

Memory- Visual Paired Associates Test:

Memory- Definition:

Memory is like a computer's hard drive—it saves information so it can be used later.

Visual Paired Associates Test- Definition:

A memory task where participants learn pairs of items, usually a visual image paired with another image or a symbol.

The test encompasses several phases:

a. Encoding (Learning Phase)

- **Definition:** The process of learning and registering information into memory.
- **Key Features:**
 - Can be visual, verbal, or associative.
 - Strong encoding improves later recall.

b. Immediate Cued Recall

- **Definition:** Later, show one item of each pair (cue) and ask the participant to select or name the matching item.
- **Key Features:**
 - Tests short-term retention.
 - Reflects initial learning strength.

c. Delayed Cued Recall

- **Definition:** After a short delay, repeat the same test to see how much they remember over time.
- **Key Features:**
 - Tests consolidation and retention over time.
 - Sensitive to forgetting or memory decay.

d. Recognition

- **Definition:** Ability to identify previously learned information when presented among distractors.
- **Key Features:**
 - Easier than free recall because cues are provided.
 - Measures memory accuracy and familiarity.

For Tech team's Reference:

1. Task Overview

- **Total Rounds:** 35 rounds (35 unique pairs).

2. The whole task flow:

1. The participant first reads the **Main Task Instructions**.

Generic Instruction (shown to all participants first)

"In this game, you will see pictures of everyday things. Some of these pictures will be shown together as pairs. Your task is to pay close attention and try to remember which

ones are being presented as pairs, because later we will test your memory in different ways. Sometimes you will have to write the missing item, and sometimes you will choose it from a few options. Let's get started!" When you feel set to take on the challenge, tap **'Let's Go!'** below and the game begins!"

1. Encoding Phase (Learning the Pairs)

Screen Layout

- Two items are displayed **together inside a white box**, centered on the screen.

Timing

- Adolescents: 3.5 seconds per pair
- Adults: 2.5 seconds per pair

Progression

- Each pair is displayed for the fixed duration.
- The screen clears automatically, then the next pair appears.
- No response required.



Main Task Flow Table for Encoding Phase (Adolescents Version; To be displayed in interface in same order)





























Instruction Displayed (before first round)

Adolescents:

"You will see two pictures appear inside a box on the screen. Just look carefully and try to remember which pictures are being presented as pairs. You don't need to press anything. Each pair will disappear after a few seconds, so focus while it is on the screen." When you feel set to take on the challenge, tap **'Let's Go!'** below and the game begins!"

Trial	First Item	Second Item	Displayed Pair	Timing (sec)
1	<input type="checkbox"/> Pen	<input type="checkbox"/> Kite	<input type="checkbox"/> + <input type="checkbox"/>	3.5
2	<input type="checkbox"/> Butterfly	<input type="checkbox"/> Spoon	<input type="checkbox"/> + <input type="checkbox"/>	3.5
3	<input type="checkbox"/> Elephant	<input type="checkbox"/> Mango	<input type="checkbox"/> + <input type="checkbox"/>	3.5
4	<input type="checkbox"/> Lock	<input type="checkbox"/> Flute	<input type="checkbox"/> + <input type="checkbox"/>	3.5
5	<input type="checkbox"/> Notebook	<input type="checkbox"/> Cow	<input type="checkbox"/> + <input type="checkbox"/>	3.5
6	<input type="checkbox"/> Eraser	<input type="checkbox"/> Cup	<input type="checkbox"/> + <input type="checkbox"/>	3.5
7	<input type="checkbox"/> Tomato	<input type="checkbox"/> Bag	<input type="checkbox"/> + <input type="checkbox"/>	3.5
8	<input type="checkbox"/> Heart	<input type="checkbox"/> Scissors	<input type="checkbox"/> + <input type="checkbox"/>	3.5
9	<input type="checkbox"/> Drum	<input type="checkbox"/> Goat	<input type="checkbox"/> + <input type="checkbox"/>	3.5
10	<input type="checkbox"/> Phone	<input type="checkbox"/> Auto	<input type="checkbox"/> + <input type="checkbox"/>	3.5
11	<input type="checkbox"/> Table	<input type="checkbox"/> Parrot	<input type="checkbox"/> + <input type="checkbox"/>	3.5
12	<input type="checkbox"/> Robot	<input type="checkbox"/> Chair	<input type="checkbox"/> + <input type="checkbox"/>	3.5
13	<input type="checkbox"/> Ship	<input type="checkbox"/> Potato	<input type="checkbox"/> + <input type="checkbox"/>	3.5

14	<input type="checkbox"/> Pencil	<input type="checkbox"/> Dice	<input type="checkbox"/> + <input type="checkbox"/>	3.5
15	<input type="checkbox"/> Belt	<input type="checkbox"/> Lemon	<input type="checkbox"/> + <input type="checkbox"/>	3.5
16	<input type="checkbox"/> Hibiscus	<input type="checkbox"/> Bike	<input type="checkbox"/> + <input type="checkbox"/>	3.5
17	<input type="checkbox"/> Carrot	<input type="checkbox"/> Peacock	<input type="checkbox"/> + <input type="checkbox"/>	3.5
18	<input type="checkbox"/> Candle	<input type="checkbox"/> Balloon	<input type="checkbox"/> + <input type="checkbox"/>	3.5
19	<input type="checkbox"/> Fork	<input type="checkbox"/> Bulb	<input type="checkbox"/> + <input type="checkbox"/>	3.5
20	<input type="checkbox"/> Sharpener	<input type="checkbox"/> Lotus	<input type="checkbox"/> + <input type="checkbox"/>	3.5
21	<input type="checkbox"/> Shirt	<input type="checkbox"/> Banana	<input type="checkbox"/> + <input type="checkbox"/>	3.5
22	<input type="checkbox"/> Chain	<input type="checkbox"/> Jug	<input type="checkbox"/> + <input type="checkbox"/>	3.5
23	 Hand	<input type="checkbox"/> Rat	 + <input type="checkbox"/>	3.5
24	<input type="checkbox"/> Television	<input type="checkbox"/> Coconut	<input type="checkbox"/> + <input type="checkbox"/>	3.5
25	<input type="checkbox"/> Book	<input type="checkbox"/> Key	<input type="checkbox"/> + <input type="checkbox"/>	3.5
26	<input type="checkbox"/> Shoe	<input type="checkbox"/> Ears	<input type="checkbox"/> + <input type="checkbox"/>	3.5
27	<input type="checkbox"/> Dog	<input type="checkbox"/> Crown	<input type="checkbox"/> + <input type="checkbox"/>	3.5
28	<input type="checkbox"/> Cloud	<input type="checkbox"/> Mirror	<input type="checkbox"/> + <input type="checkbox"/>	3.5

29	 Cycle	 Plate	 + 	3.5
30	 Pig	 Clock	 + 	3.5
31	 Watch	 Crayon	 + 	3.5
32	 Leaf	 Pant	 + 	3.5
33	 Door	 Apple	 + 	3.5
34	 Hat	 Ring	 + 	3.5
35	 Bucket	 Monkey	 + 	3.5



Main Task Flow Table for Encoding Phase (Adults Version; To be displayed in interface in same order)

Instruction Displayed (before first trial)

Adults:

"You will see two items presented together inside a box. Your task is to observe carefully and remember which items are being presented as pairs. You don't need to press anything. Each pair will only remain on screen briefly, so focus while it is shown. When you're prepared to begin the task, press 'Let's Go!' below to start."

Trial	First Image	Second Image	Response Time (sec)
1			

1	<input type="checkbox"/> Mixer	<input type="checkbox"/> Spectacles	2.5
2	<input type="checkbox"/> Mobile Phone	<input type="checkbox"/> Water Tap	2.5
3	<input type="checkbox"/> Lemon	<input type="checkbox"/> Socks	2.5
4	<input type="checkbox"/> Plane	<input type="checkbox"/> Lamp	2.5
5	<input type="checkbox"/> Pillow	 Mug	2.5
6	<input type="checkbox"/> Bowl	<input type="checkbox"/> Switch	2.5
7	<input type="checkbox"/> Helmet	<input type="checkbox"/> Rose	2.5
8	<input type="checkbox"/> Shark	<input type="checkbox"/> Fan	2.5
9	<input type="checkbox"/> Sun	<input type="checkbox"/> Table	2.5
10	<input type="checkbox"/> Rock	<input type="checkbox"/> Peas	2.5
11	<input type="checkbox"/> Chilli	<input type="checkbox"/> Hen	2.5
12	<input type="checkbox"/> Window	<input type="checkbox"/> Orange	2.5
13	<input type="checkbox"/> Purse	<input type="checkbox"/> Hammer	2.5
14	<input type="checkbox"/> Zebra	<input type="checkbox"/> Almonds	2.5
15	 Ball	<input type="checkbox"/> Nose	2.5
16	<input type="checkbox"/> Rope	<input type="checkbox"/> Ice Cream	2.5

17	<input type="checkbox"/> Horse	<input type="checkbox"/> Umbrella	2.5
18	<input type="checkbox"/> Nose	<input type="checkbox"/> Cauliflower	2.5
19	<input type="checkbox"/> Pen	<input type="checkbox"/> Chair	2.5
20	<input type="checkbox"/> Clock	<input type="checkbox"/> Dustbin	2.5
21	<input type="checkbox"/> Laptop	<input type="checkbox"/> Moon	2.5
22	<input type="checkbox"/> Crocodile	<input type="checkbox"/> Brush	2.5
23	 Cup	<input type="checkbox"/> Rainbow	2.5
24	<input type="checkbox"/> Scooter	<input type="checkbox"/> Calendar	2.5
25	<input type="checkbox"/> Camel	<input type="checkbox"/> Key	2.5
26	<input type="checkbox"/> Bank	<input type="checkbox"/> Watermelon	2.5
27	<input type="checkbox"/> Jug	<input type="checkbox"/> Beetle	2.5
28	<input type="checkbox"/> Iron Box	<input type="checkbox"/> Strawberry	2.5
29	<input type="checkbox"/> Sunflower	<input type="checkbox"/> Ladder	2.5
30	<input type="checkbox"/> Screwdriver	<input type="checkbox"/> Garlic	2.5
31	<input type="checkbox"/> Basket	<input type="checkbox"/> Train	2.5

32	<input type="checkbox"/> Camera	★ Starfish	2.5
33	<input type="checkbox"/> Lady's Finger	<input type="checkbox"/> Candle	2.5
34	<input type="checkbox"/> Torch Light	<input type="checkbox"/> Mat	2.5
35	<input type="checkbox"/> Cherry	<input type="checkbox"/> Mirror	2.5

End of Phase:

- After the last pair disappears, the screen transitions into the **Immediate Cued Recall Phase**.

2. Immediate Cued Recall Phase (Right After Encoding)

Screen Layout:

- One item from each pair appears alone inside a white box.
- The writing area appears below for keyboard or stylus input.

Timing:

- 15 seconds per trial.
- Automatic progression if response submitted early.
- If no response: display “**Time is up!**” for 1 second, then move to the next trial.

Main Task Flow Table for Immediate Cued Recall Phase (Adolescents Version; Cue to be displayed in interface in same order)

Instruction (before first trial):


Adolescents (14–18 years):


"Great job learning the pairs! Now, one item from each pair will appear by itself. Your task is to write the item that goes with it. Try to answer quickly — you'll have a short time for each one."

"Remember: write the exact item that was paired. Don't just write a general category, color, or size — focus on the specific item."

Example: If the design is ☐ Apple and it was paired with ☐ Chair, write 'Chair', not 'furniture' or 'brown chair' or 'big chair'." When you feel set to take on the challenge, tap 'Let's Go!' below and the game begins!"

Trial	Displayed Cue	Correct Target	Response Bar	Response Time (sec)
1	<input type="checkbox"/> Kite	<input type="checkbox"/> Pen	_____	15
2	<input type="checkbox"/> Butterfly	<input type="checkbox"/> Spoon	_____	15
3	<input type="checkbox"/> Mango	<input type="checkbox"/> Elephant	_____	15
4	<input type="checkbox"/> Flute	<input type="checkbox"/> Lock	_____	15
5	<input type="checkbox"/> Notebook	<input type="checkbox"/> Cow	_____	15
6	<input type="checkbox"/> Eraser	<input type="checkbox"/> Cup	_____	15
7	<input type="checkbox"/> Bag	<input type="checkbox"/> Tomato	_____	15
8	<input type="checkbox"/> Heart	<input type="checkbox"/> Scissors	_____	15
9	<input type="checkbox"/> Drum	<input type="checkbox"/> Goat	_____	15
10	<input type="checkbox"/> Auto	<input type="checkbox"/> Phone	_____	15

11	<input type="checkbox"/> Parrot	<input type="checkbox"/> Table	<hr/> <hr/>	15
12	<input type="checkbox"/> Robot	<input type="checkbox"/> Chair	<hr/> <hr/>	15
13	<input type="checkbox"/> Potato	<input type="checkbox"/> Ship	<hr/> <hr/>	15
14	<input type="checkbox"/> Dice	<input type="checkbox"/> Pencil	<hr/> <hr/>	15
15	<input type="checkbox"/> Belt	<input type="checkbox"/> Lemon	<hr/> <hr/>	15
16	<input type="checkbox"/> Bike	<input type="checkbox"/> Hibiscus	<hr/> <hr/>	15
17	<input type="checkbox"/> Peacock	<input type="checkbox"/> Carrot	<hr/> <hr/>	15
18	<input type="checkbox"/> Balloon	<input type="checkbox"/> Candle	<hr/> <hr/>	15
19	<input type="checkbox"/> Bulb	<input type="checkbox"/> Fork	<hr/> <hr/>	15
20	<input type="checkbox"/> Sharpener	<input type="checkbox"/> Lotus	<hr/> <hr/>	15
21	<input type="checkbox"/> Banana	<input type="checkbox"/> Shirt	<hr/> <hr/>	15
22	<input type="checkbox"/> Jug	<input type="checkbox"/> Chain	<hr/> <hr/>	15
23	<input type="checkbox"/> Rat	 Hand	<hr/> <hr/>	15
24	<input type="checkbox"/> Coconut	<input type="checkbox"/> Television	<hr/> <hr/>	15
25	<input type="checkbox"/> Key	<input type="checkbox"/> Book	<hr/> <hr/>	15

26	<input type="checkbox"/> Ears	<input type="checkbox"/> Shoe	<hr/>	15
27	<input type="checkbox"/> Dog	<input type="checkbox"/> Crown	<hr/>	15
28	<input type="checkbox"/> Mirror	<input type="checkbox"/> Cloud	<hr/>	15
29	<input type="checkbox"/> Plate	<input type="checkbox"/> Cycle	<hr/>	15
30	<input type="checkbox"/> Clock	<input type="checkbox"/> Pig	<hr/>	15
31	<input type="checkbox"/> Crayon	 Watch	<hr/>	15
32	<input type="checkbox"/> Pant	<input type="checkbox"/> Leaf	<hr/>	15
33	<input type="checkbox"/> Apple	<input type="checkbox"/> Door	<hr/>	15
34	<input type="checkbox"/> Ring	<input type="checkbox"/> Hat	<hr/>	15
35	<input type="checkbox"/> Monkey	<input type="checkbox"/> Bucket	<hr/>	15

**Main Task Flow Table for Immediate Cued Recall Phase (Adults Version;
cue to be displayed in interface in same order)**

Instruction (before first trial):


Adults (18–22 years):

"You've just seen all the pairs. Now, a single item from each pair will appear alone. Your task is to type or write the item that was originally paired with it. Respond quickly — each trial has a time limit."

"Type the exact item that was paired . Do not write a general category, color, or size —

focus on the specific item."

Example: If the cue is ☐ Pen and it was paired with ☐ Elephant, type '*Elephant*', not 'animal', 'creature', or 'grey elephant'." When you're prepared to begin the task, press '**Let's Go!**' below to start."

Trial	Displayed Cue	Correct Target	Response Bar	Response Time (sec)
1	<input type="checkbox"/> Spectacles	<input type="checkbox"/> Mixer	_____	15
2	<input type="checkbox"/> Water Tap	<input type="checkbox"/> Mobile Phone	_____	15
3	<input type="checkbox"/> Lemon	<input type="checkbox"/> Socks	_____	15
4	<input type="checkbox"/> Plane	<input type="checkbox"/> Lamp	_____	15
5	 Mug	<input type="checkbox"/> Pillow	_____	15
6	<input type="checkbox"/> Switch	<input type="checkbox"/> Bowl	_____	15
7	<input type="checkbox"/> Rose	<input type="checkbox"/> Helmet	_____	15
8	<input type="checkbox"/> Shark	<input type="checkbox"/> Fan	_____	15
9	<input type="checkbox"/> Table	<input type="checkbox"/> Sun	_____	15
10	<input type="checkbox"/> Peas	<input type="checkbox"/> Rock	_____	15
11	<input type="checkbox"/> Hen	<input type="checkbox"/> Chilli	_____	15
12	<input type="checkbox"/> Orange	<input type="checkbox"/> Window	_____	15
13	<input type="checkbox"/> Purse	<input type="checkbox"/> Hammer	_____	15

14	<input type="checkbox"/> Zebra	<input type="checkbox"/> Almonds	_____	15
15	<input type="checkbox"/> Nose	⚽ Ball	_____	15
16	<input type="checkbox"/> Ice Cream	<input type="checkbox"/> Rope	_____	15
17	<input type="checkbox"/> Umbrella	<input type="checkbox"/> Horse	_____	15
18	<input type="checkbox"/> Cauliflower	<input type="checkbox"/> Nose	_____	15
19	<input type="checkbox"/> Chair	<input type="checkbox"/> Pen	_____	15
20	<input type="checkbox"/> Dustbin	🕒 Clock	_____	15
21	<input type="checkbox"/> Moon	<input type="checkbox"/> Laptop	_____	15
22	<input type="checkbox"/> Brush	<input type="checkbox"/> Crocodile	_____	15
23	<input type="checkbox"/> Rainbow	🍵 Cup	_____	15
24	<input type="checkbox"/> Calendar	<input type="checkbox"/> Scooter	_____	15
25	<input type="checkbox"/> Camel	<input type="checkbox"/> Key	_____	15
26	<input type="checkbox"/> Watermelon	<input type="checkbox"/> Bank	_____	15
27	<input type="checkbox"/> Beetle	<input type="checkbox"/> Jug	_____	15
28	<input type="checkbox"/> Strawberry	<input type="checkbox"/> Iron Box	_____	15

29	<input type="checkbox"/> Ladder	<input type="checkbox"/> Sunflower	_____	15
30	<input type="checkbox"/> Garlic	<input type="checkbox"/> Screwdriver	_____	15
31	<input type="checkbox"/> Train	<input type="checkbox"/> Basket	_____	15
32	★ Starfish	<input type="checkbox"/> Camera	_____	15
33	<input type="checkbox"/> Candle	<input type="checkbox"/> Lady's Finger	_____	15
34	<input type="checkbox"/> Mat	<input type="checkbox"/> Torch Light	_____	15
35	<input type="checkbox"/> Mirror	<input type="checkbox"/> Cherry	_____	15

End of Phase:

- After the last item, screen transitions into **Delay Interval** with filler tasks.

3. Delay Interval

Duration: 15 minutes.

Implementation:

- After the encoding phase, the screen displays a message:

Adolescents:

"Great job looking at all the pairs! Before we test your memory, you'll play a few short brain-teaser games. These games are like a quick workout for your mind. Once you're done, we'll bring you back to check how many pairs you can remember!" When you feel set to take on the challenge, tap **'Let's Go!'** below and the game begins!"

Adults:

"Well done—you've completed the first part. Next, you'll do a few short thinking activities designed to keep your mind active while your memory continues to work in the background. After that, we'll return to test how well you remember the pairs."

- During this 5-minute gap, other cognitive tasks are administered in sequence:
 - Response inhibition / Go-No Go task
 - Cognitive Flexibility Task
 - Stroop Task (Attention)

End of Phase

- At the end of 15 minutes, the delayed Cued Recall test launches automatically.

4. Cued Recall Phase (Test Your Memory;After the Delay Interval)

Screen Layout

- One item from a previously learned pair is displayed inside a white box.
- A **writing area** appears below for participant response (keyboard or stylus input).

Timing

- Participants have **up to 15 seconds** to enter a response.
- If a response is submitted before 15 seconds, the task automatically advances to the next trial.
- If no response is given within 15 seconds, the message “*Time is up!*” appears for 1 second, then the task advances.

Main Task Flow Table for Delayed Cued Recall Phase (Adolescents Version; cue to be displayed in interface in same order)


Adolescents (14–18 years)


"Welcome back to the memory game you played earlier! Remember, you saw pairs of items and tried to learn which ones go together. Now, again, one item from each pair will appear alone. Your task is to write the item that goes with it. You'll have a short time for each one, so try to answer quickly. If you don't respond in time, the game will say "Time is up!" and move on to the next item."

“Write the exact item that goes with the one you see. Don’t just write a general category, color, or size of the object — try to remember the specific pair.”

Example: If the design is ☐ Apple and it was paired with ☐ Chair, write **‘Chair’**, not ‘furniture’ or ‘brown chair’ or ‘big chair’. When you feel set to take on the challenge, tap **‘Let’s Go!’** below and the game begins!”

Trial	Displayed Cue	Correct Target	Response Bar	Response Time (sec)
1	<input type="checkbox"/> Pen	<input type="checkbox"/> Kite	_____	15
2	<input type="checkbox"/> Spoon	<input type="checkbox"/> Butterfly	_____	15
3	<input type="checkbox"/> Elephant	<input type="checkbox"/> Mango	_____	15
4	<input type="checkbox"/> Lock	<input type="checkbox"/> Flute	_____	15
5	<input type="checkbox"/> Cow	<input type="checkbox"/> Notebook	_____	15
6	<input type="checkbox"/> Cup	<input type="checkbox"/> Eraser	_____	15
7	<input type="checkbox"/> Tomato	<input type="checkbox"/> Bag	_____	15
8	<input type="checkbox"/> Scissors	<input type="checkbox"/> Heart	_____	15
9	<input type="checkbox"/> Goat	<input type="checkbox"/> Drum	_____	15
10	<input type="checkbox"/> Phone	<input type="checkbox"/> Auto	_____	15
11	<input type="checkbox"/> Table	<input type="checkbox"/> Parrot	_____	15

12	<input type="checkbox"/> Chair	<input type="checkbox"/> Robot	_____	15
13	<input type="checkbox"/> Ship	<input type="checkbox"/> Potato	_____	15
14	<input type="checkbox"/> Pencil	<input type="checkbox"/> Dice	_____	15
15	<input type="checkbox"/> Lemon	<input type="checkbox"/> Belt	_____	15
16	<input type="checkbox"/> Hibiscus	<input type="checkbox"/> Bike	_____	15
17	<input type="checkbox"/> Carrot	<input type="checkbox"/> Peacock	_____	15
18	<input type="checkbox"/> Candle	<input type="checkbox"/> Balloon	_____	15
19	<input type="checkbox"/> Fork	<input type="checkbox"/> Bulb	_____	15
20	<input type="checkbox"/> Lotus	<input type="checkbox"/> Sharpener	_____	15
21	<input type="checkbox"/> Shirt	<input type="checkbox"/> Banana	_____	15
22	<input type="checkbox"/> Chain	<input type="checkbox"/> Jug	_____	15
23	 Hand	<input type="checkbox"/> Rat	_____	15
24	<input type="checkbox"/> Television	<input type="checkbox"/> Coconut	_____	15
25	<input type="checkbox"/> Book	<input type="checkbox"/> Key	_____	15
26	<input type="checkbox"/> Shoe	<input type="checkbox"/> Ears	_____	15
27	<input type="checkbox"/> Crown	<input type="checkbox"/> Dog	_____	15

28	<input type="checkbox"/> Cloud	<input type="checkbox"/> Mirror	<hr/>	15
29	<input type="checkbox"/> Cycle	<input type="checkbox"/> Plate	<hr/>	15
30	<input type="checkbox"/> Pig	<input type="checkbox"/> Clock	<hr/>	15
31	 Watch	<input type="checkbox"/> Crayon	<hr/>	15
32	<input type="checkbox"/> Leaf	<input type="checkbox"/> Pant	<hr/>	15
33	<input type="checkbox"/> Door	<input type="checkbox"/> Apple	<hr/>	15
34	<input type="checkbox"/> Hat	<input type="checkbox"/> Ring	<hr/>	15
35	<input type="checkbox"/> Bucket	<input type="checkbox"/> Monkey	<hr/>	15


Main Task Flow Table for Delayed Cued Recall Phase (Adults Version; cue to be displayed in interface in same order)




Adults (18–22 years)

"We're returning to the memory task you did before. Earlier, you learned pairs of items and tried to remember which ones belonged together. In this part, again, a single item from each pair will appear alone. Your task is to type or write the item that was originally paired with it. You will have limited time to respond for each item. If you do not answer within the time limit, the message "Time is up!" will appear and the task will move on."

"Type the exact item that was paired with the cue you see. Do not write a general category, color, or size of the object — focus on the specific paired item."

Example: If the cue is ☐ Pen and it was paired with ☐ Elephant, type **'Elephant'**, not 'animal', 'creature', or 'grey elephant' or 'big elephant'. When you're prepared to begin the task, press **'Let's Go!'** below to start."

Trial	Displayed Cue	Correct Target	Response Bar	Response Time (sec)
1	<input type="checkbox"/> Mixer	<input type="checkbox"/> Spectacles	_____	15
2	<input type="checkbox"/> Mobile Phone	<input type="checkbox"/> Water Tap	_____	15
3	<input type="checkbox"/> Socks	<input type="checkbox"/> Lemon	_____	15
4	<input type="checkbox"/> Lamp	<input type="checkbox"/> Plane	_____	15
5	<input type="checkbox"/> Pillow	 Mug	_____	15
6	<input type="checkbox"/> Bowl	<input type="checkbox"/> Switch	_____	15
7	<input type="checkbox"/> Helmet	<input type="checkbox"/> Rose	_____	15
8	<input type="checkbox"/> Fan	<input type="checkbox"/> Shark	_____	15
9	<input type="checkbox"/> Sun	<input type="checkbox"/> Table	_____	15
10	<input type="checkbox"/> Rock	<input type="checkbox"/> Peas	_____	15
11	<input type="checkbox"/> Chilli	<input type="checkbox"/> Hen	_____	15
12	<input type="checkbox"/> Window	<input type="checkbox"/> Orange	_____	15
13	<input type="checkbox"/> Hammer	<input type="checkbox"/> Purse	_____	15
14	<input type="checkbox"/> Almonds	<input type="checkbox"/> Zebra	_____	15

15	 Ball	<input type="checkbox"/> Nose	_____	15
16	<input type="checkbox"/> Rope	<input type="checkbox"/> Ice Cream	_____	15
17	<input type="checkbox"/> Horse	<input type="checkbox"/> Umbrella	_____	15
18	<input type="checkbox"/> Nose	<input type="checkbox"/> Cauliflower	_____	15
19	<input type="checkbox"/> Pen	<input type="checkbox"/> Chair	_____	15
20	 Clock	<input type="checkbox"/> Dustbin	_____	15
21	<input type="checkbox"/> Laptop	<input type="checkbox"/> Moon	_____	15
22	<input type="checkbox"/> Crocodile	<input type="checkbox"/> Brush	_____	15
23	 Cup	<input type="checkbox"/> Rainbow	_____	15
24	<input type="checkbox"/> Scooter	<input type="checkbox"/> Calendar	_____	15
25	<input type="checkbox"/> Key	<input type="checkbox"/> Camel	_____	15
26	<input type="checkbox"/> Bank	<input type="checkbox"/> Watermelon	_____	15
27	<input type="checkbox"/> Jug	<input type="checkbox"/> Beetle	_____	15
28	<input type="checkbox"/> Iron Box	<input type="checkbox"/> Strawberry	_____	15
29	<input type="checkbox"/> Sunflower	<input type="checkbox"/> Ladder	_____	15

30	<input type="checkbox"/> Screwdriver	<input type="checkbox"/> Garlic	_____	15
31	<input type="checkbox"/> Basket	<input type="checkbox"/> Train	_____	15
32	<input type="checkbox"/> Camera	★ Starfish	_____	15
33	<input type="checkbox"/> Candle	<input type="checkbox"/> Lady's Finger	_____	15
34	<input type="checkbox"/> Torch Light	<input type="checkbox"/> Mat	_____	15
35	<input type="checkbox"/> Cherry	<input type="checkbox"/> Mirror	_____	15

5. Recognition Phase (Pick the Right Match; After the Cued Recall Phase)

Screen Layout

- The Cue item is shown at the top inside a white box.
- Below, three options are displayed horizontally:
 1. The correct paired item (target)
 2. A distractor from the same category
 3. A distractor from an unrelated category

The position of display of these options must be randomized.

Timing

- Participants have **up to 4 seconds** to select one of the three options.

- If a response is made before 4 seconds, the task advances immediately.
- If no response is made within 4 seconds, the message “*Too Late*” appears for 1 second, then the task advances.





Main Task Flow Table for Recognition Phase (Adolescents Version; Cue to be displayed in interface in same order, option order should be randomized)

Adolescents:

"Next, you'll see one picture at the top of the screen. Below it, you'll see three choices. Your job is to pick the picture that was originally paired with the one on top. Be quick—you'll only have a few seconds for each choice. If you don't tap the suitable choice on time, the game will say "Time is up!" and move on." When you feel set to take on the challenge, tap 'Let's Go!' below and the game begins!"

Trial	First Image	Second Image	Displayed Cue	Correct Target	Related Distractor	Unrelated Distractor	Response Time (sec)
1	<input type="checkbox"/> Pen	<input type="checkbox"/> Kite	<input type="checkbox"/> Pen	<input type="checkbox"/> Kite	<input type="checkbox"/> Parachute	<input type="checkbox"/> Elephant	4
2	<input type="checkbox"/> Butterfly	<input type="checkbox"/> Spoon	<input type="checkbox"/> Butterfly	<input type="checkbox"/> Spoon	Knife	<input type="checkbox"/> Scooter	4
3	<input type="checkbox"/> Elephant	<input type="checkbox"/> Mango	<input type="checkbox"/> Mango	<input type="checkbox"/> Elephant	<input type="checkbox"/> Cow	<input type="checkbox"/> Phone	4
4	<input type="checkbox"/> Lock	<input type="checkbox"/> Flute	<input type="checkbox"/> Lock	<input type="checkbox"/> Flute	<input type="checkbox"/> Violin	<input type="checkbox"/> Grapes	4
5	<input type="checkbox"/> Notebook	<input type="checkbox"/> Cow	<input type="checkbox"/> Notebook	<input type="checkbox"/> Cow	<input type="checkbox"/> Buffalo	<input type="checkbox"/> Pencil	4
6	<input type="checkbox"/> Eraser	<input type="checkbox"/> Cup	<input type="checkbox"/> Eraser	<input type="checkbox"/> Cup	Bottle	<input type="checkbox"/> Bird	4

7	<input type="checkbox"/> Tomato	<input type="checkbox"/> Bag	<input type="checkbox"/> Bag	<input type="checkbox"/> Tomato	Ladies finger	<input type="checkbox"/> Cycle	4
8	<input type="checkbox"/> Heart	<input type="checkbox"/> Scissors	<input type="checkbox"/> Scissors	<input type="checkbox"/> Heart	<input type="checkbox"/> Spade (symbol)	<input type="checkbox"/> Door	4
9	<input type="checkbox"/> Drum	<input type="checkbox"/> Goat	<input type="checkbox"/> Goat	<input type="checkbox"/> Drum	<input type="checkbox"/> Guitar	<input type="checkbox"/> Orange	4
10	<input type="checkbox"/> Phone	<input type="checkbox"/> Auto	<input type="checkbox"/> Auto	<input type="checkbox"/> Phone	Earphones	<input type="checkbox"/> Snake	4
11	<input type="checkbox"/> Table	<input type="checkbox"/> Parrot	<input type="checkbox"/> Parrot	<input type="checkbox"/> Table	Bed	<input type="checkbox"/> Apple	4
12	<input type="checkbox"/> Robot	<input type="checkbox"/> Chair	<input type="checkbox"/> Robot	<input type="checkbox"/> Chair	Stool	<input type="checkbox"/> Strawberry	4
13	<input type="checkbox"/> Ship	<input type="checkbox"/> Potato	<input type="checkbox"/> Ship	<input type="checkbox"/> Potato	Onion	<input type="checkbox"/> Hen	4
14	<input type="checkbox"/> Pencil	<input type="checkbox"/> Dice	<input type="checkbox"/> Dice	<input type="checkbox"/> Pencil	<input type="checkbox"/> Pen	<input type="checkbox"/> Dog	4
15	<input type="checkbox"/> Belt	<input type="checkbox"/> Lemon	<input type="checkbox"/> Belt	<input type="checkbox"/> Lemon	Grapes	<input type="checkbox"/> Turtle	4
16	<input type="checkbox"/> Hibiscus	<input type="checkbox"/> Bike	<input type="checkbox"/> Bike	<input type="checkbox"/> Hibiscus	<input type="checkbox"/> Lotus	<input type="checkbox"/> Glass	4
17	<input type="checkbox"/> Carrot	<input type="checkbox"/> Peacock	<input type="checkbox"/> Peacock	<input type="checkbox"/> Carrot	<input type="checkbox"/> Broccoli	<input type="checkbox"/> Clock	4
18	<input type="checkbox"/> Candle	<input type="checkbox"/> Balloon	<input type="checkbox"/> Balloon	<input type="checkbox"/> Candle	<input type="checkbox"/> Torch Light	<input type="checkbox"/> Lion	4
19	<input type="checkbox"/> Fork	<input type="checkbox"/> Bulb	<input type="checkbox"/> Bulb	<input type="checkbox"/> Fork	<input type="checkbox"/> Spoon	<input type="checkbox"/> Camel	4

20	<input type="checkbox"/> Sharpener	<input type="checkbox"/> Lotus	<input type="checkbox"/> Lotus	<input type="checkbox"/> Sharpener	Ruler	<input type="checkbox"/> Crocodile	4
21	<input type="checkbox"/> Shirt	<input type="checkbox"/> Banana	<input type="checkbox"/> Banana	<input type="checkbox"/> Shirt	Tie	<input type="checkbox"/> Dolphin	4
22	<input type="checkbox"/> Chain	<input type="checkbox"/> Jug	<input type="checkbox"/> Jug	<input type="checkbox"/> Chain	Earrings	<input type="checkbox"/> Cucumber	4
23	 Hand	<input type="checkbox"/> Rat	<input type="checkbox"/> Rat	 Hand	Leg	<input type="checkbox"/> Cycle	4
24	<input type="checkbox"/> Television	<input type="checkbox"/> Coconut	<input type="checkbox"/> Coconut	<input type="checkbox"/> Television	<input type="checkbox"/> Radio	<input type="checkbox"/> Horse	4
25	<input type="checkbox"/> Book	<input type="checkbox"/> Key	<input type="checkbox"/> Key	<input type="checkbox"/> Book	<input type="checkbox"/> Notebook	<input type="checkbox"/> Duck	4
26	<input type="checkbox"/> Shoe	<input type="checkbox"/> Ear	<input type="checkbox"/> Shoe	<input type="checkbox"/> Ear	<input type="checkbox"/> Nose	<input type="checkbox"/> Corn	4
27	<input type="checkbox"/> Dog	<input type="checkbox"/> Crown	<input type="checkbox"/> Crown	<input type="checkbox"/> Dog	Cat	<input type="checkbox"/> Chair	4
28	<input type="checkbox"/> Cloud	<input type="checkbox"/> Mirror	<input type="checkbox"/> Cloud	<input type="checkbox"/> Mirror	Spectacles	<input type="checkbox"/> Crab	4
29	<input type="checkbox"/> Cycle	<input type="checkbox"/> Plate	<input type="checkbox"/> Plate	<input type="checkbox"/> Cycle	Bike	<input type="checkbox"/> Fish	4
30	<input type="checkbox"/> Pig	<input type="checkbox"/> Clock	<input type="checkbox"/> Clock	<input type="checkbox"/> Pig	Donkey	<input type="checkbox"/> Watermelon	4
31	 Watch	<input type="checkbox"/> Crayon	<input type="checkbox"/> Crayon	 Watch	Clock	<input type="checkbox"/> Owl	4
32	<input type="checkbox"/> Leaf	<input type="checkbox"/> Pant	<input type="checkbox"/> Pant	<input type="checkbox"/> Leaf	<input type="checkbox"/> Grass	<input type="checkbox"/> Bell	4

33	<input type="checkbox"/> Door	<input type="checkbox"/> Apple	<input type="checkbox"/> Apple	<input type="checkbox"/> Door	<input type="checkbox"/> Window	<input type="checkbox"/> Octopus	4
34	<input type="checkbox"/> Hat	<input type="checkbox"/> Ring	<input type="checkbox"/> Ring	<input type="checkbox"/> Hat	<input type="checkbox"/> Cap	<input type="checkbox"/> Tea	4
35	<input type="checkbox"/> Bucket	<input type="checkbox"/> Monkey	<input type="checkbox"/> Monkey	<input type="checkbox"/> Bucket	<input type="checkbox"/> Basket	<input type="checkbox"/> Penguin	4


Main Task Flow Table for Recognition Phase (Adults Version; Cue to be displayed in interface in same order, option order should be randomized)

Adults:

"In this final part, you'll again see one item at the top of the screen. Below it, three choices will be shown. Select the item that was originally paired with the one on top. Be ready—each trial only lasts a few seconds. If you don't tap the suitable choice on time, the game will say "Time is up!" and move on." When you're prepared to begin the task, press 'Let's Go!' below to start."

Trial	First Image	Second Image	Displayed Cue	Correct Target	Related Distractor	Unrelated Distractor	Response Time (sec)
1	<input type="checkbox"/> Mixer	<input type="checkbox"/> Spectacles	<input type="checkbox"/> Mixer	<input type="checkbox"/> Spectacles	<input type="checkbox"/> Sunglasses	<input type="checkbox"/> Apple	4
2	<input type="checkbox"/> Mobile Phone	<input type="checkbox"/> Water Tap	<input type="checkbox"/> Mobile Phone	<input type="checkbox"/> Water Tap	Shower	<input type="checkbox"/> Cow	4
3	<input type="checkbox"/> Lemon	<input type="checkbox"/> Socks	<input type="checkbox"/> Lemon	<input type="checkbox"/> Socks	Shoe	<input type="checkbox"/> Mango	4
4	<input type="checkbox"/> Plane	<input type="checkbox"/> Lamp	<input type="checkbox"/> Lamp	<input type="checkbox"/> Plane	Helicopter	<input type="checkbox"/> Goat	4

5	<input type="checkbox"/> Pillow	 Mug	 Mug	<input type="checkbox"/> Pillow	Bed	<input type="checkbox"/> Snake	4
6	<input type="checkbox"/> Bowl	<input type="checkbox"/> Switch	<input type="checkbox"/> Switch	<input type="checkbox"/> Bowl	Plate	<input type="checkbox"/> Hen	4
7	<input type="checkbox"/> Helmet	<input type="checkbox"/> Rose	<input type="checkbox"/> Helmet	<input type="checkbox"/> Rose	Hibiscus	<input type="checkbox"/> Fish	4
8	<input type="checkbox"/> Shark	<input type="checkbox"/> Fan	<input type="checkbox"/> Shark	<input type="checkbox"/> Fan	AC	<input type="checkbox"/> Cycle	4
9	<input type="checkbox"/> Sun	<input type="checkbox"/> Table	<input type="checkbox"/> Table	<input type="checkbox"/> Sun	<input type="checkbox"/> Moon	<input type="checkbox"/> Pig	4
10	<input type="checkbox"/> Rock	<input type="checkbox"/> Peas	<input type="checkbox"/> Peas	<input type="checkbox"/> Rock	Pebbles	<input type="checkbox"/> Dog	4
11	<input type="checkbox"/> Chilli	<input type="checkbox"/> Hen	<input type="checkbox"/> Hen	<input type="checkbox"/> Chilli	<input type="checkbox"/> Corn	<input type="checkbox"/> Lemon	4
12	<input type="checkbox"/> Window	<input type="checkbox"/> Orange	<input type="checkbox"/> Window	<input type="checkbox"/> Orange	<input type="checkbox"/> Lemon	<input type="checkbox"/> Tiger	4
13	<input type="checkbox"/> Purse	<input type="checkbox"/> Hammer	<input type="checkbox"/> Hammer	<input type="checkbox"/> Purse	<input type="checkbox"/> Bag	<input type="checkbox"/> Coconut	4
14	<input type="checkbox"/> Zebra	<input type="checkbox"/> Almonds	<input type="checkbox"/> Almonds	<input type="checkbox"/> Zebra	<input type="checkbox"/> Tiger	<input type="checkbox"/> Milk	4
15	 Ball	<input type="checkbox"/> Nose	<input type="checkbox"/> Nose	 Ball	Bat	<input type="checkbox"/> Goat	4
16	<input type="checkbox"/> Rope	<input type="checkbox"/> Ice Cream	<input type="checkbox"/> Ice Cream	<input type="checkbox"/> Rope	Fish Net	<input type="checkbox"/> Snake	4
17	<input type="checkbox"/> Horse	<input type="checkbox"/> Umbrella	<input type="checkbox"/> Umbrella	<input type="checkbox"/> Horse	<input type="checkbox"/> Donkey	<input type="checkbox"/> Chair	4
18	<input type="checkbox"/> Nose	<input type="checkbox"/> Cauliflower	<input type="checkbox"/> Cauliflower	<input type="checkbox"/> Nose	<input type="checkbox"/> Ear	<input type="checkbox"/> Dog	4

19	<input type="checkbox"/> Pen	<input type="checkbox"/> Chair	<input type="checkbox"/> Chair	<input type="checkbox"/> Pen	<input type="checkbox"/> Pencil	<input type="checkbox"/> Apple	4
20	<input type="checkbox"/> Clock	<input type="checkbox"/> Dustbin	<input type="checkbox"/> Dustbin	<input type="checkbox"/> Clock	<input type="checkbox"/> Watch	<input type="checkbox"/> Carrot	4
21	<input type="checkbox"/> Laptop	<input type="checkbox"/> Moon	<input type="checkbox"/> Moon	<input type="checkbox"/> Laptop	Mobile Phone	<input type="checkbox"/> Mango	4
22	<input type="checkbox"/> Crocodile	<input type="checkbox"/> Brush	<input type="checkbox"/> Brush	<input type="checkbox"/> Crocodile	<input type="checkbox"/> Turtle	<input type="checkbox"/> Grapes	4
23	 Cup	<input type="checkbox"/> Rainbow	<input type="checkbox"/> Rainbow	 Cup	<input type="checkbox"/> Mug	<input type="checkbox"/> Hen	4
24	<input type="checkbox"/> Scooter	<input type="checkbox"/> Calendar	<input type="checkbox"/> Calendar	<input type="checkbox"/> Scooter	<input type="checkbox"/> Car	<input type="checkbox"/> Cow	4
25	<input type="checkbox"/> Camel	<input type="checkbox"/> Key	<input type="checkbox"/> Key	<input type="checkbox"/> Camel	Cow	<input type="checkbox"/> Milk	4
26	<input type="checkbox"/> Bank	<input type="checkbox"/> Watermelon	<input type="checkbox"/> Bank	<input type="checkbox"/> Watermelon	Coconut	<input type="checkbox"/> Zebra	4
27	<input type="checkbox"/> Jug	<input type="checkbox"/> Beetle	<input type="checkbox"/> Beetle	<input type="checkbox"/> Jug	<input type="checkbox"/> Flower Pot	<input type="checkbox"/> Fish	4
28	<input type="checkbox"/> Iron Box	<input type="checkbox"/> Strawberry	<input type="checkbox"/> Strawberry	<input type="checkbox"/> Iron Box	Washing Machine	<input type="checkbox"/> Horse	4
29	<input type="checkbox"/> Sunflower	<input type="checkbox"/> Ladder	<input type="checkbox"/> Ladder	<input type="checkbox"/> Sunflower	<input type="checkbox"/> Tulip	<input type="checkbox"/> Broccoli	4
30	<input type="checkbox"/> Screwdriver	<input type="checkbox"/> Garlic	<input type="checkbox"/> Garlic	<input type="checkbox"/> Screwdriver	<input type="checkbox"/> Wrench	<input type="checkbox"/> Monkey	4

31	<input type="checkbox"/> Basket	<input type="checkbox"/> Train	<input type="checkbox"/> Train	<input type="checkbox"/> Basket	<input type="checkbox"/> Cart	<input type="checkbox"/> Tiger	4
32	<input type="checkbox"/> Camera	★ Starfish	<input type="checkbox"/> Camera	★ Starfish	Dolphin	<input type="checkbox"/> Lemon	4
33	<input type="checkbox"/> Lady's Finger	<input type="checkbox"/> Candle	<input type="checkbox"/> Candle	<input type="checkbox"/> Lady's Finger	<input type="checkbox"/> Carrot	<input type="checkbox"/> Chair	4
34	<input type="checkbox"/> Torch Light	<input type="checkbox"/> Mat	<input type="checkbox"/> Torch Light	<input type="checkbox"/> Mat	Carpet	<input type="checkbox"/> Dog	4
35	<input type="checkbox"/> Cherry	<input type="checkbox"/> Mirror	<input type="checkbox"/> Mirror	<input type="checkbox"/> Cherry	<input type="checkbox"/> Strawberry	<input type="checkbox"/> Crayon	4

After the participant completes all the blocks, we would give instructions that emphasize the end of this task.

Adolescents:

"That's it! You've finished this memory game. Great work!"

Adults:

"This concludes the memory task. Thank you for your participation."

3. Technical Implementation Notes

- **Background differs by age group:**

- Adolescents: colorful gradient background

Adults: soft neutral background

- **Stimulus position:** Center, high contrast.

- **Response buttons (Recognition Task):** Three options, aligned horizontally at bottom; white border; light blue highlight when tapped.
- **Feedback (Time is up!) :** Full-screen centered text (white, bold, 1 sec).

4. Scoring Instructions for tech team:

Data Columns Required (will not be shown to participants for interpretation, for our assessment use):

- **Round Number:** Sequential number identifying each round.
- **Phase:** Indicate test phase: *Encoding*, *Immediate Recall*, *Cued Delayed Recall*, or *Recognition*.
- **Stimulus Pair:** The paired items presented or recalled (e.g., word-picture).
- **Participant Response:** Response given by the participant (e.g., recalled item, recognized pair).
- **Response Accuracy:** Score 1 if participant correctly recalls or recognizes the pair, otherwise 0.
- **Reaction Time (RT):** Time in milliseconds from stimulus/cue presentation to participant response (if applicable).

Scoring Instructions:

Immediate Recall Phase:

- Assign 1 for correctly recalled pairs upon cue, otherwise 0.

Cued Delayed Recall Phase:

- Assign 1 for correctly recalled pairs upon cue after delay, otherwise 0.

Recognition Phase:

- Assign 1 if the participant correctly recognizes the pair, otherwise 0.

Additional Scoring Parameters:

- **Total Rounds Answered:** Count of rounds with participant response in each phase.
- **Total Rounds Not Answered:** Count of rounds without response.
- **Correct Responses:** Sum of correct responses per phase.
- **Incorrect Responses:** Sum of incorrect or no responses per phase.
- **Immediate Recall Phase Accuracy Rate:**

- **AccuracyImmediate Recall**= Correct Responses in Immediate Recall/Total Rounds Answered in Immediate Recall×100
- **Delayed Cued Recall Phase Accuracy Rate:**
- **AccuracyDelayed Recall** = Correct Responses in Delayed Recall/Total Rounds Answered in Delayed Recall×100
- **Recognition Phase Accuracy Rate**
- **AccuracyRecognition** = Correct Responses in Recognition/Total Rounds x 100
- **Overall Task Accuracy Rate**
- **AccuracyOverall** = Sum of Correct Responses across all phases/ Sum of Total Rounds Answered across all phases×100
- **Immediate Recall Phase Mean RT:** The average reaction time across all rounds in the immediate recall phase where a participant gave a response.
- **Delayed Cued Recall Phase Mean RT:** The average reaction time across all rounds in the delayed cued recall phase where a participant responded.
- **Recognition Phase Mean RT:** The average reaction time across all rounds in the recognition phase where a participant responded
- **Mean Reaction Time of Overall Task:** Average RT of answered rounds.

Learning or Consolidation Slope

- **Absolute Change in Accuracy between Delayed and Immediate Recall:**
- **Consolidation Slope** =Accuracy Delayed Recall–Accuracy Immediate Recall
- **Consolidation Slope (%)**= Accuracy Delayed Recall– AccuracyImmediate Recall/ AccuracyImmediate Recall ×100