



Multimodal Lexical Memory Test

Version No: 2023.1
Issue Date: 2023-04-17

Purpose of this document

This file contains all the information to understand and analyze the Multimodal Lexical Memory Test. You will be able to find relevant information about how this assessment task works, what it measures, and all relevant data about the variables recorded during the performance of the activity.

Task Info

In this section information about the task, its structure, and stimuli will be given.

Task Description

The *Multimodal Lexical Memory Test* measures the ability to distinguish new information from older information while updating the stored information with the incoming new pieces of information. As the user sees the picture of an object or hears the name of an object, for each object seen or heard, they must choose from three possibilities: 1) the item is presented for the first time in the task, 2) the last time this same item appeared was in a spoken format, or 3) the last time it appeared it was presented as a picture. The stimuli consist of images (seen stimuli) or words read aloud (heard stimuli).

The concept of this task is based on the n-back task paradigm (Kirchner, 1958), and on the episodic recall tasks (Ashford, 2005; Van Der Hoek et al., 2019).

You can try the *Multimodal Lexical Memory Test* for free on [this page](#). If you want more information about its technical details, you can contact us at support@cognifit.com.

Cognitive skills measured

The primary cognitive ability measured by this task is ***multimodal lexical memory***.

This task contributes to the measurement of Updating, Visual perception, Auditory perception, Recognition, Contextual memory, Non-verbal memory, Naming, Working memory, Processing speed, and Response time.

Task Structure

The task is divided into 2 phases:

Phase	Amount of trials	Stimulus presented as		Congruence pairing		Correct answer		
		Picture	Sound	Same modality	Cross-modality	"Not presented before"	"Presented as picture"	"Presented as spoken word"
0 (Learning)	4	3	1	1	1	2	1	1
1 (Testing)	60	30	30	20	20	20	20	20

"Stimulus presented as": indicates the modality of target stimulus presentation.

"Congruence pairing": indicates the modality relationship between the target stimulus and its preceding presentation.

"Correct answer": indicates which button the user is expected to press.

Task Stimuli

A stimulus will be presented either visually or audibly. Immediately following each presentation, the users will have a 7000 millisecond window to discern whether it's their first encounter with the given stimulus, or if they've experienced it before, and if so, in what format appeared last time (image or sound). It is crucial for test-takers to remember not only the stimulus itself but also the modality of its presentation.

Each stimulus, representing one of 60 distinct objects, will be centrally displayed on the screen. These objects span a variety of categories including clothing and accessories, food items, animals, household items, musical instruments, and outdoor tools.

The maximum number of times that one given stimulus can appear during the task ranges between 2 and 5 appearances in the case of repeated items. Similarly, the maximum number of trials (items) that can occur between the presentation of a given stimulus and its repetition ranges between 2 and 8.

Variables Info

In this section details about the variables, their definition, range, and other pieces of relevant information will be given.

Basic Variables

Accuracy

This variable measures the percentage of correct responses in the whole testing phase. Its range can go from 0 to 100, and higher scores indicate better performance.

Response time

This variable measures the average response time to correct trials in the whole task. It ranges from 0 to 7000 milliseconds, and lower values indicate better performance.

Accuracy in congruent modality presentation

This variable measures the percentage of correct responses where the stimulus to be remembered was presented last time in a congruent way, that is, it's presented as a picture and its last apparition was also a picture or it's presented as a spoken word and its last apparition was also as a spoken word. It ranges from 0 to 100, and higher values indicate better performance.

Accuracy in incongruent modality presentation

This variable measures the percentage of correct responses where the stimulus to be remembered was presented last time in an incongruent way, that is, it's presented as a picture and its last apparition was presented as a spoken word, or vice versa. It ranges from 0 to 100, and higher values indicate better performance.

Response time in congruent modality presentation

This variable measures the average response time to correct trials where the stimulus to be remembered was presented last time in a congruent way, that is, it's presented as a picture and its last apparition was also a picture or it's presented as a spoken word and its last apparition was also as a spoken word. It ranges from 0 to 7000, and lower values indicate better performance.

Response time in incongruent modality presentation

This variable measures the average response time to correct trials where the stimulus to be remembered was presented last time in an incongruent way, that is, it's presented as a picture and its last apparition was presented as a spoken word, or vice versa. It ranges from 0 to 7000, and lower values indicate better performance.

Accuracy in new stimuli presentation

This variable measures the percentage of correct responses to new stimuli, that is, to stimulus that appear for the first time. It ranges from 0 to 100, and higher values indicate better performance.

Accuracy in old stimuli presentation

This variable measures the percentage of correct responses to old stimuli, that is, to stimuli that have appeared previously. It ranges from 0 to 100, and higher values indicate better performance.

Response time in new stimuli presentation

This variable measures the average response time in correct trials where a new stimulus is presented, that is, to stimuli that appear for the first time. It ranges from 0 to 7000 milliseconds, and lower values indicate better performance.

Response time in old stimuli presentation

This variable measures the average response time in correct trials where an old stimulus is presented, that is, to stimuli that have appeared previously. It ranges from 0 to 7000 milliseconds, and lower values indicate better performance.

Omission errors

This variable measures the number of trials where no response is given by the user after 7000 milliseconds since the presentation of the stimulus, that is, the number of timeouts. It ranges from 0 to 60. High scores on this variable indicate that the user is distracted (not paying attention) or has a slow response.

Omission errors (percentage)

This variable measures the number of trials where no response is given by the user after 7000 milliseconds since the presentation of the stimulus, that is, the number of timeouts. It ranges from 0 to 100. High scores on this variable indicate that the user is distracted (not paying attention) or has a slow response.

Additional Variables**Accuracy in visual stimuli presentation**

This variable measures the percentage of correct responses in all the trials where the presented stimulus is a picture, regardless of how it was presented before. It ranges from 0 to 100, and higher values indicate better performance.

Accuracy in auditory stimuli presentation

This variable measures the percentage of correct responses in all the trials where the presented stimulus is a spoken word, regardless of how it was presented before. It ranges from 0 to 100, and higher values indicate better performance.

Response time in visual stimuli presentation

This variable measures the average response time to correct trials where the presented stimulus is a picture, regardless of how it was presented before. It ranges from 0 to 7000 milliseconds, and lower values indicate better performance.

Response time in auditory stimuli presentation

This variable measures the average response time to correct trials where the presented stimulus is a spoken word, regardless of how it was presented before. It ranges from 0 to 7000 milliseconds, and lower values indicate better performance.

Validity Index

The user's performance will be considered to deviate from what is expected to the point of invalidating the results of the assessment when it falls outside these ranges.

Task validity

This variable represents the validity of the whole task, and it is 'true' only when all the individual variables of the Validity Index of the task are 'true'. Otherwise, it is 'false'.

Accuracy validity

This variable measures the validity of the variable "Accuracy", and it is 'true' when its value is between 0 and 100 (both included). Otherwise, it is 'false'.

Response time validity

This variable measures the validity of the variable "Response time", and it is 'true' when its value is between 250 and 7000 milliseconds (both included). Otherwise, it is 'false'.

Omission errors validity

This variable measures the validity of the variable "Omission errors", and it is 'true' when its value is below 30, included. Otherwise, it is 'false'.

References

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