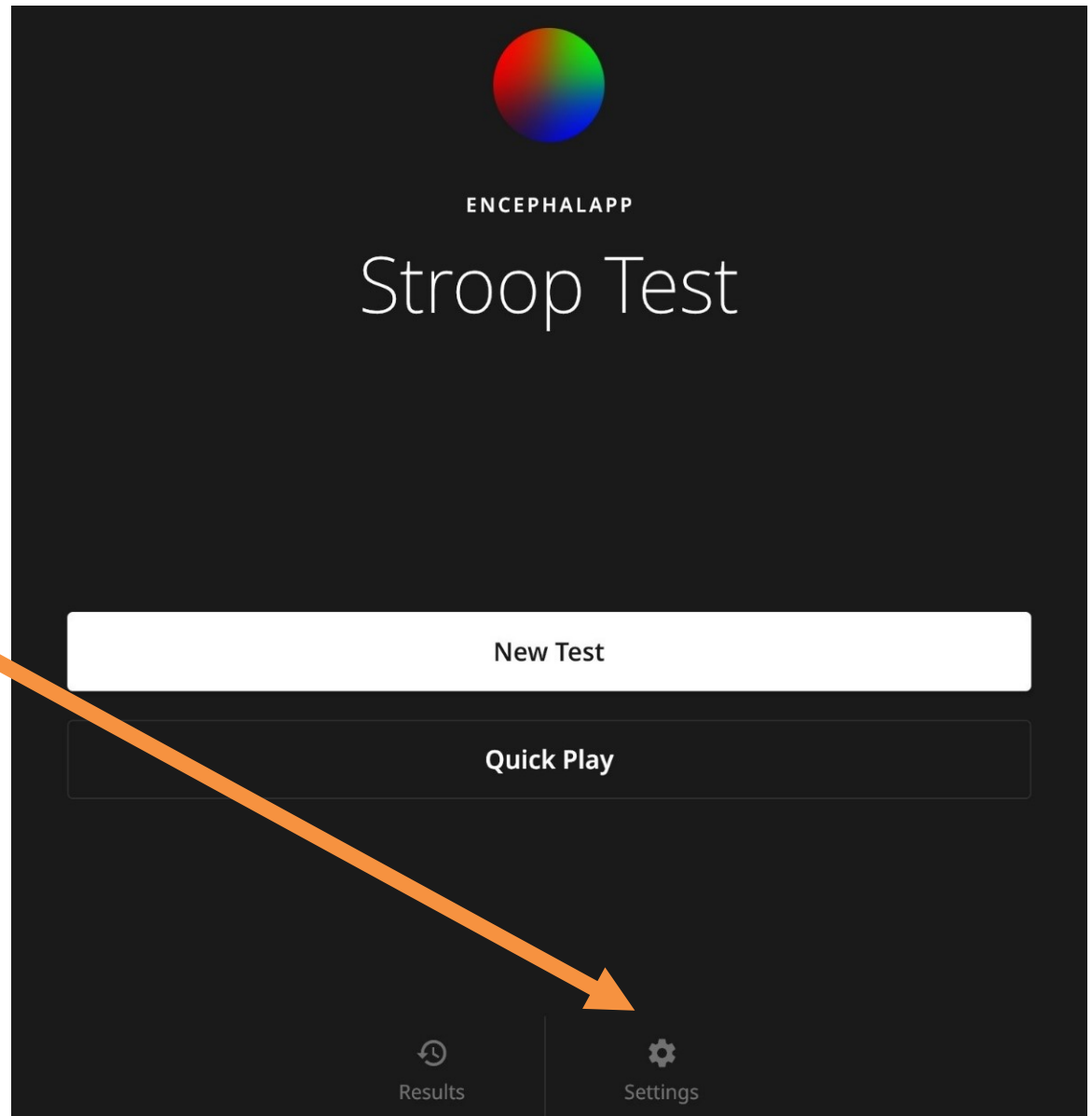


# Before administration of the EncephalApp

- **Environment**
  - Quiet and non-judgmental environment
  - Minimize interruptions
- **Equipment**
  - If using an iPhone or Android phone, be sure to switch it to “Airplane” mode to prevent incoming calls or texts from disrupting the administration
  - Ensure that the App is properly downloaded and you have enough charge

# EncephalApp Face Page

- New Test
- Quick Play
- Results
- Settings
  - This has to be formatted first



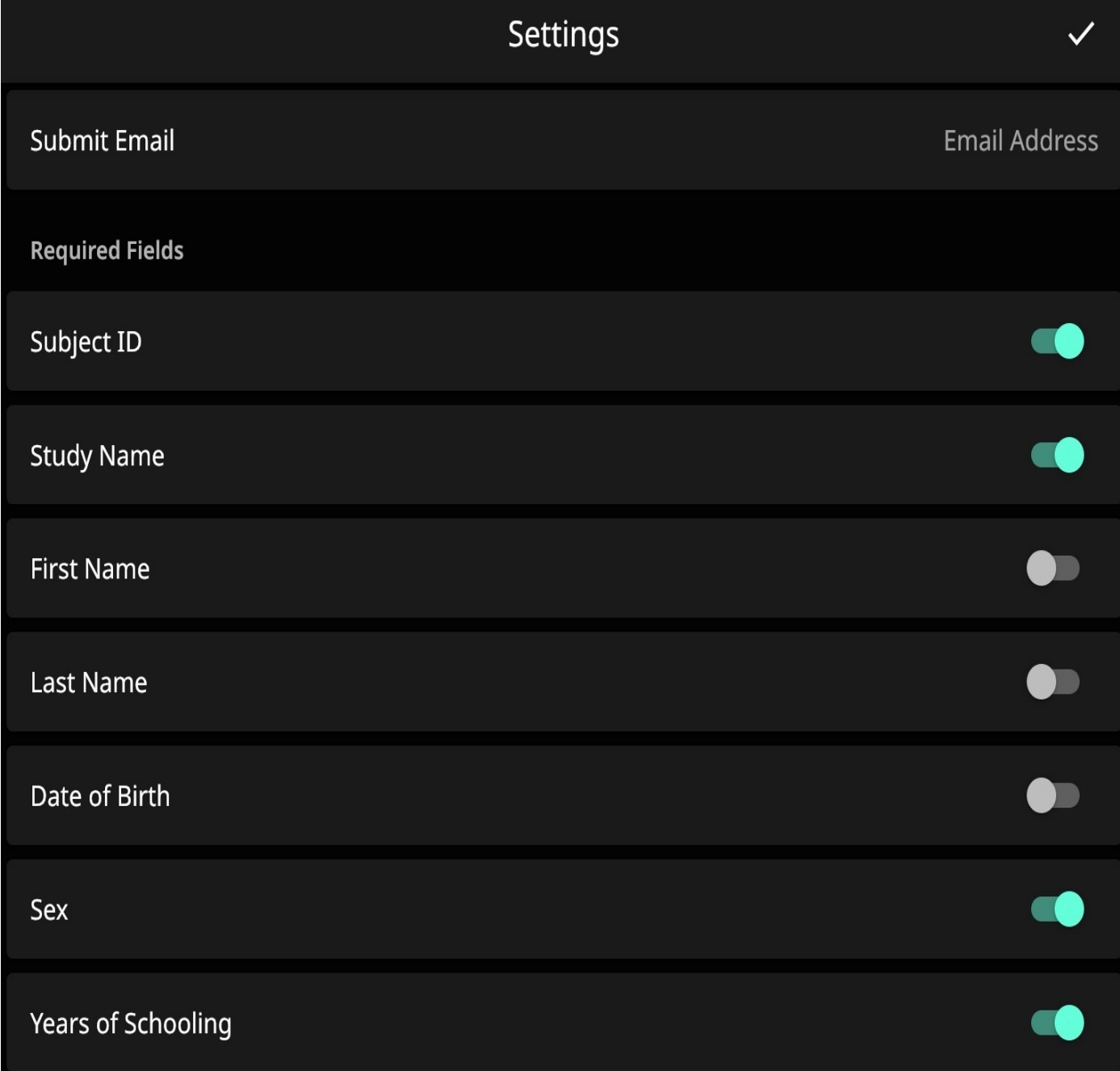
# Settings Part- 1

Enter the email address  
Associated with the Device

**Optional Subject Data**  
that


**You can flip off /on**

Depending on your study needs



Settings	
Submit Email	Email Address
Required Fields	
Subject ID	<input checked="" type="checkbox"/>
Study Name	<input checked="" type="checkbox"/>
First Name	<input type="checkbox"/>
Last Name	<input type="checkbox"/>
Date of Birth	<input type="checkbox"/>
Sex	<input checked="" type="checkbox"/>
Years of Schooling	<input checked="" type="checkbox"/>

# Settings Part - 2

Test Phases	
Practice: Stroop Off	2
Stroop Off	5
Practice: Stroop On	2
Stroop On	5
Test Directions	<input checked="" type="checkbox"/>
Terms of Service	>
 encephalapp@gmail.com	>

Default number of correct Runs that subjects have to Correctly perform before Completing it.

LEAVE THIS PART AS IT IS

Directions to give the test Appear if this is on

LEAVE THIS PART AS IT IS

# Settings



Submit Email

Email Address

## Required Fields

Subject ID



Study Name



First Name



Last Name



Date of Birth



Sex



Years of Schooling



## Test Phases

Practice: Stroop Off

2

Stroop Off

5

Practice: Stroop On

2

Stroop On

5

Test Directions



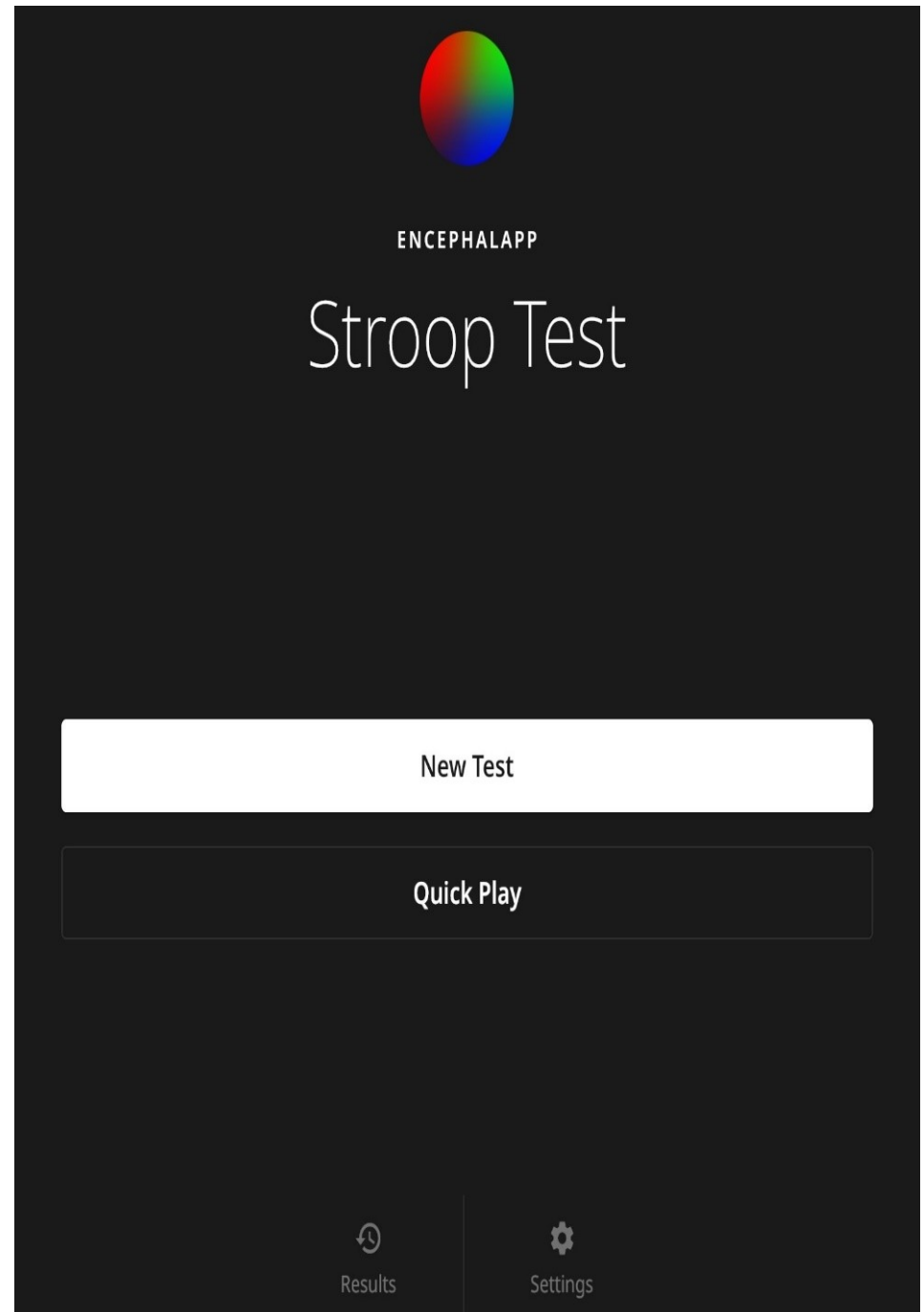
# Overall Structure of the Test

- Introduction
- Instructions for Stroop Off State
- Need to then complete TWO Stroop Off training runs before the test
- Then FIVE Stroop Off Testing Runs
- Instructions for Stroop On State
- Need to then complete TWO Stroop On training runs before the test
- Then FIVE Stroop On Testing Runs

**TOTAL FOURTEEN RUNS AT LEAST: TIME RANGES BETWEEN 5 TO 10 MINUTES**

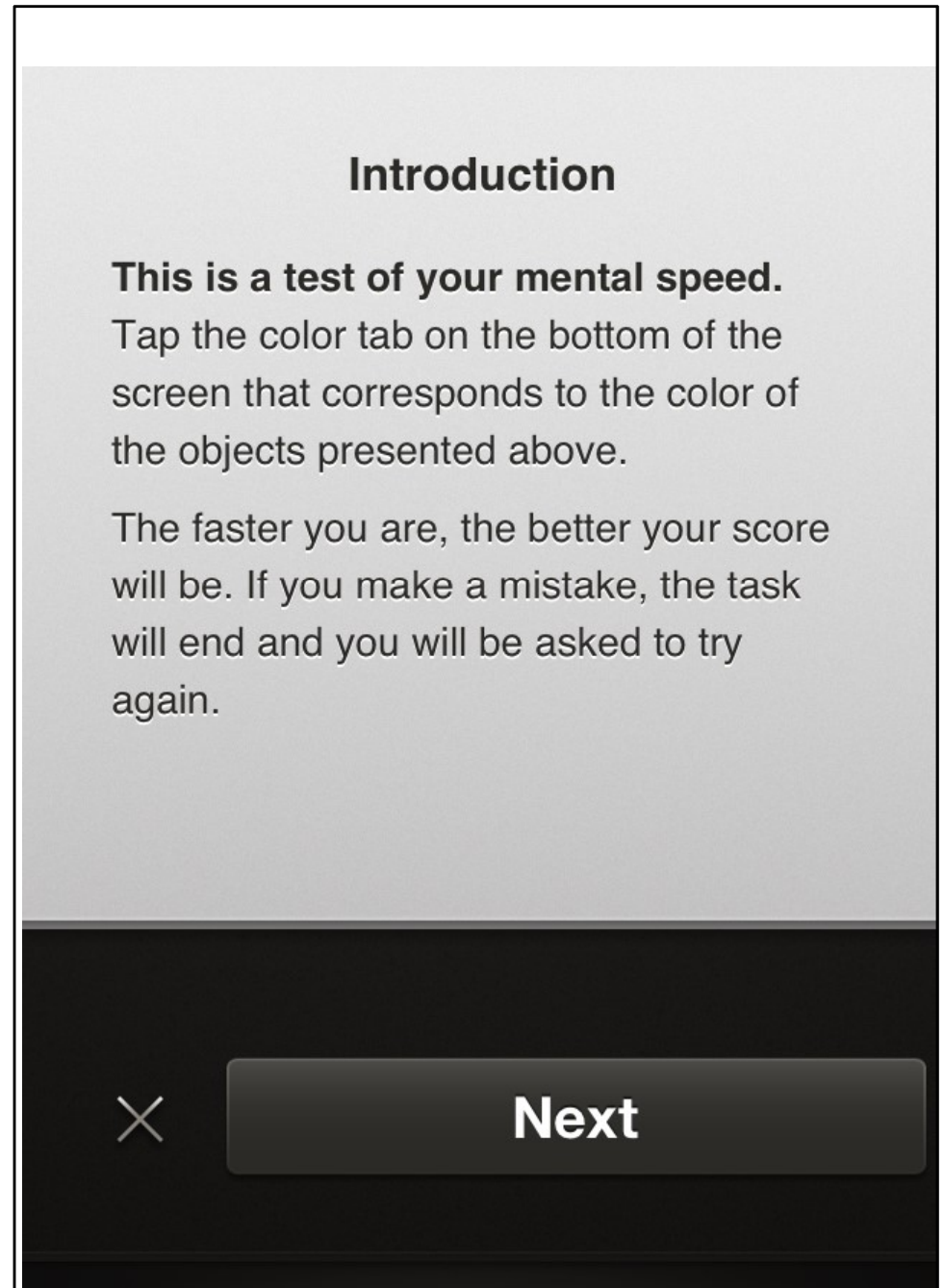
# Now the test can be started

Touch the **New Test**  
Button to Start the  
Administration



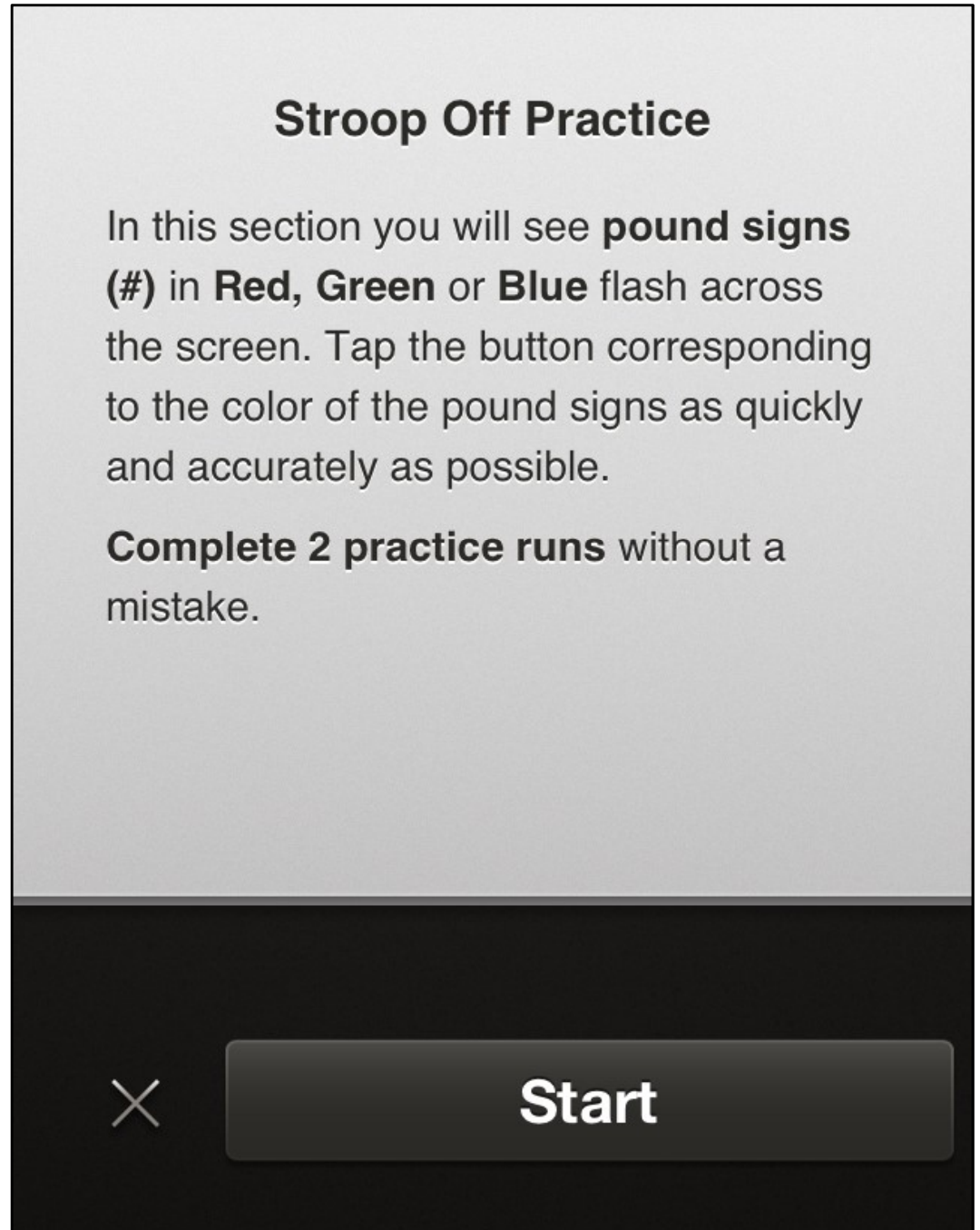
# The Introduction Screen will appear

- Read it to the subject  
VERBATIM
- When they have expressed their understanding, press the “NEXT” Button to start
- If they do not want to continue press the “X” on the left side of the “NEXT” button and this will end



# Stroop OFF Practice Run Instructions

- Read it to the subject  
VERBATIM
- When they have expressed their understanding, press the “START” Button to start
- If they do not want to continue press the “X” on the left side of the “START” button and this will end



**Stroop Off Practice**

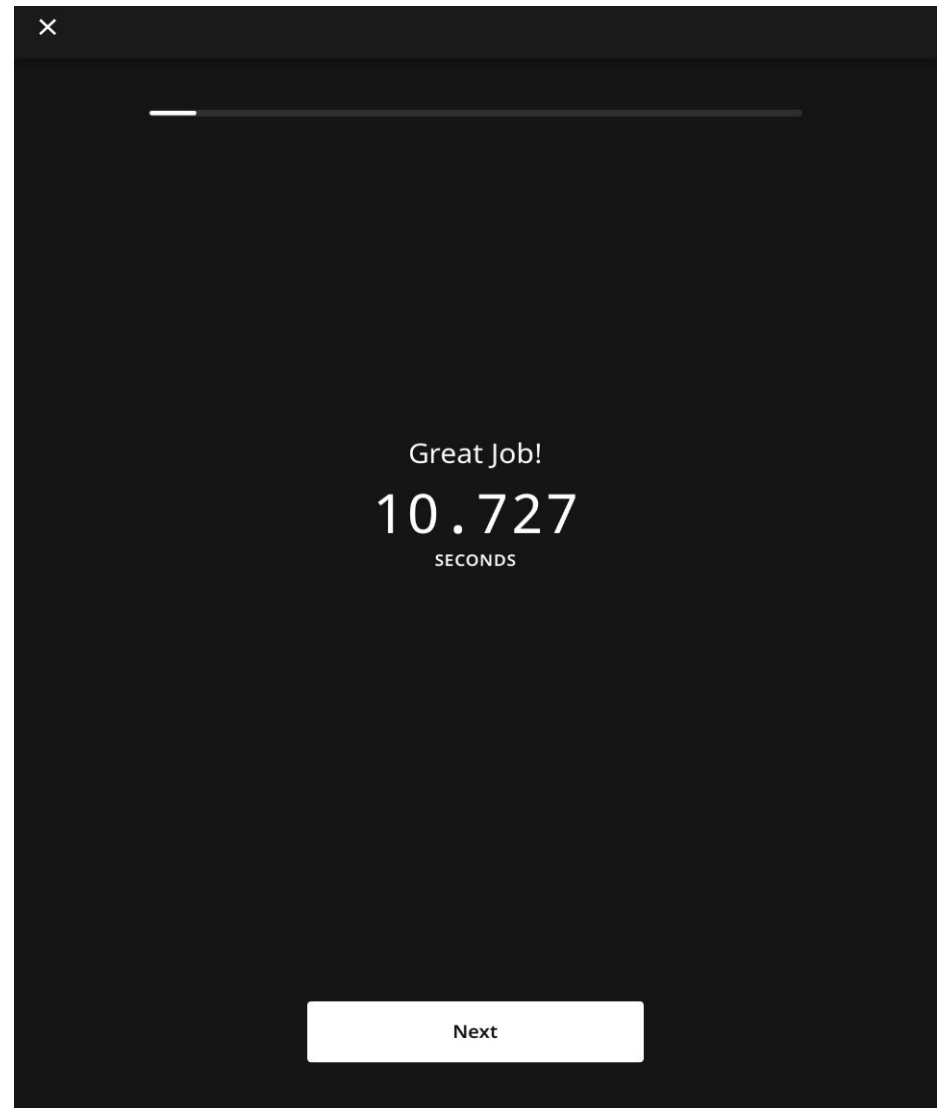
In this section you will see **pound signs (#)** in **Red, Green** or **Blue** flash across the screen. Tap the button corresponding to the color of the pound signs as quickly and accurately as possible.

**Complete 2 practice runs** without a mistake.

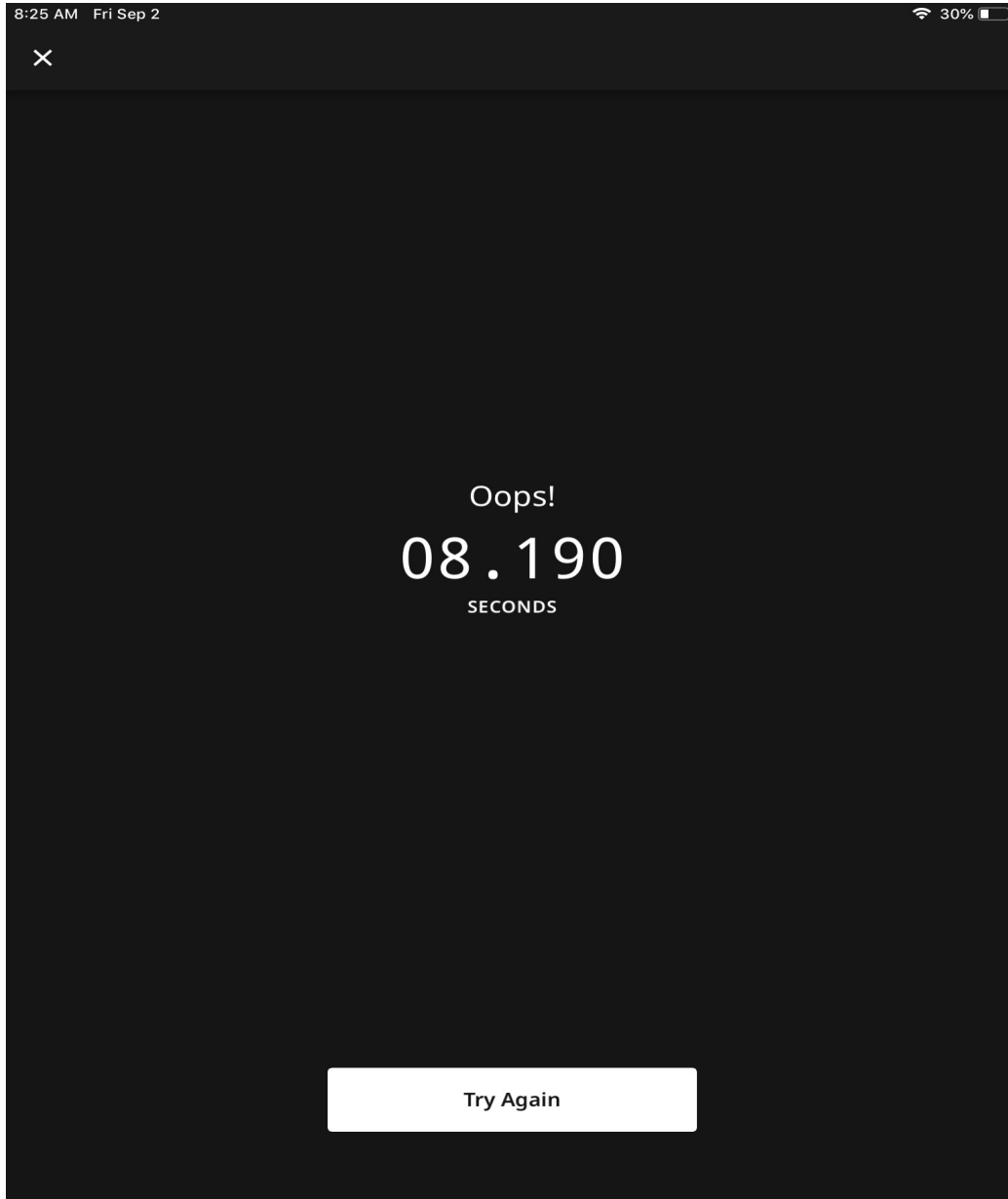
✕ **Start**

# Upon completion of a successful run

- Each run is 10 presentations that have to be answered accurately
- Subjects are shown the time taken
- It is also reinforced by the display that they are on the right track



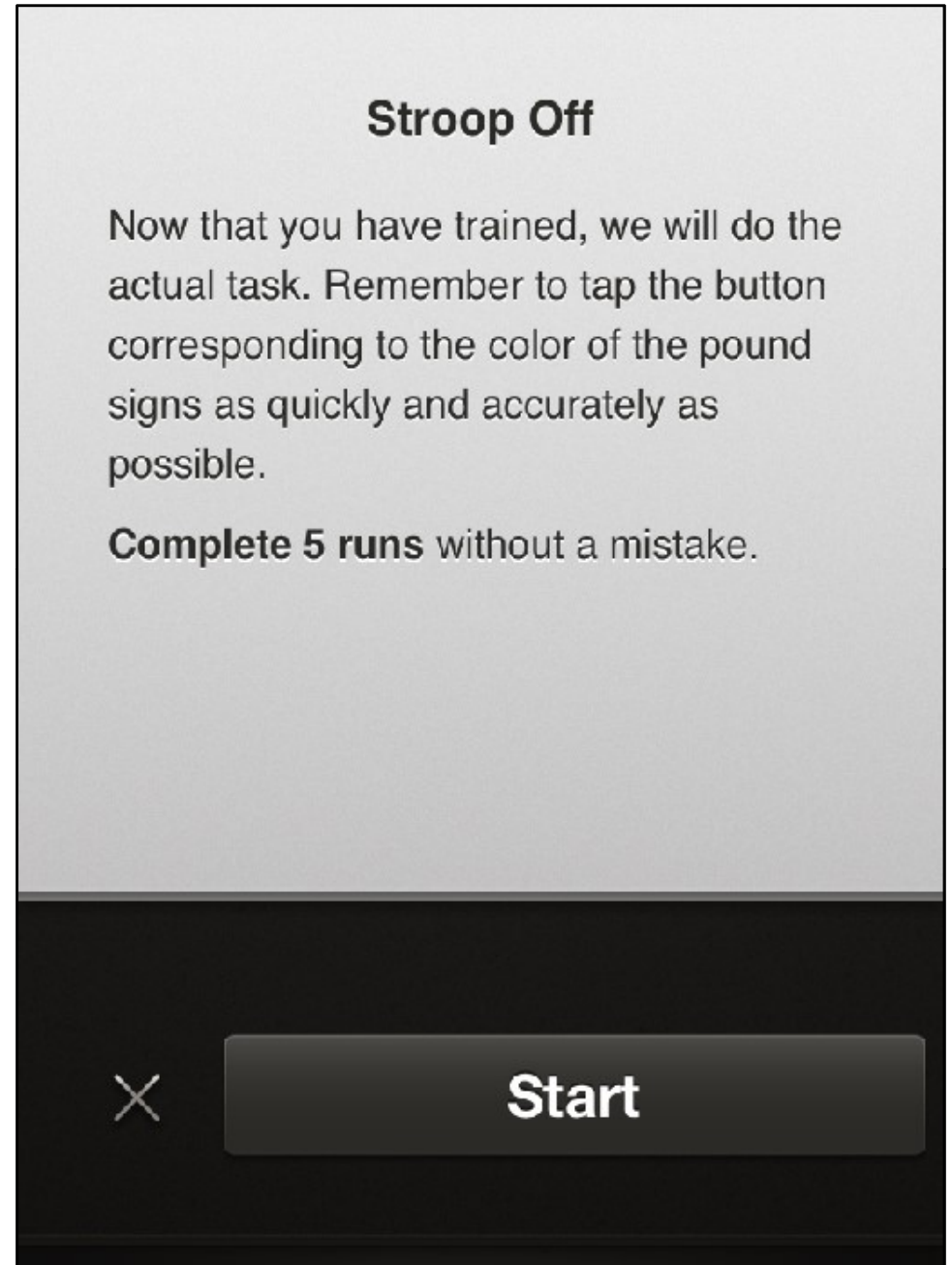
# If subjects touch the wrong color button



- The task will stop and this screen will appear with a “Try Again” button
- They will need to complete the last run again

# Stroop OFF Testing Instructions

- If the subjects can complete 2 correct “Practice Runs” then this screen will appear
- Read it to the subject  
VERBATIM
- When they have expressed their understanding, press the “START” Button to start
- If they do not want to continue press the “X” on the left side of the “START” button and this will end



# Stroop “Off” State: no words, just symbols

The task is to correctly and rapidly press the color corresponding to the color of the symbols presented

**Presentation of the symbol  
in a particular color**

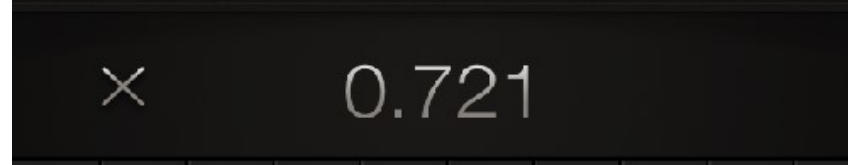


####

**Touch the correct color**



**Response Time**



Once five correct runs of the  
**Stroop Off State** have been completed,  
the subject will then move on to  
**Stroop On State**

# Stroop ON Practice Run Instructions

- Read it to the subject  
VERBATIM
- When they have expressed their understanding, press the “START” Button to start
- If they do not want to continue press the “X” on the left side of the “START” button and this will end

## Stroop On Practice

In this section you will see the words RED, BLUE, and GREEN **written in different colors**. Tap the button corresponding to the color these words are written in and NOT the colors they mean. For example, if the word RED is written in the color **blue**, you should tap the **Blue** button.

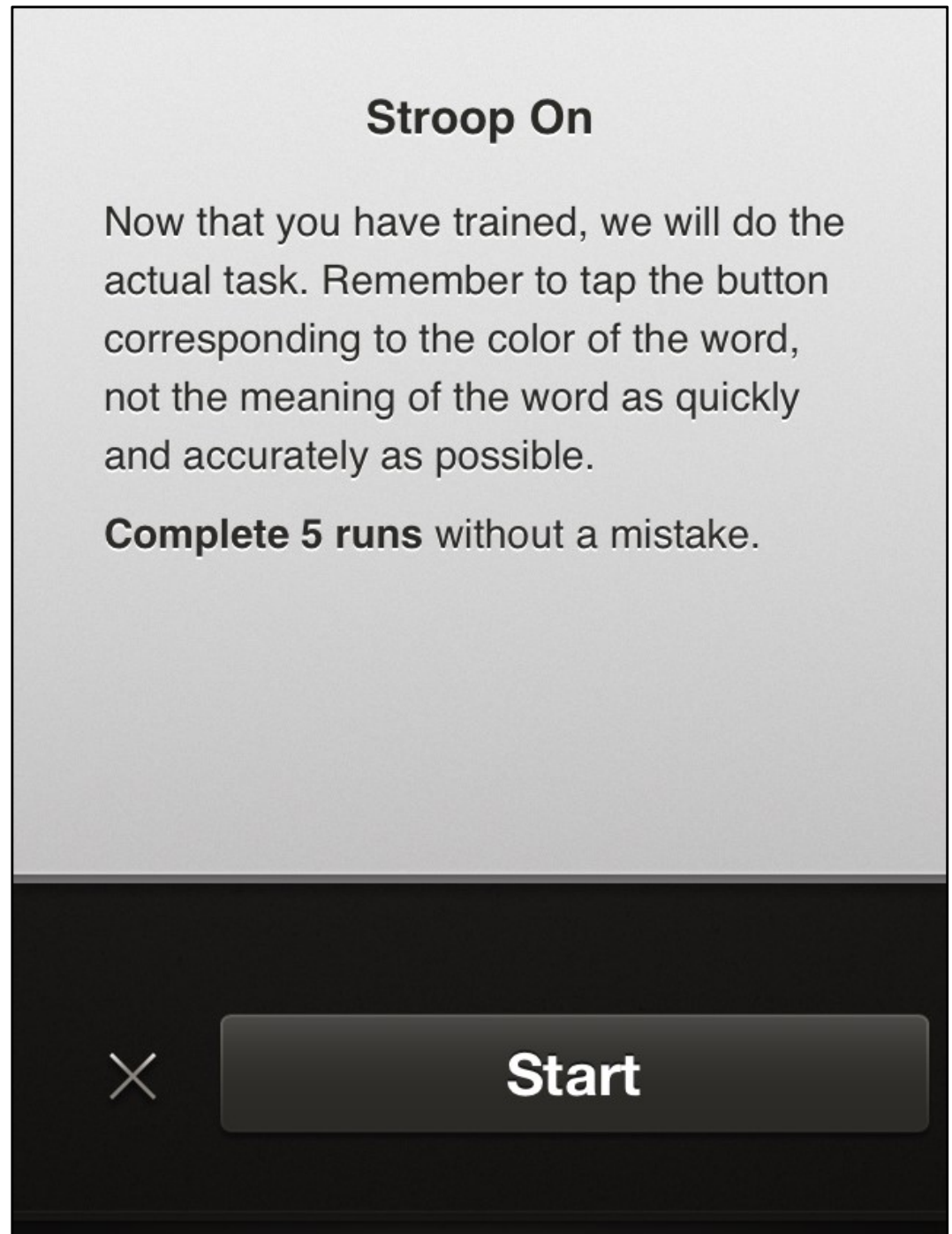
**Complete 2 practice runs** without a mistake.



**Start**

# Stroop ON Testing Instructions

- If the subjects can complete 2 correct “Practice Runs” then this screen will appear
- Read it to the subject  
VERBATIM
- When they have expressed their understanding, press the “START” Button to start
- If they do not want to continue press the “X” on the left side of the “START” button and this will end



# Stroop “On” State: Words in discordant colors

The task is to correctly and rapidly press the color corresponding to the color of the word presented, not the color it means

**Presentation of a word in a discordant color**



Green

**Touch the correct color of the word, not what the word means**



Blue Green Red

**Response Time**



x 0.865



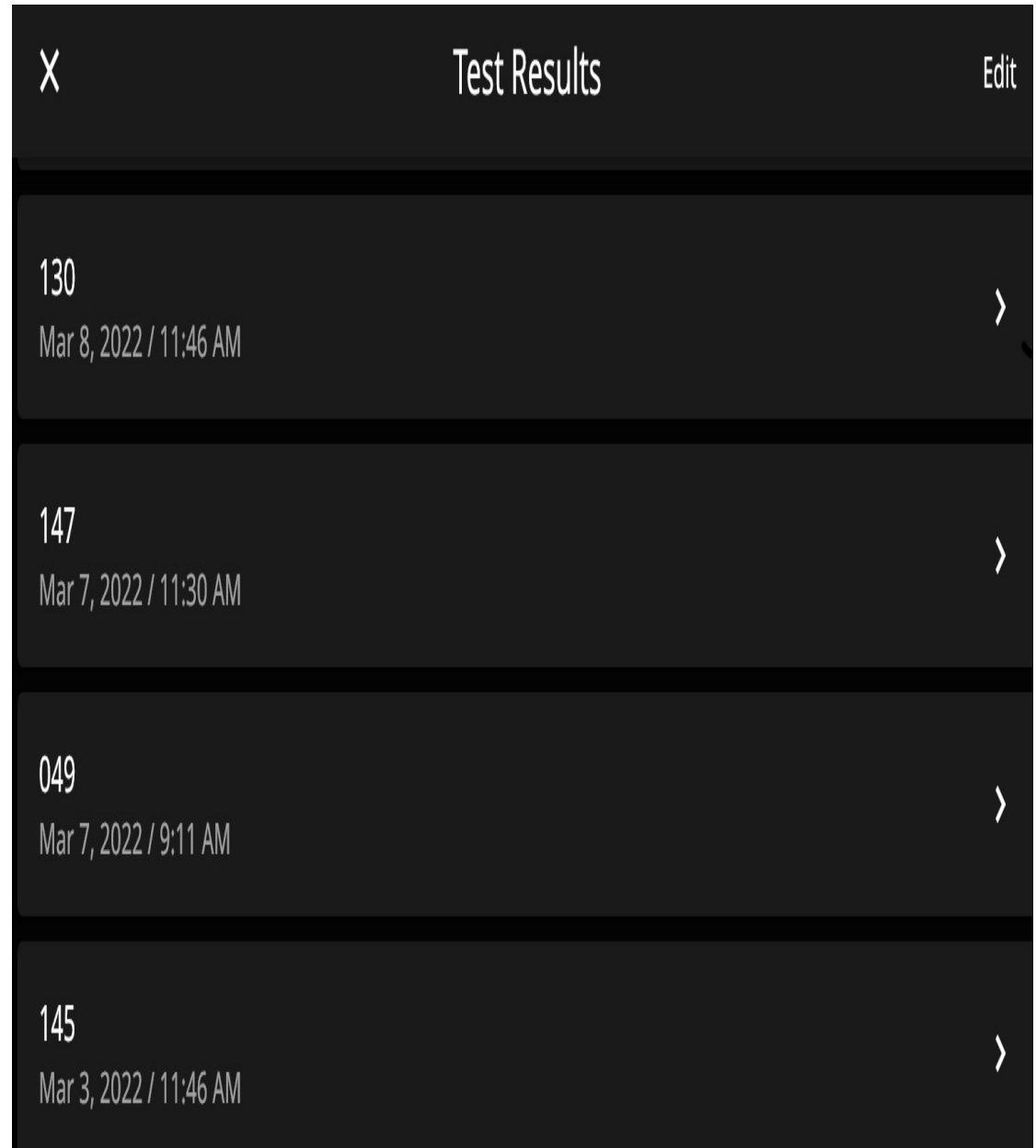
Once five correct runs of the  
**Stroop Off State** and **Stroop On State**  
have been completed, the task will  
end and results will be available

# Stroop Outputs: The lower the value, the better the performance

<b>Output</b>	<b>Definition</b>	<b>Interpretation</b>
OFFTIME	Time required to complete 5 correct runs in the “Off State”	Psychomotor speed
ONTIME	Time required to complete 5 correct runs in the “On State”	Psychomotor speed and cognitive flexibility
TRIALS OFF	Number of trials it took the subject to get 5 correct runs in “Off state”	Accuracy
TRIALS ON	Number of trials it took the subject to get 5 correct runs in “On state”	Accuracy and flexibility
OFFTIME + ONTIME	Sum of OffTime and OnTime	Composite of psychomotor speed
ONTIME minus OFFTIME	OnTime subtracted by OffTime	Isolated measure of cognitive flexibility

# The results are accessible on the device you gave the test from

- On the face page if you click on the “Results” Button
- The list of all tests given with date and time stamps are accessible

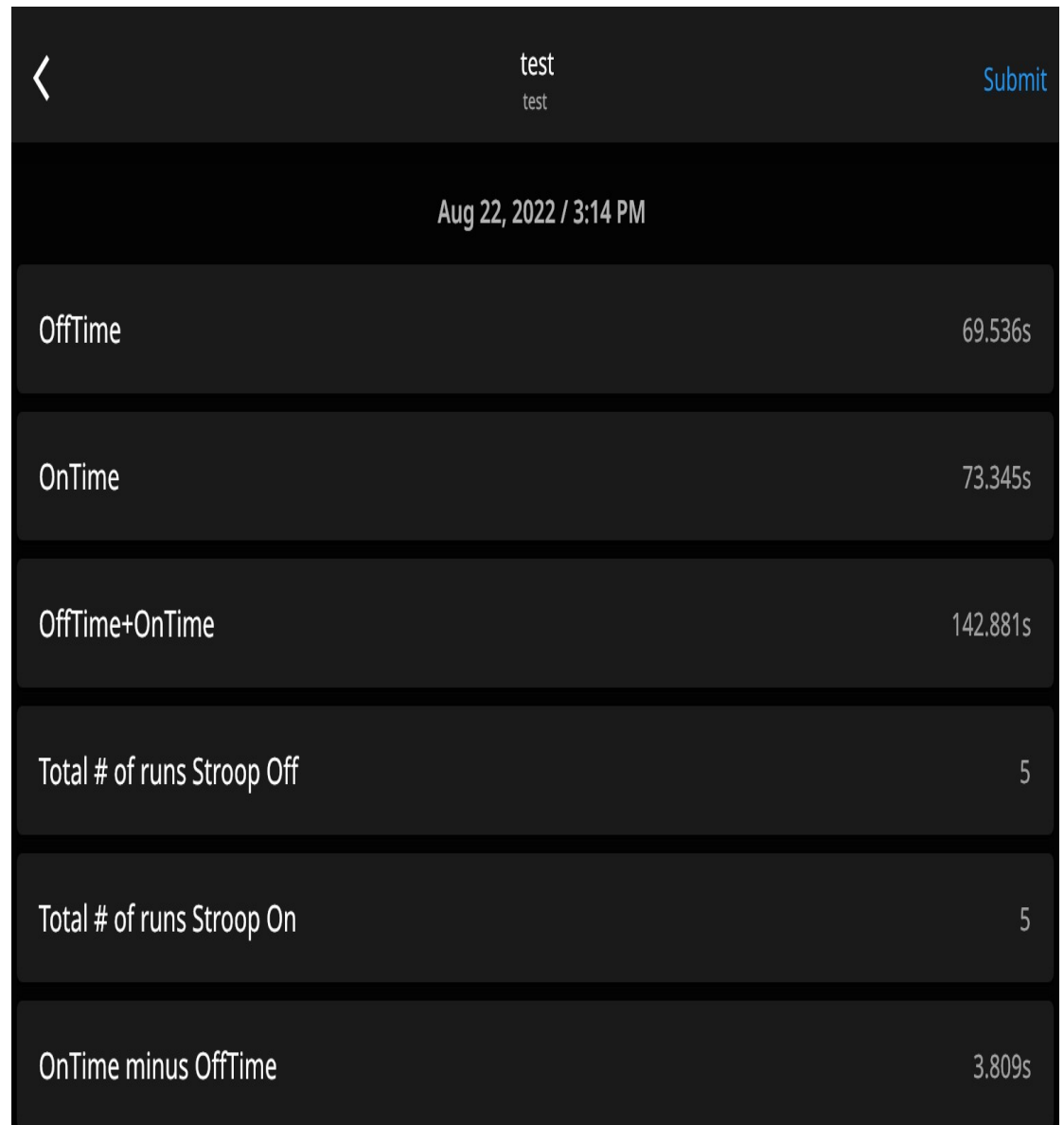


The screenshot shows a mobile application interface with a dark background. At the top, there is a header bar with a close button (X) on the left, the title "Test Results" in the center, and an "Edit" button on the right. Below the header, there is a list of four test results, each in a separate row. Each row contains a test ID, a date and time stamp, and a right-pointing chevron icon. The test results are as follows:

Test ID	Date and Time
130	Mar 8, 2022 / 11:46 AM
147	Mar 7, 2022 / 11:30 AM
049	Mar 7, 2022 / 9:11 AM
145	Mar 3, 2022 / 11:46 AM

# Once you click on a particular result

- All relevant results are displayed
- If you want further details you can scroll down to see individual run times
- You can submit the test results by hitting the top right submit button



test	
OffTime	69.536s
OnTime	73.345s
OffTime+OnTime	142.881s
Total # of runs Stroop Off	5
Total # of runs Stroop On	5
OnTime minus OffTime	3.809s



test

test

Subm

Practice: Stroop Off

29.969s / 2 Attempts

1 15.451s >

2 14.518s >

Stroop Off 69.536s / 5 Attempts

1 14.270s >

2 14.940s >

3 14.242s >

4 12.553s >

5 13.531s >

Practice: Stroop On

27.005s / 2 Attempts

1 13.992s >

2 13.013s >

Stroop On 73.345s / 5 Attempts

1 12.954s >

2 15.503s >

3 14.773s >

4 14.008s >

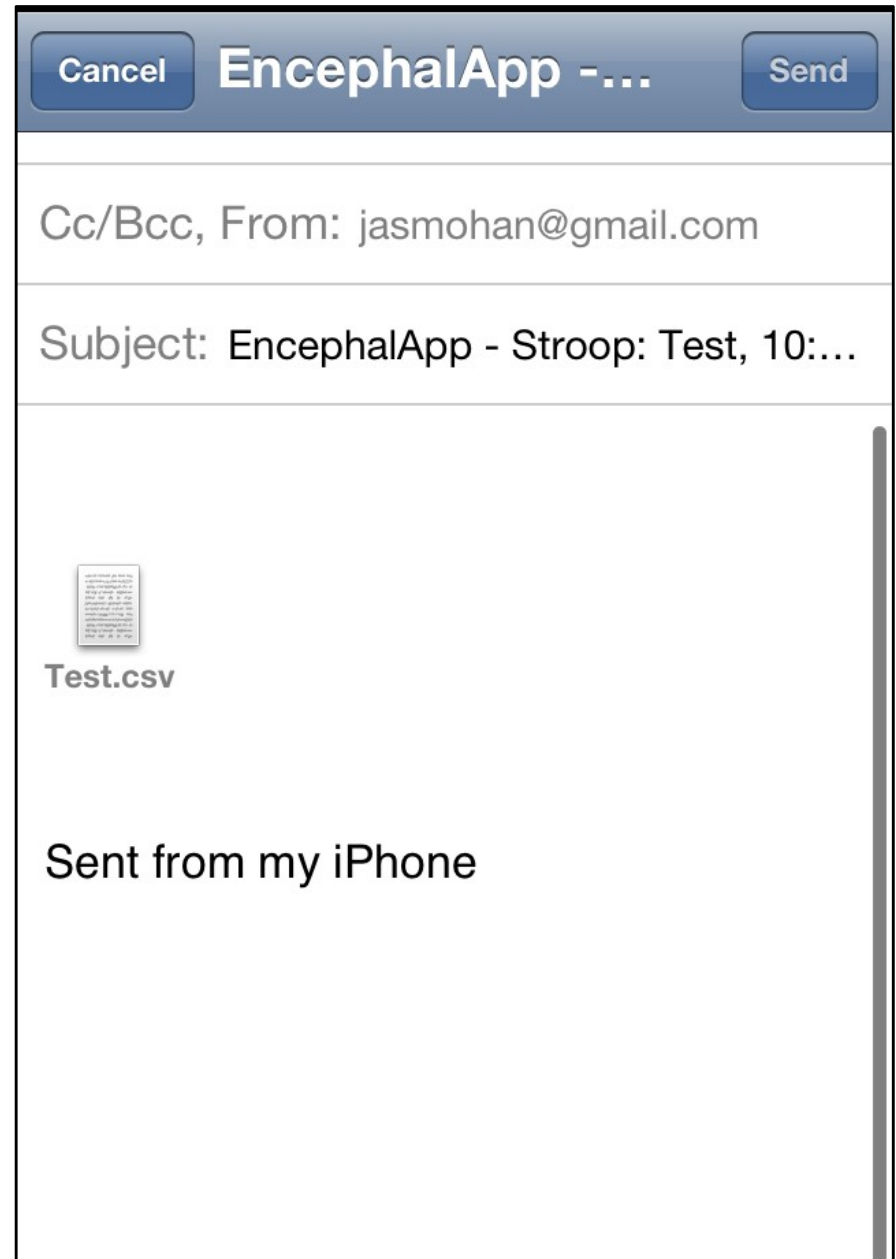
5 16.107s >

# Email the results in .csv format that can be opened and exported into Excel

Enter the destination email address



Results file in comma separated values format

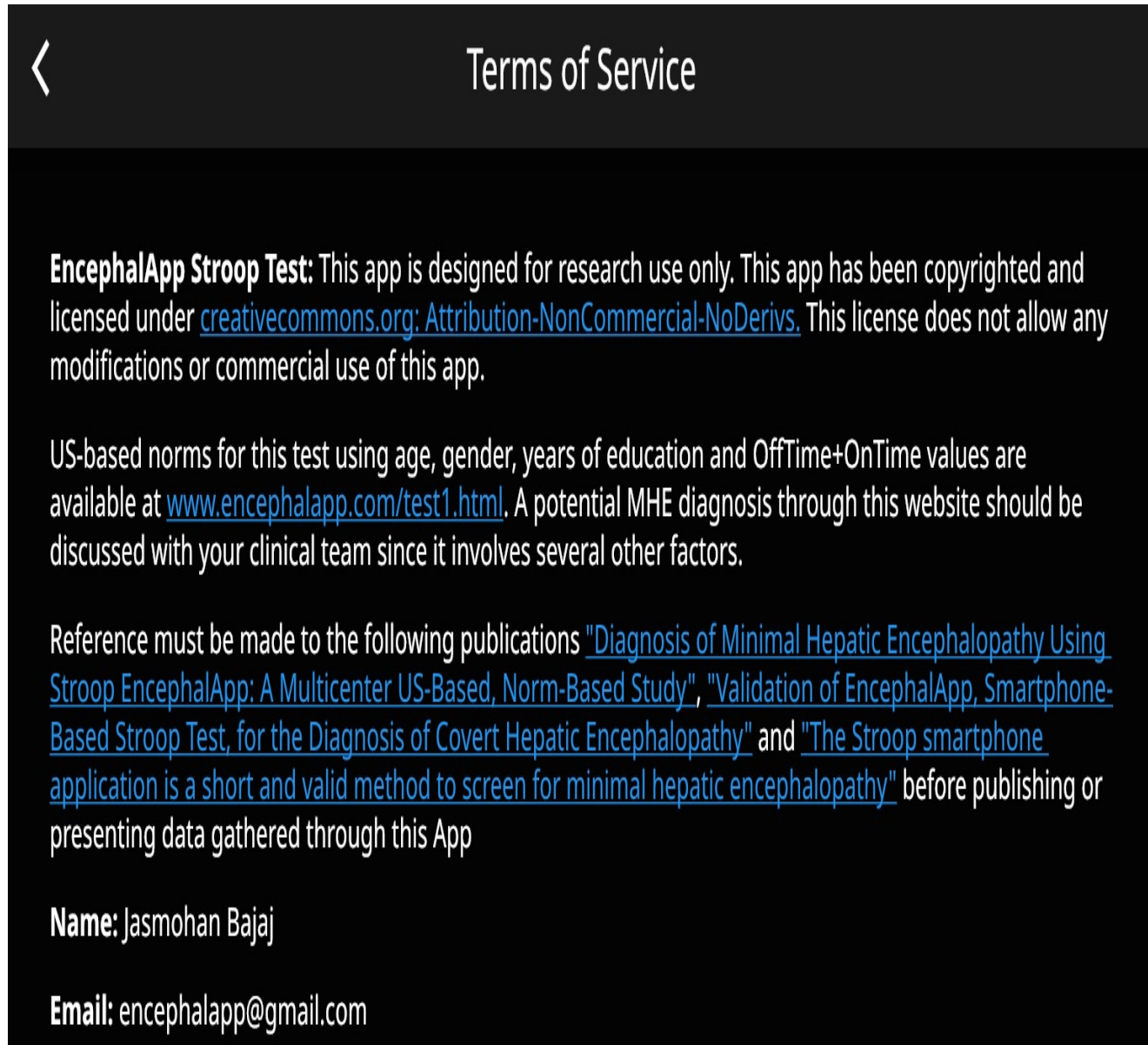


# Terms of Service must be followed

- Copyrighted and Licensed under Creative Commons
- Free to use
- Source must always be cited

Bajaj JS et al

Hepatology 2013



The screenshot shows a mobile application interface with a dark header. On the left is a white back arrow, and on the right is the text 'Terms of Service'. The main content area is white with black text. It contains three paragraphs of text, each starting with a bolded title. The first paragraph is about the app's research-only purpose and Creative Commons license. The second paragraph discusses US-based norms and clinical consultation. The third paragraph lists three scientific publications for citation. At the bottom, contact information for Jasmohan Bajaj is provided.

< Terms of Service

**EncephalApp Stroop Test:** This app is designed for research use only. This app has been copyrighted and licensed under [creativecommons.org: Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/). This license does not allow any modifications or commercial use of this app.

US-based norms for this test using age, gender, years of education and OffTime+OnTime values are available at [www.encephalapp.com/test1.html](http://www.encephalapp.com/test1.html). A potential MHE diagnosis through this website should be discussed with your clinical team since it involves several other factors.

Reference must be made to the following publications "[Diagnosis of Minimal Hepatic Encephalopathy Using Stroop EncephalApp: A Multicenter US-Based, Norm-Based Study](#)", "[Validation of EncephalApp, Smartphone-Based Stroop Test, for the Diagnosis of Covert Hepatic Encephalopathy](#)" and "[The Stroop smartphone application is a short and valid method to screen for minimal hepatic encephalopathy](#)" before publishing or presenting data gathered through this App

**Name:** Jasmohan Bajaj

**Email:** [encephalapp@gmail.com](mailto:encephalapp@gmail.com)