

Stroop Test

The Stroop Test is a classic psychological experiment used to investigate attention, cognitive control, and interference. First developed by John Ridley Stroop in 1935, it has become one of the most widely used tasks in cognitive psychology. The test demonstrates how automatic processes (such as reading) can interfere with more controlled processes (such as naming colours), revealing important insights into how the human mind works.

Why Does the Stroop Effect Occur?

The Stroop Effect occurs because reading is an automatic process, whereas naming colours requires more conscious effort. When the word and colour conflict, the brain experiences interference because two competing responses are activated:

- The automatic response: reading the word
- The controlled response: naming the ink colour

To complete the task correctly, the participant must inhibit the automatic reading response, which takes time and cognitive effort.

This makes the Stroop task a powerful tool for studying:

- Selective attention (focusing on relevant information)
- Cognitive inhibition (suppressing automatic responses)
- Processing speed

What Previous Studies Found:

Stroop (1935) - The Original Study

Stroop found participants were slower to name ink colours of incongruent words (e.g., “RED” in blue ink). This showed that reading is automatic and interferes with colour naming, highlighting cognitive interference and forming the basis for research into attention and automatic processing.

MacLeod (1991) - Review of Stroop Research

MacLeod reviewed decades of Stroop studies, confirming the effect is reliable across languages, ages, and tasks. He concluded the Stroop task is a key measure of automatic processing and cognitive control, widely used to study attention and inhibition.

Cohen, Dunbar, & McClelland (1990) - Connectionist Model

This model explained the Stroop Effect as competition between neural pathways. Reading is faster due to stronger practice-based connections, while colour naming is slower. The study linked observed behaviour to underlying cognitive processes in the brain.

Egner & Hirsch (2005) - Neural Basis of Cognitive Control

Using fMRI, Egner and Hirsch showed that Stroop interference is linked to activity in the prefrontal cortex and anterior cingulate cortex. Their findings demonstrated how the brain actively resolves conflict between competing responses, providing modern evidence that the Stroop Effect reflects real-time cognitive control processes.

Why this matters in real life:

1. Understanding Attention and Distraction:

The Stroop Effect illustrates how irrelevant information can interfere with our goals. In everyday life, this is similar to:

- Trying to concentrate while distracted by notifications
- Reading while background conversations compete for attention

2. Multitasking and Cognitive Limits:

The task highlights the limits of multitasking. Even when we think we can handle multiple tasks, interference can slow us down and increase errors. This has implications in contexts such as:

- Driving while using a phone
- Working in busy or noisy environments

3. Clinical Use:

The Stroop Test is widely used in clinical psychology and neuropsychology to assess:

- Attention and executive functioning
- Brain injury or neurological disorders
- Cognitive decline in ageing

4. Real-World Decision Making:

In many real-life situations, we must ignore automatic impulses and make controlled decisions—such as resisting distractions, following rules, or making careful judgments. The Stroop Test provides a simple model for how this process works and why it can sometimes fail.

Your Task: Create a simple STROOP Test

Your Stroop Test will include 5 colour names and 5 font colours (Green, Blue, Yellow, Silver and Red – you can find a list of words and font colours at the end of this booklet!) and will include two conditions:

Condition 1:

You will ask participants to press a designated key that corresponds with the WORD they are being presented with (e.g. if participants are presented with the word 'RED' in Blue font they will have to select the 'RED' key).

Condition 2:

You will ask the participants to select a designated key that corresponds with the FONT COLOUR the word is presented in (e.g. if the word 'RED' is presented in Blue font they will have to select the 'BLUE' key).

Procedure:

1. Participants will be tested individually; all aspects of the study will take place in an individual lab booth.
2. Participants will first be presented with an information sheet, followed by a consent form. After providing informed consent, participants will begin the computer-based Stroop task.
3. Participants will first be shown an instruction screen explaining Condition 1 (Word Condition). They will be instructed to press a designated key corresponding to the word, regardless of font colour.
4. In Condition 1, participants will be shown a series of colour words (e.g., RED, BLUE, GREEN) presented individually on the screen in incongruent font colours. For example, if the word "RED" is shown in blue font, participants must press the key assigned to "RED".
5. Participants' responses and reaction times will be recorded for each trial.
6. Participants will then be shown a second instruction screen explaining Condition 2 (Font Colour Condition). They will be instructed to press a designated key corresponding to the font colour, ignoring the word itself.
7. In Condition 2, participants will again be shown a series of colour words presented individually on the screen in incongruent font colours. For example, if the word "RED" is shown in blue font, participants must press the key assigned to "BLUE".
8. Responses and reaction times will again be recorded for each trial.
9. Upon completion of both conditions, participants will be verbally debriefed and provided with a written debrief form explaining the purpose of the study.

Study Creation:

- **Block** = a section of the experiment
 - Instructions 1
 - Condition 1
 - Instructions 2
 - Condition 2
 - End message/thank you

- **Trial** = one “unit” of a stimulus + response
 - 20 Trials for condition 1 (colour words in different font colours linked to the Condition 1 events)
 - 20 Trials for Condition 2 (colour words in different font colours linked to Condition 2 events)
 - For each trial, the order should be: Fixation Cross, Blank Screen and Stroop Word Event

- **Event** = the thing that appears on the screen (e.g., word, fixation cross, blank screen)
 - 1 event for the Fixation Cross
 - 1 event for the Blank Screen
 - 20 events for Condition 1 (colour words in different font colours with specific correct response)
 - 20 events for Condition 2 (colour words in different font colours with specific correct response)

Step-by-step instructions:

1. Create new experiment:

- Open SuperLab 6
- Create a New Experiment
- Blank Experiment

2. Create reusable inter-stimulus events:

- Create two Events you'll insert between stimuli:
- Fixation Cross:
 - Create a new Event
 - Event Type: 'Text' and type in a '+'
 - Change font size 72
 - Set to display for 500ms
- Blank Screen:
 - Create a new Event
 - Event Type: 'Text' and leave blank
 - Set to display for 500ms

2. Block 1: Instruction (Condition 1)

- Create a new Block and name it Instructions1.
- Create a new Trial and name it Instructions1.
- Create a new Event and name it Instructions1.
- Event Type: 'Text'
 - Type in a clear set of instructions.
 - Space the text out nicely, so it is readable and easy to understand
- Set the 'Correct Response':
 - Click 'Edit Response' and then click 'New'
 - Call the response 'SPACEBAR' and add a space into 'The Following Key' box
- Input: 'After a correct response..'
- Link the Instruction Block, Trial and Event:
 - When the Block is highlighted, tick the corresponding Trial(s)
 - When the Trial is highlighted, tick the corresponding Event(s)

3. Block 2: Condition 1

- Create your Block (called Condition1)
- Create 20 Trials (Condition1.1 to Condition1.20)
- Create 20 new Events (Condition1.1 to Condition1.20)
- Event Type: Text.
 - Type the WORD (e.g., “Red”). Change the font colour to match what the table at the end of the booklet requires (e.g., Blue font).
 - Set font size large (e.g., size 48) so it is easily readable.
- Set the ‘Correct Response’:
 - Click ‘Edit Response’ and then click ‘New’
 - Add new ‘Correct Response’ You must assign keys for each colour word:
 - R = Red
 - B = Blue
 - Y = Yellow
 - G = Green
 - S = Silver
- Input: ‘After a correct response..’ For Condition 1, the correct response is the WORD, not the font.
- Link the Block, Trials and Events.
 - Separating each word with the Blank Screen and Fixation Cross.
 - For each Trial, click on the Fixation Cross, Blank screen and then your word
- Randomise the Block.

4. Block 3: Condition 2 Instruction

- Follow steps for Block 1
- In the text box, type clear instructions for Condition 2

5. Block 4: Condition 2

- Follow the steps for Block 2
- You must create new Events so the previous events cannot be reused – this is because the correct response must be different
- Input: ‘After a correct response..’ For Condition 2, the correct response is the FONT colour, not the word

6. Block 5: Thank you page

- Create a new Block (End)
- Create a new Trial (End)
- Create a new Event (End), change 'Event Type' to Text and enter your instructions for your first condition
- Now you need to link the Instruction Block, Trial and Event

Test the Experiment Before Running It

You must check:

- Do all stimuli appear correctly?
- Are the colours correct? Do they match the table?
- Do the keys work for each colour?
- Does the Fixation-Blank screen-Stimulus sequence work?
- Are both conditions randomised?
- Does each block end properly with the SPACEBAR?

In addition to the SuperLab task, you will be required to create your study materials (template of these are available via the Module Moodle page). These include:

1. Study Information Sheet
2. Consent Form
3. Debrief Sheet
4. Study Protocol

Once completed, the study materials and SuperLab programme must be emailed to katie.sullivan@uwtsd.ac.uk and kate.williams@uwtsd.ac.uk

Your study materials will be printed and provided to you prior to running your study with a participant.

Word	Font
Red	Blue font
Red	Yellow font
Red	Green font
Red	Silver font
Blue	Red font
Blue	Yellow font
Blue	Green font
Blue	Silver font
Yellow	Red font
Yellow	Blue font
Yellow	Green font
Yellow	Silver font
Green	Red font
Green	Blue font
Green	Yellow font
Green	Silver font
Silver	Red font
Silver	Blue font
Silver	Yellow font
Silver	Green font