Early Spark

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Cognitive Assessment Report

Date: October 26, 2023

Subject: Cognitive Assessment based on Game Metrics and Speech Analysis

Overview:

This report presents a cognitive assessment based on a series of digital cognitive games (Stroop Colour, Memory Recall, and Object-Purpose Matching) and speech/sentiment analysis. The data provided includes scores from the cognitive games, as well as metrics extracted from a single audio file, including pause duration, filler word usage, lexical diversity, speech rate, and sentiment analysis. This report aims to provide an initial overview of cognitive function, highlighting potential areas of concern and recommending further evaluation when appropriate.

Metrics Explanation:

* Stroop Colour: This test measures cognitive flexibility and selective attention. Participants are asked to name the colour of a word, while the word itself spells out a different colour (e.g., the word "blue" printed in red ink). The score represents the number of correct responses within a given time frame. Lower scores may indicate difficulty with executive function, attention, and processing speed.

* Memory Game: This assesses short-term and working memory. Participants are presented with a sequence of stimuli (e.g., objects, colours) and are then asked to recall the sequence in the correct order. The score reflects the number of sequences correctly recalled. Low scores are potentially indicative of impaired immediate recall or working memory.

* Image Recall: Image recall tasks measures an individuals ability to memorize and recall images from earlier parts of the test, testing long term visual memory

* Speech Metrics: These measures provide insights into language production and cognitive processing.

* Total Time: The total duration of the audio file in seconds.

* Total Pause Time: The cumulative duration of pauses within the audio file in seconds.

* Pause Density (%): The percentage of the total time spent pausing. Elevated pause density may reflect word-finding difficulties or cognitive processing delays.

* Repeated Words: The number of times words were repeated during speech.

* Filler Words: The number of filler words (e.g., "um," "ah") used during speech. Increased filler word usage can be associated with hesitations, word-finding difficulties, or anxiety.

* Filler Frequency (%): The percentage of total words that are filler words.

* Unique Words: The number of unique words used in speech.

* Lexical Diversity (%): The ratio of unique words to the total number of words, expressed as a percentage. Lower lexical diversity can indicate reduced vocabulary or difficulty with language generation.

* Speech Fluency (words/sec): The rate of speech, measured in words per second. Reduced speech fluency can be indicative of motor speech difficulties or cognitive processing delays.

* Sentiment Analysis: This analyzes the emotional tone of the speech. The output includes a label (e.g., "positive," "negative," "neutral") and probabilities for each sentiment category. The weighted score represents an overall sentiment score based on the probabilities. Extreme positive or negative sentiment can indicate underlying emotional or psychological distress.

Memory Game Analysis:

The memory game score is 1. This suggests potential difficulties with short-term memory, working memory, and the ability to encode and retrieve new information. This score warrants further investigation to determine the underlying cause of the memory impairment. Factors influencing this include attention, motivation, and understanding of the task instructions.

Image Recall:

The image recall score of 0 shows potentially very low performance on long term memory.

Stroop Colour:

The Stroop Colour score of 40 suggests average performance in cognitive flexibility and selective attention. This score is within a normal range, indicating adequate executive function and processing speed.

Speech Analysis:

Based on the provided speech metrics for the single audio file:

* Pauses: The pause density is 50%, which is very high. This suggests considerable hesitation during speech. This could be attributed to word-finding difficulties, cognitive processing delays, anxiety, or other factors.
* Filler Words: The filler frequency is 14.29%, indicating a moderate use of filler words. This can also be indicative of difficulty with fluency or word retrieval.
* Lexical Diversity: The lexical diversity is 100%. Which is unusually high and might be indicative of a short sample size. This should ideally be based on a larger speaking sample.
* Speech Fluency: The speech fluency is extremely high at 78.57 words/second. This is likely an error, as normal speech fluency is generally between 2-4 words per second. Given that the total pause time matches the total time, this may be the result of a computation error.

Sentiment Analysis:

The sentiment analysis indicates a neutral sentiment (weighted score of 45.078). This suggests that the speech content is generally emotionally neutral. However, it's important to note that a single neutral reading doesn't preclude underlying emotional concerns; a more comprehensive assessment would involve analyzing sentiment across multiple speech samples.

Heuristic Cognitive Risk Assessment:

Based on the available data, there is a risk profile suggesting cognitive challenges. The low memory game score of 1 and image recall score of 0 are concerning and warrant further evaluation. The high pause density in the speech sample further supports this concern. The very high (and likely erroneous) speech fluency does not help clarify the picture. While the Stroop score is normal and the Sentiment Analysis shows "neutral", the memory challenges should be investigated further.

Integrated Interpretation:

The combined results suggest a possible cognitive impairment, primarily impacting memory function. The high pause density in speech might reflect cognitive processing issues. While the Stroop test suggests adequate executive function and processing speed, the overall picture warrants further investigation. It's important to consider that these results are based on a limited dataset and further assessment is needed for a more comprehensive evaluation. The extremely high speech fluency calculated suggests an error, highlighting the limitations of automated analysis without manual verification. The verbatim transcript is also very short, only one sentence.

Recommendations:

1. Comprehensive Neuropsychological Evaluation: A full neuropsychological evaluation is strongly recommended. This would involve a battery of standardized tests to assess various cognitive domains, including memory, attention, executive function, language, and visuospatial skills.
2. Neurological Consultation: A consultation with a neurologist is recommended to rule out any underlying neurological conditions that may be contributing to the observed cognitive difficulties.
3. Repeat Cognitive Testing: Repeat the digital cognitive games and record additional speech samples to establish a baseline and monitor for any changes over time. Ensure that the audio capture accurately records speech.
4. Address Potential Confounding Factors: Review any potential confounding factors that may be affecting cognitive performance, such as medication side effects, sleep disturbances, or mood disorders.
5. Consider Speech Therapy: If speech analysis continues to show high pause density and other language-related difficulties, consider a referral to a speech therapist for further evaluation and intervention.

It is a test done by AI; if the score is too high it is suggested to consult a doctor immediately, if not then also it is better to meet a doctor.

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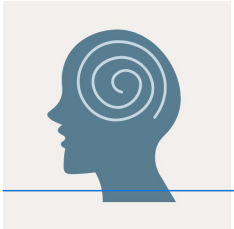

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