



## **USER GUIDE FOR SCIT TEST RESULTS**

This guide provides information about what aspects of cognition are assessed by SCIT, as well as charts of normative data for participants aged between 5 and 90 years, plus answers to frequently asked questions.

## SCIT Test Report

Once a participant has completed a U- or H-test, two test reports will be placed in the Licence Holder's file. The pdf file provides participants with summary data of their test session, while the Excel version provides the raw data for each stimulus response, as a resource for researchers.

SCIT results are based on three measures:

- How quickly a participant responds each time a U- or H-stimulus is displayed. This is known as the Mean Response Time and is measured to the nearest millisecond. **A fast Response Time** indicates that the brain has healthy axons that convey information efficiently between the visual, association, frontal and motor regions of the cortex.
- How often a participant incorrectly indicates which side of the U- or H-stimulus is shortest. This is known as the Mean Error Rate and is expressed as the percentage of stimulus presentations that elicited an incorrect response. **A low Error Rate** indicates healthy neurons and synapses that process information effectively and inhibit unwanted responses.
- How many times a participant fails to respond to a stimulus within 1.5 seconds is known as a Timed out. **A low number of Timed outs** indicates that the attentional processes of the frontal and prefrontal cortices are functioning well.

Additionally, SCIT results are analysed separately for the four quickest exposure durations, collectively known as the Head, while the four longest exposure durations are combined as the Tail.

- The Head includes durations that are so fleeting that sometimes the brain is unable to consciously recognize that it saw a U- or H-stimulus. Nonetheless, the information is available to subcortical parts of the brain (eg. thalamus) and the visual cortex, so **scores for the Head indicate how effective these areas are** at processing information (known as 'unconscious' or 'subconscious' perception).
- The Tail consists of durations of 80 milliseconds or more, where the stimulus is displayed for long enough that it reaches conscious awareness. **Scores for the Tail indicate how effective the frontal cortex is** at making quick judgements.

The six parameters measured by SCIT are summarized below:

	Mean Response Time	Mean Error Rate	Timed Outs
<b>Head</b> (4 quickest exposure durations: 16-64 milliseconds)	Axonal communication from subcortical to cortical areas	Neuronal function in brain regions involved in unconscious perception	Subconscious attentional processes
<b>Tail</b> (4 longest exposure durations: 80-128 milliseconds)	Axonal communication between cortical areas	Neuronal function in cortical regions; response inhibition	Conscious attention and decision-making

Since these parameters collectively contribute to brain function, **they are equally important.**

## There are two ways to use SCIT

SCIT can be used to track small changes in the cognitive performance of a participant through time. For example, it can be used to assess whether a different diet or a new pharmacological treatment influences brain function. To do this, the participant should be tested before the intervention begins, during the treatment, and again after the intervention has concluded. Changes in scores on any of the six SCIT parameters will indicate which aspects of brain function may have been affected by the intervention, as well as whether the changes constitute improvements or impairments.

SCIT can also be used as a once-off measure to assess how the functioning of a participant's brain compares to healthy individuals of the same age. To do this, the participant's results are compared to charts of **normative data**. Simply print out the charts and use a pen to indicate the location of the participant's scores. Green areas correspond to the results obtained from healthy individuals, amber indicates possible mild impairment, while red indicates probable impairment.

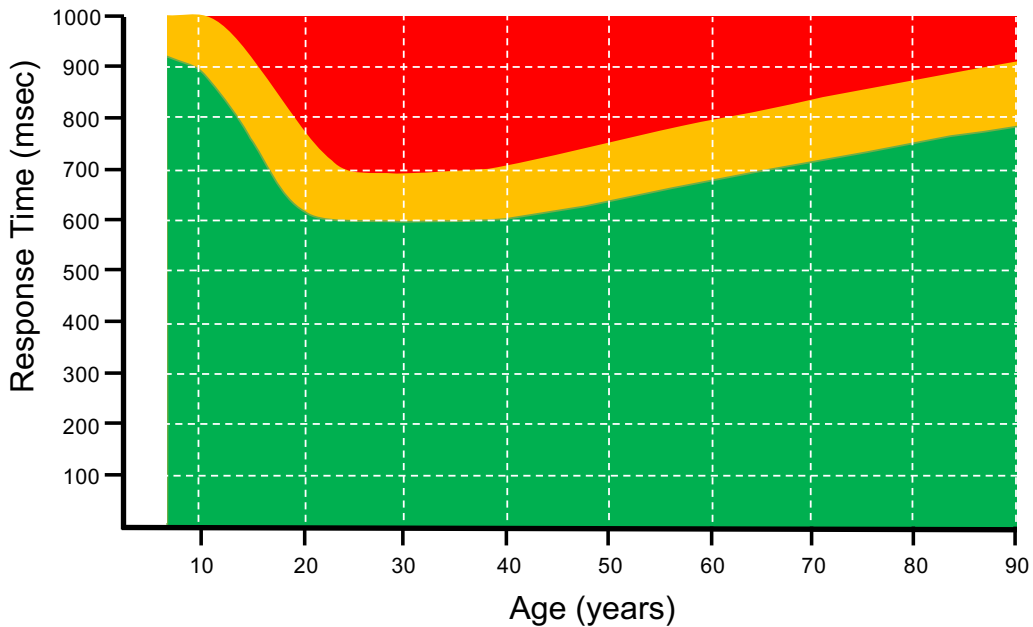
## Normative data

The normative charts below are based on published and unpublished data from 837 participants aged 5 – 87 years. These charts are subject to ongoing revision without notice. Results in the amber and red zones may indicate cognitive impairment compared to healthy individuals of a similar age. However many factors can influence SCIT performance, so if a participant has an amber or red result, they should be retested on another day when they are feeling rested and alert. SCIT is sensitive to fundamental aspects of information processing that underlie brain function, and some of the impairments it detects are too subtle to affect the activities of everyday living.

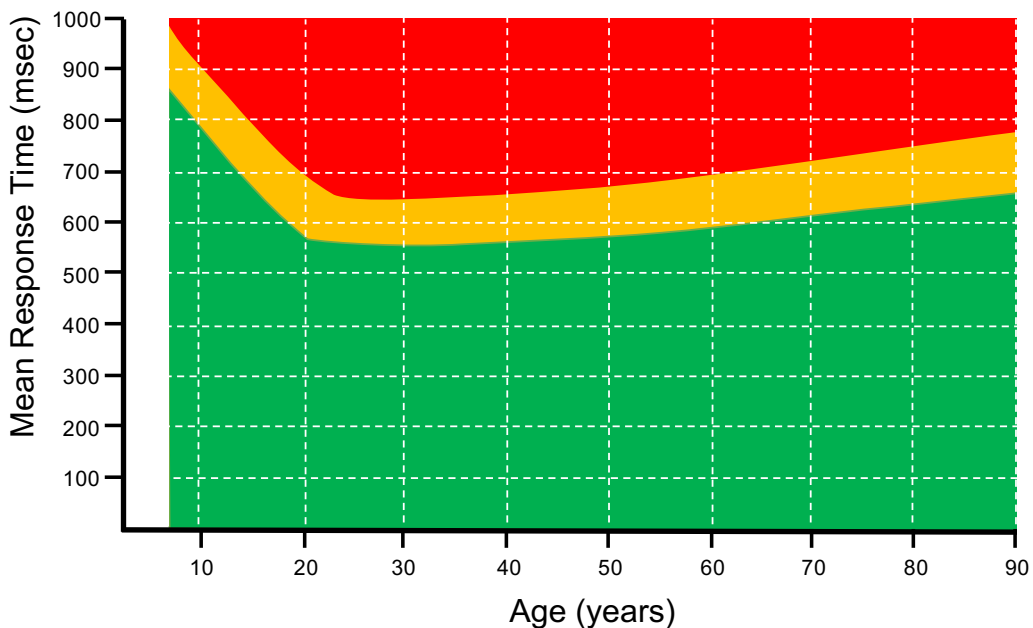
**SCIT cannot diagnose or identify brain injury or psychological illness. If you are concerned about your results, please seek advice from a medical practitioner.**

For privacy reasons, we do not request information about the age of participants. The templates below can be used to plot a participant's results:

**Normative chart of Mean Response Time (Head) for H- and U-tests**

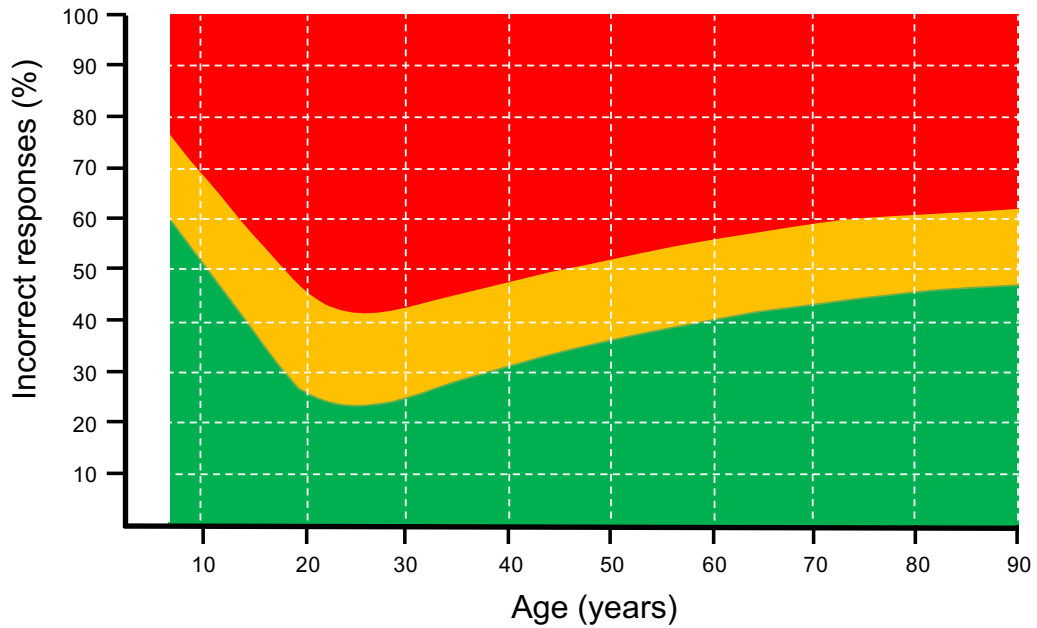


**Normative chart of Mean Response Time (Tail) for H- and U-tests**

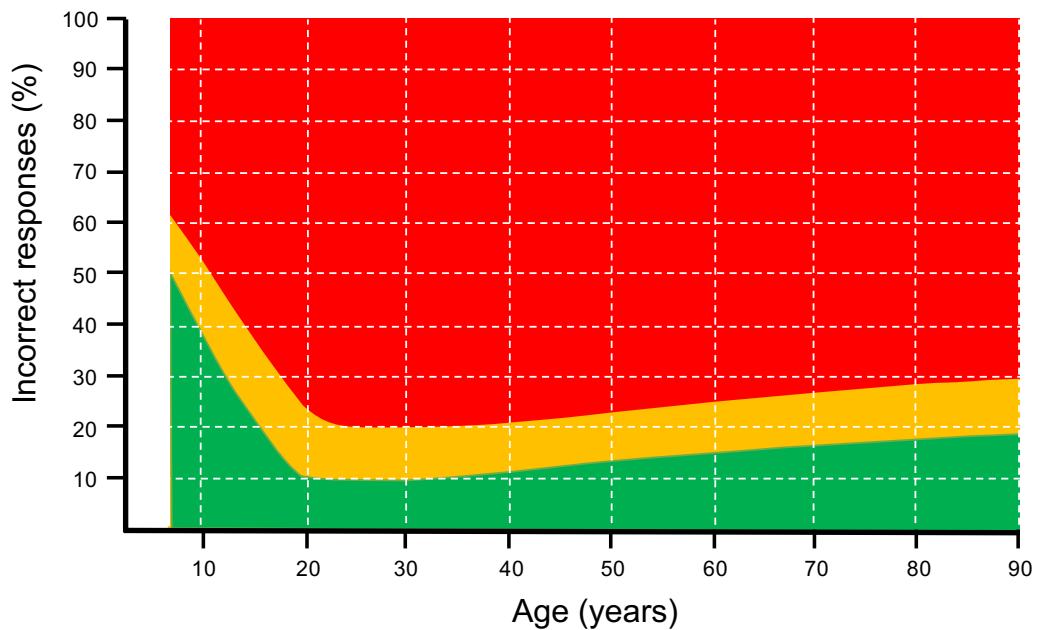


■ Normal healthy ■ Possible impairment ■ Probable impairment

Normative chart of Mean Error Rate (**Head**) for H- and U-tests



Normative chart of Mean Error Rate (**Tail**) for H- and U-tests



■ Normal healthy 
 ■ Possible impairment 
 ■ Probable impairment

Although normative values are not yet available for **Timed outs**, here is a rough guide:

	Normal healthy	Possible impairment	Probable impairment
<b>Head (16-64 msec)</b>	0-3	4-6	6+
<b>Tail (80-128 msec)</b>	0-1	2-4	5+

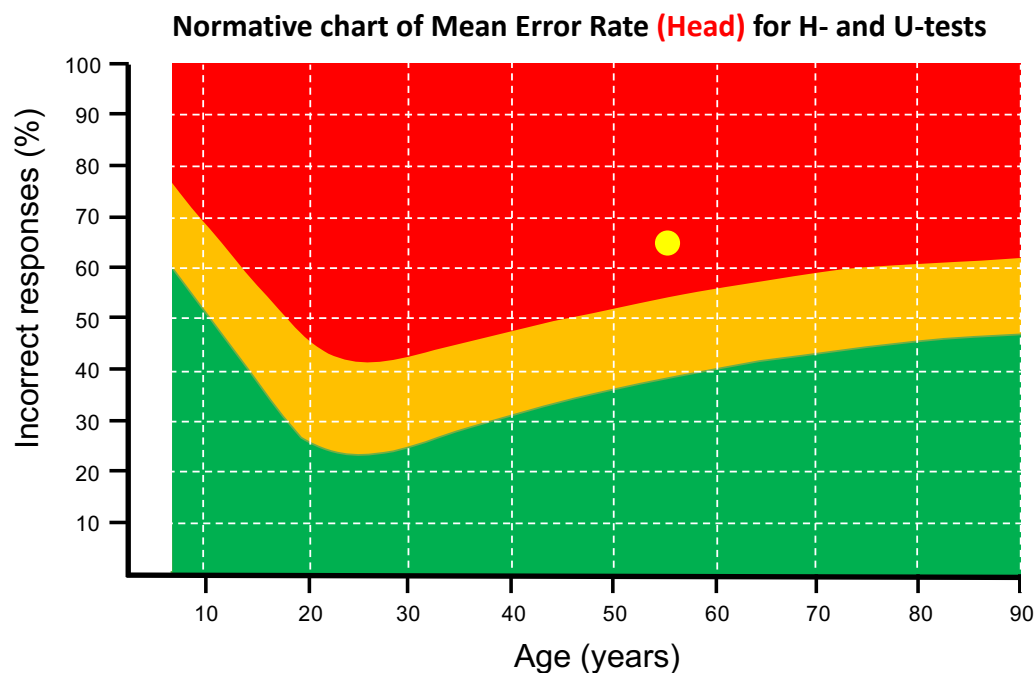
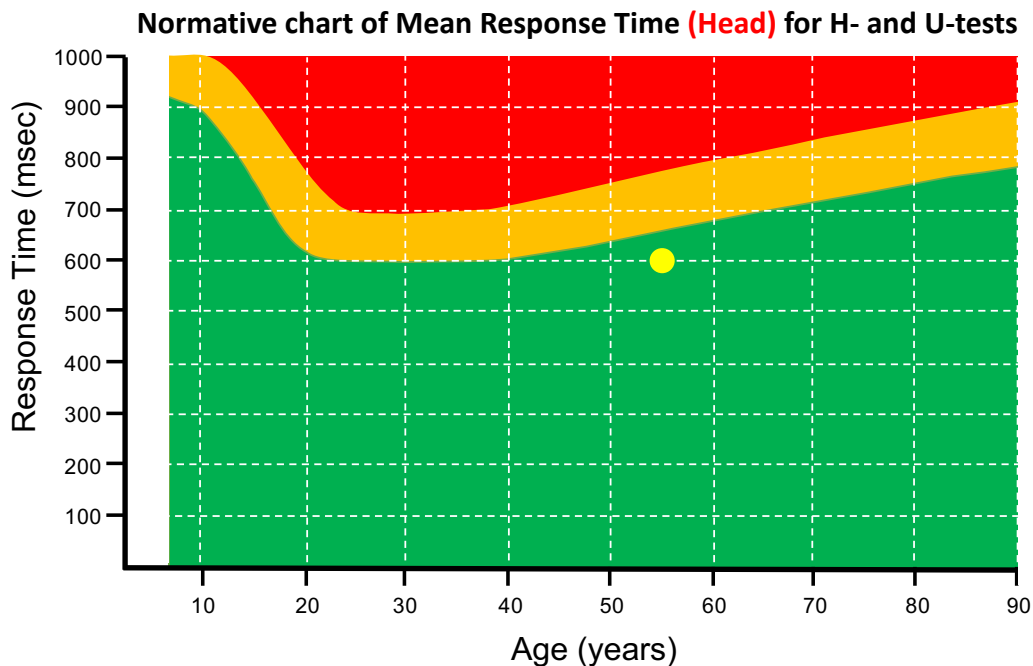
Due to the high sensitivity of SCIT, it is common for participants to have 1-2 amber values among their 6 scores. Red values are a more reliable indicator of impairment, with the extent of impairment being indicated by the distance away from the amber zone. Conversely, green scores that are further away from the amber zone indicate superior cognitive function.

## EXAMPLE

Participant #567 is 55 years old and received the following results:

Mean Response Time (Head):	600 msec
Mean Error Rate (Head):	65%

These results are plotted as yellow dots on the templates below:



■ Normal healthy   ■ Possible impairment   ■ Probable impairment

In this instance, Participant #567 has a normal Mean Response Time (Head) for their age, but they have made more errors than healthy people of the same age, indicating that they may have impaired neuronal function in the subcortical or cortical areas associated with unconscious visual perception. If they receive a similar result after being retested, they may choose to show their results to a medical practitioner.

## Frequently asked questions

### *Q. Is it possible to cheat on SCIT?*

A. It is not possible for participants with genuine impairment on the parameters measured by SCIT to obtain results in the normal range. While it is possible to deliberately perform worse on SCIT, such malingering can be detected on retesting, because it is very difficult to fake the same poor result twice. Impaired participants who are unable to see the stimulus sometimes pretend they can see by responding when they see the mask. Although such participants characteristically record normal response times, their impairment is revealed by error rates close to 50%.

### *Q. Why do some participants have more than a 50% error rate?*

A. A random pattern of responses results in an error rate of between 40-60%. As Timed outs are recorded as errors, participants with high error rates tend to have multiple Timed outs. Occasionally a participant may record a high proportion of errors (more than 60%) in the Head and Tail without registering any Timed outs. This can happen when the participant misunderstood the instructions and had pressed the button corresponding to the longest side of the stimulus instead of the shortest side. In such cases, the participant should be told how to respond correctly and then be retested.

### *Q. Is it possible for a participant with cognitive problems to perform normally on SCIT?*

A. Yes. SCIT is sensitive to fundamental aspects of brain function that are necessary for many but not all cognitive domains. Cognitive domains that are not strongly time-dependent, such as memory and language, can be affected even when SCIT performance is normal.

### *Q. Why do the normative charts vary according to age?*

A. It takes around 20 years for the developing brain to become fully myelinated. Consequently performance on SCIT reaches a peak during the third decade of life. Thereafter, the natural ageing process involves a gradual loss of neurons that affects the ability to process information quickly and accurately. As the rates of brain maturation and ageing differ between people, healthy individuals of the same age can perform differently on SCIT.

### *Q. Do males and females perform differently on SCIT?*

A. No. Our data indicate that when matched for age, both sexes have the same response times and error rates.

### *Q. Is there a difference in performance on the U- and H-tests?*

A. Our data indicate that healthy participants aged between 15-70 years perform similarly on the U- and H-tests, which means that the same normative curves can be used for both versions. However, the H-test can be challenging for children aged 5-15 and for adults older than 70, and for this reason it is recommended that they do the U-test.

### *Q. I was distracted while doing the SCIT and missed some responses. What should I do?*

A. At the end of the testing procedure participants can choose to 'Escape' or 'Submit' their test data. If Escape is selected you will be returned to the NeuroTest home page, the test results will not be submitted and a licence will not be used. Participants should only submit their test data if they performed the test without distractions, as SCIT results are unreliable if a participant was interrupted. If in doubt, it is best to do another test.

### *Q. I received amber and red scores. Should I be concerned?*

A. Due to the high sensitivity of SCIT, it is common for participants to have 1-2 amber values among their 6 scores. Red values are a more reliable indicator of impairment. As a variety of factors can influence SCIT performance, it is recommended that you do another test when you are feeling rested and relaxed. If you still perform poorly, you may wish to investigate whether problems with your eyesight could have contributed to your performance.

## Frequently asked questions continued

*Q. I lost my test results. How can I get another copy?*

A. Test results are available upon login to SCIT. Use the 'SCIT login' link to access your account and view your results.

*Q. I tried to purchase a licence but was blocked from proceeding with the transaction. Why is this?*

A. The independent payment gateway used to purchase SCIT licenses places restrictions on certain types of transactions. Send an email to [contact@neurotest.com](mailto:contact@neurotest.com) and we will send you an invoice for the number of test licences you require.

*Q. After purchasing a licence I decided not to do the SCIT. Can I receive a refund?*

A. Refunds will not be given if you have changed your mind. Please refer to Section 14 of our 'Terms and Conditions of Use'.

*Q. I completed a test as a participant, not as a licence holder. Can I get my results?*

A. Test results are placed in the licence holder's account. Participants should ask the licence holder for their test results.

*Q. My elderly parent tested themselves on SCIT, how can I get their results?*

A. Our privacy regulations prevent us from sharing the results of SCIT with anyone other than the licence holder, except where required to do so by Law. Please refer to the NeuroTest 'Privacy Policy.'

*Q. I can see SCIT on my tablet and smartphone, so why do the instructions say I cannot do SCIT on these devices?*

A. Although SCIT is configured to run on most computers, devices that require responses to be entered via a touch screen lack the millisecond accuracy required by SCIT, and consequently the results obtained on these devices are unreliable. However, you can do SCIT on a tablet provided you use a wireless keyboard. Smartphones are unsuitable because the screen is too small to enable the images to be displayed at the correct size, and this affects response accuracy.

*Q. I realized during my response that I had pressed the wrong side and tried to correct the button press halfway but still received an error for that response. Why?*

A. SCIT records the first button press to a stimulus, even if the second button is pressed just a few milliseconds later. If you commonly experience this problem, take a little longer to respond, as an accurate response is more important than a speedy response.

*Q. The mask of black circles is very distracting, is it needed?*

A. The mask of filled circles is essential, as it blocks out the after-image of the stimulus and ensures that the stimulus is only visible for the required number of milliseconds.

If you have any further questions, please contact us:



**NeuroTest Pty Ltd**

PO Box 1340

Glen Waverley

VIC 3150 Australia

Email: [contact@neurotest.com](mailto:contact@neurotest.com)

URL: [www.neurotest.com](http://www.neurotest.com)

ABN: 40 165 324 121