LEVANTE: Core Task Design and Details

11/1/2023

Questions

- Battery duration:
  - How much time does each task take?
  - How much time can we save by making tasks adaptive?
- Can we make the interfaces more similar, and otherwise streamline instructions/ergonomics?
  - Avoid long instructions/narratives—modify ROAR tasks?
- Create short, engaging breaks in-between tasks? (e.g. balloon popping / Fruit Ninja-like game?)

Estimated Task Duration

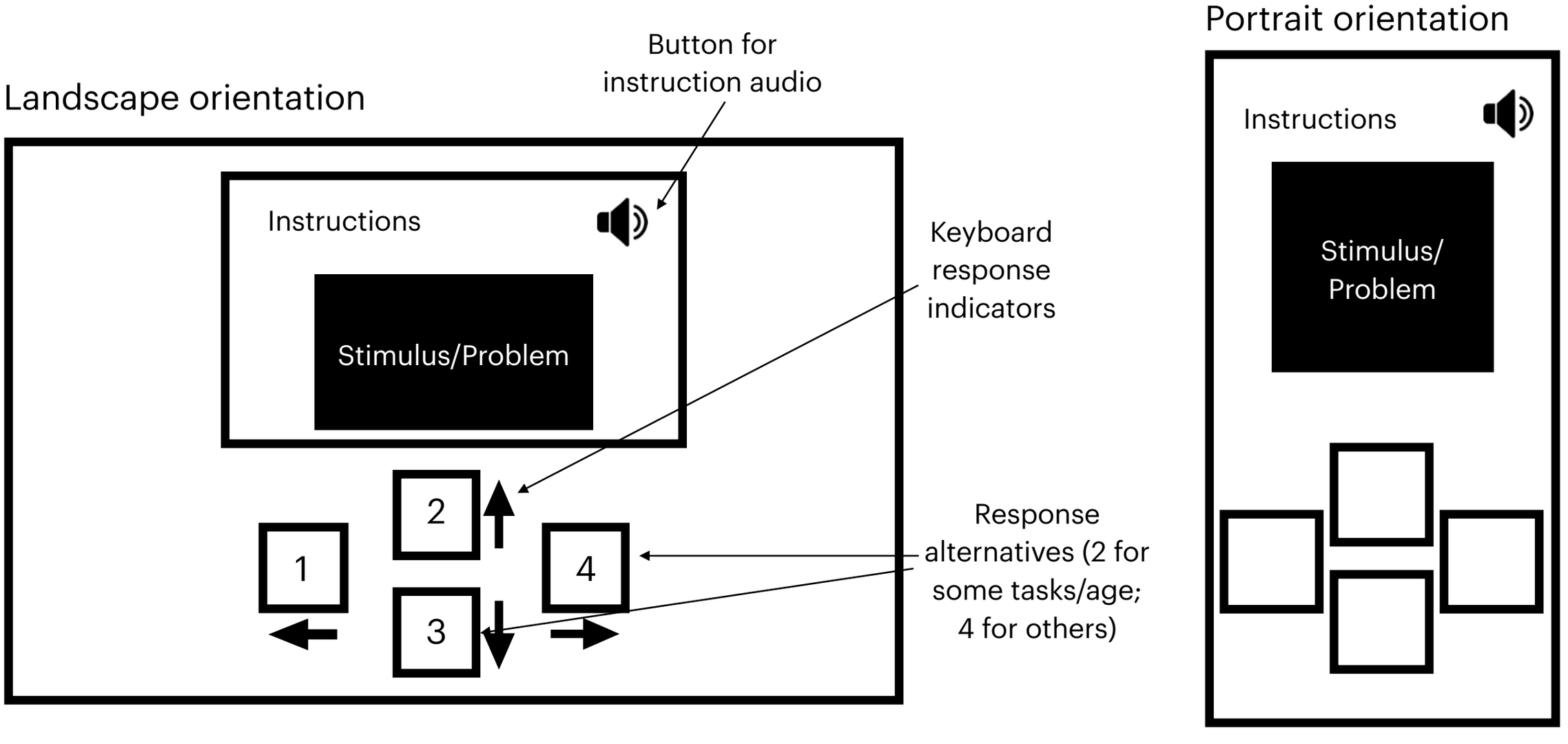
Skill	Task	Instructions	Trials	Adaptive Trials	Time Per Trial	Original Time	Adaptive Time	% savings	early_stop	task_type
Reasoning	Matrix Reasoning	30	36	10	20	12.50	3.83	69.33	yes	4afc (images stim responses)
EF	Hearts & Flowers	60	62	56	3	4.10	3.80	7.32	yes	2afc (sort of specia
EF	Corsi Block	40	20	10	5	2.33	1.50	35.71	yes	special
EF	Something's the Same	30	24	12	5	2.50	1.50	40.00	yes	2afc (images stim
EF	MEFS	--	--	--	--	5.00	5.00		--	--
Social	Gaze Following					7.50	4.00	46.67	?	
Social	Theory of Mind Battery		25		30	12.50	6.25	50.00	?	
Language	ROAR Vocab	120	90	30	3	6.50	3.50	46.15	yes	
Language	ROAR Single Word Reading	90	76	30	2.5	4.67	2.75	41.07	yes	
Language	ROAR Sentence Comprehension	90	30	15	6	4.50	3.00	33.33	yes	
Math	Number Line Estimation	30	28	12	5	2.83	1.50	47.06	yes	2-4afc (image stim
Math	EGMA: Number Identification	15	20	10	3	1.25	0.75	40.00	yes	2-4afc
Math	EGMA: Number Discrimination	15	12	6	3	0.85	0.55	35.29	yes	2-4afc
Math	EGMA: Missing number	15	12	6	4	1.05	0.65	38.10	yes	2-4afc
Math	EGMA: Addition (lvl 1 + 2)	15	25	12	5	2.33	1.25	46.43	yes	2-4afc
Math	EGMA: Subtraction (lvl 1 + 2)	15	25	12	6	2.75	1.45	47.27	yes	2-4afc
Spatial	Mental Rotation	30	28	12	3	1.90	1.10	42.11	no	2afc (images stim
					Total (mins)	**75.07**	**42.38**			

Task time estimates: https://docs.google.com/spreadsheets/d/1OnMKVtxHos8lsKDzF0moeghmRAFSTsD1-OpPF7wArCU/edit?usp=sharing

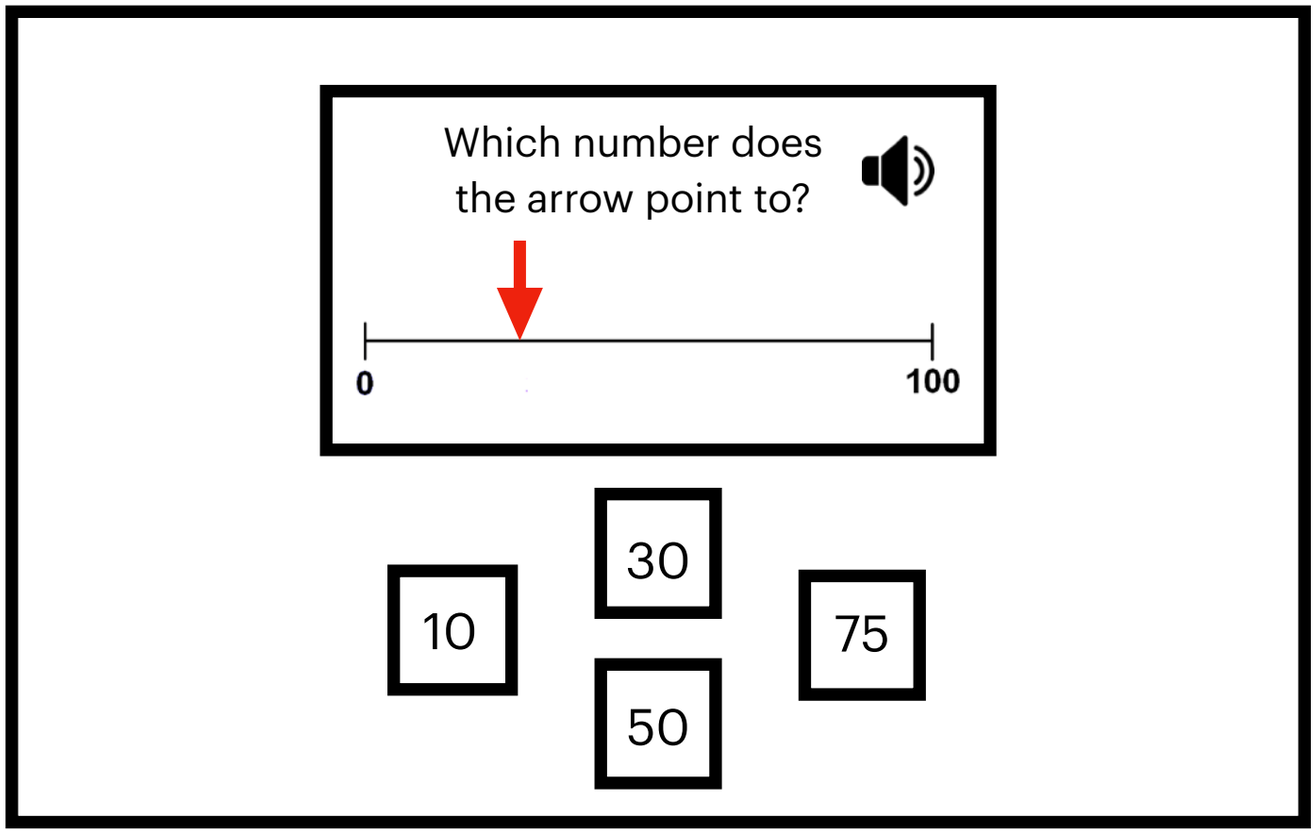
Interface Design

- Standardizing the interface reduces required learning, and reduces bias favoring children with more tablet/computer experience (e.g.: use 2AFC / 4AFC; no open-ended keyboard entry)

- **Desiderata**: support tablet (touch), computer (keyboard + mouse), and phone? (minimum resolution?)—portrait + landscape orientation?



Math: Number Line Estimation

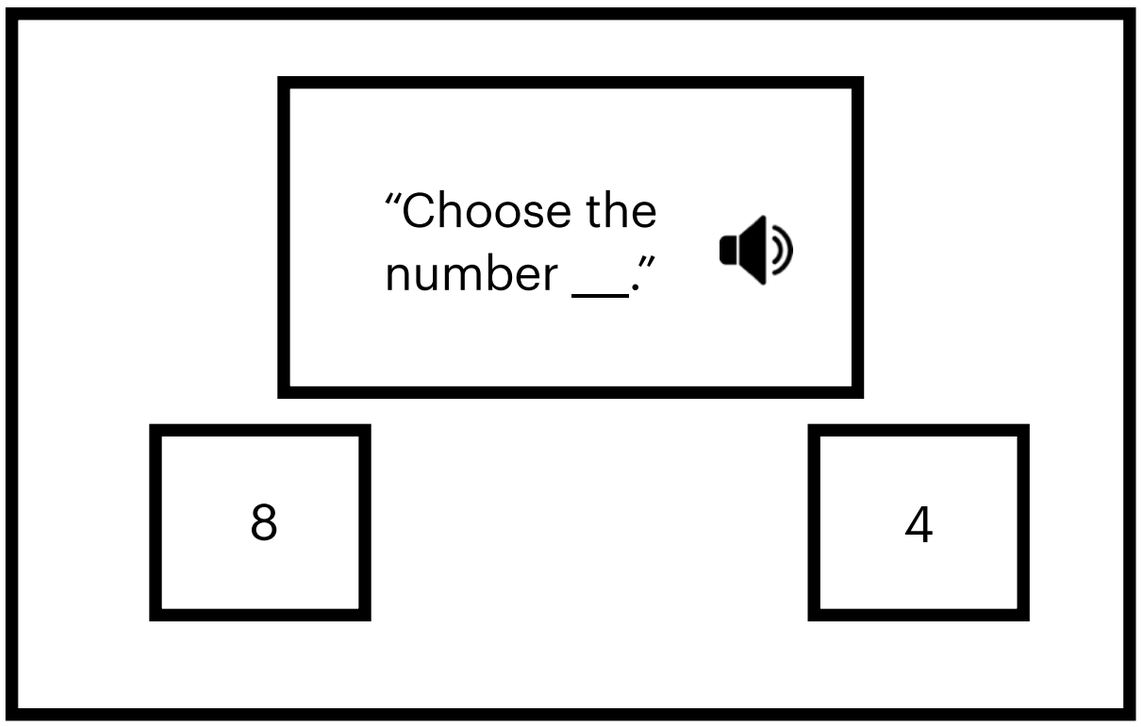


If children fail Number Line Estimation, Number Identification, and/or Number Discrimination, skip other math tasks?

(Maybe order 1. Number Identification, 2. Number Discrimination, 3. Number Line Estimation?)

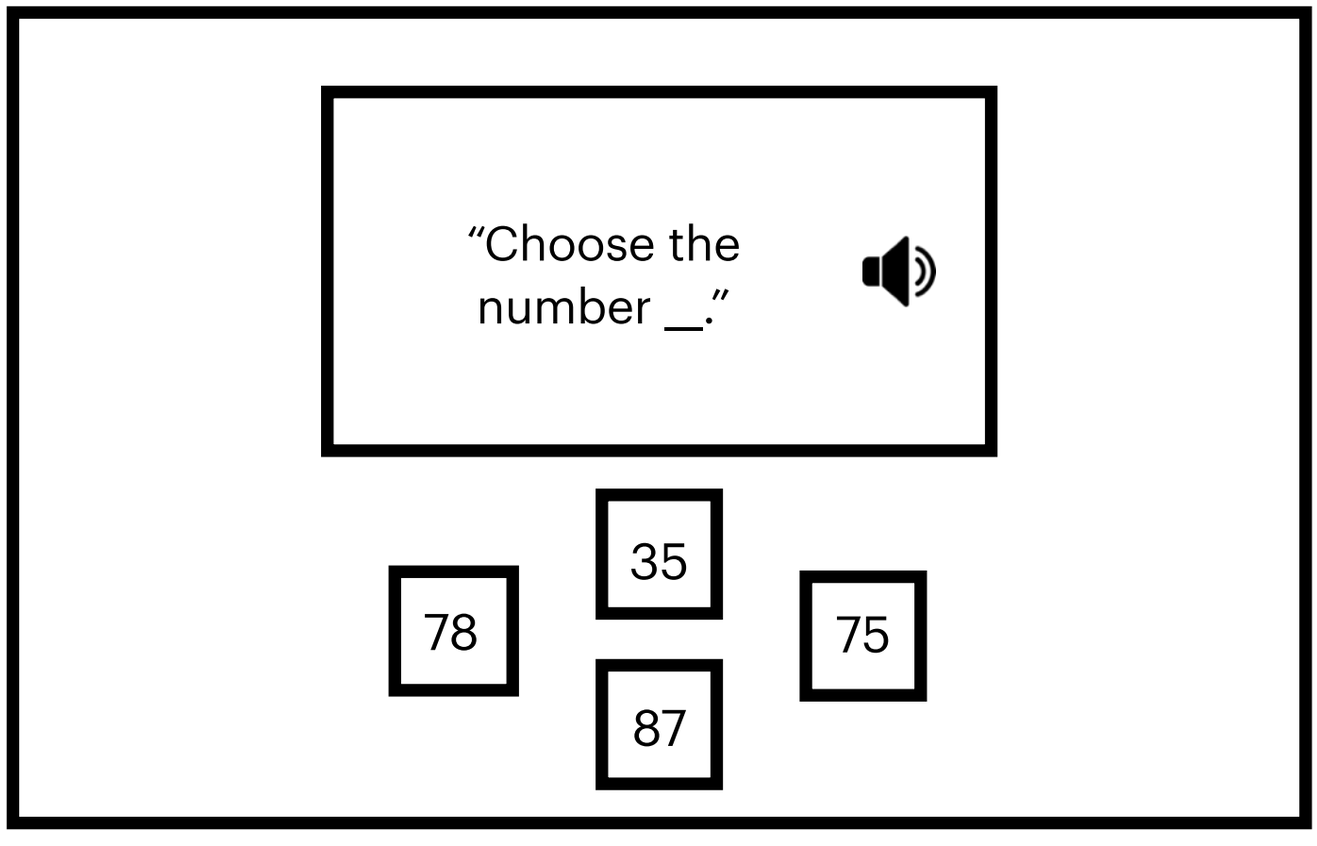
Math: Number Identification (EGMA)

Younger/less skilled children: 2AFC



Note: the target number is only spoken — not written in the instructions.

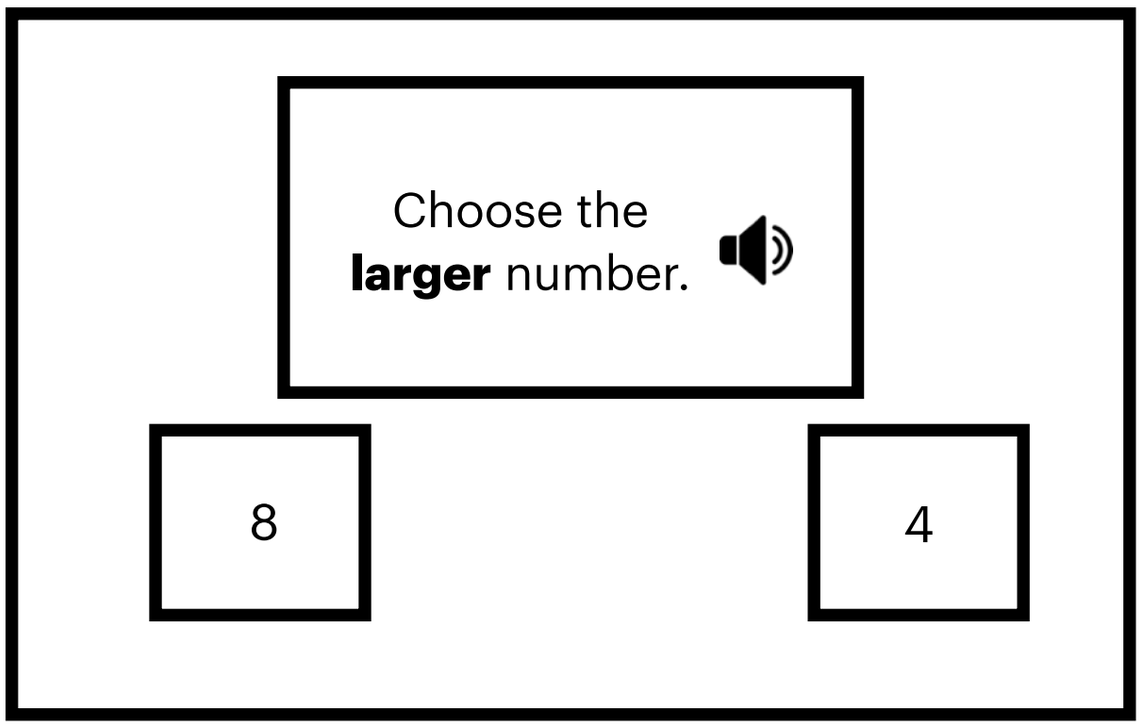
Older/more skilled children: 4AFC



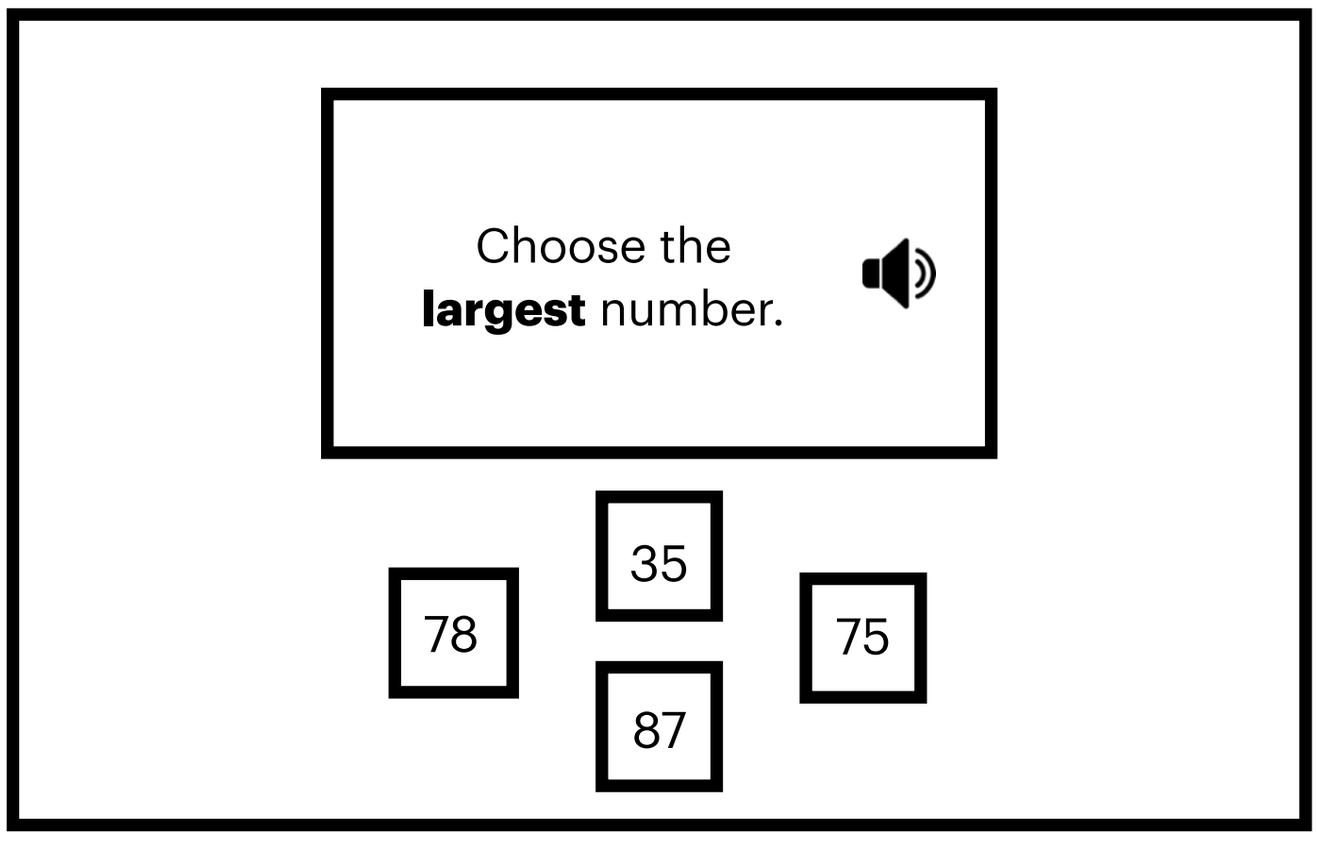
Item bank: https://docs.google.com/spreadsheets/d/1MlU4eOd45XVMg7HrnTDGZ3rv1cfNjvjpdc8e_edQqQk/edit?usp=sharing

Math: Number Comparison (EGMA)

Younger/less skilled children: 2AFC



Older/more skilled children: 4AFC



Item bank: https://docs.google.com/spreadsheets/d/1MlU4eOd45XVMg7HrnTDGZ3rv1cfNjvjpdc8e_edQqQk/edit?usp=sharing

Math: EGMA

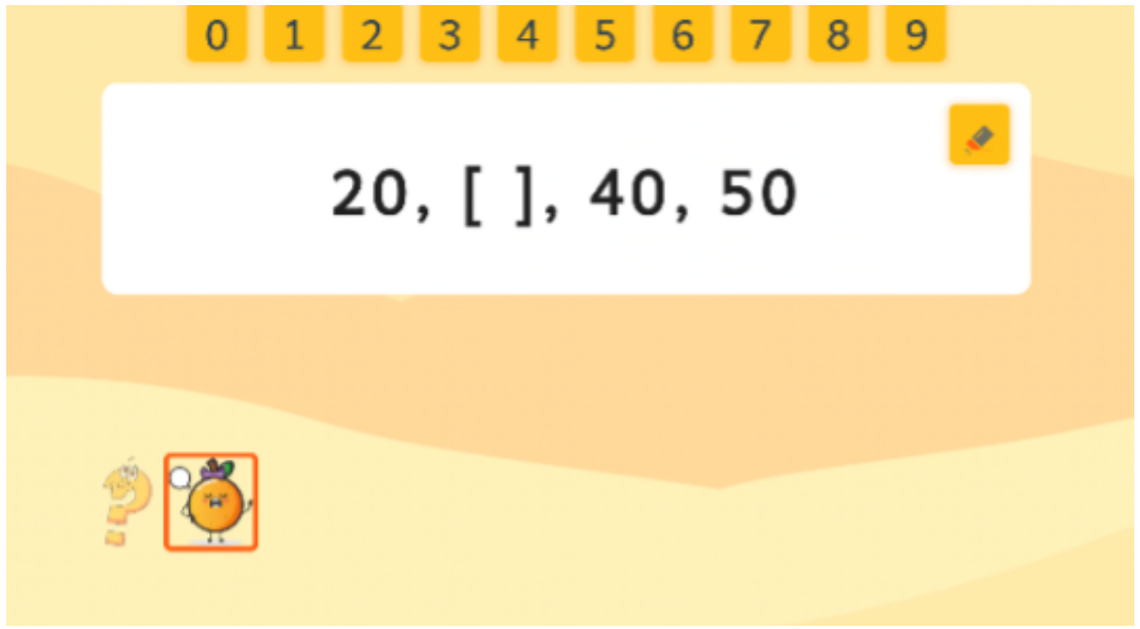
Missing number

Choose the best number to fill the blank.

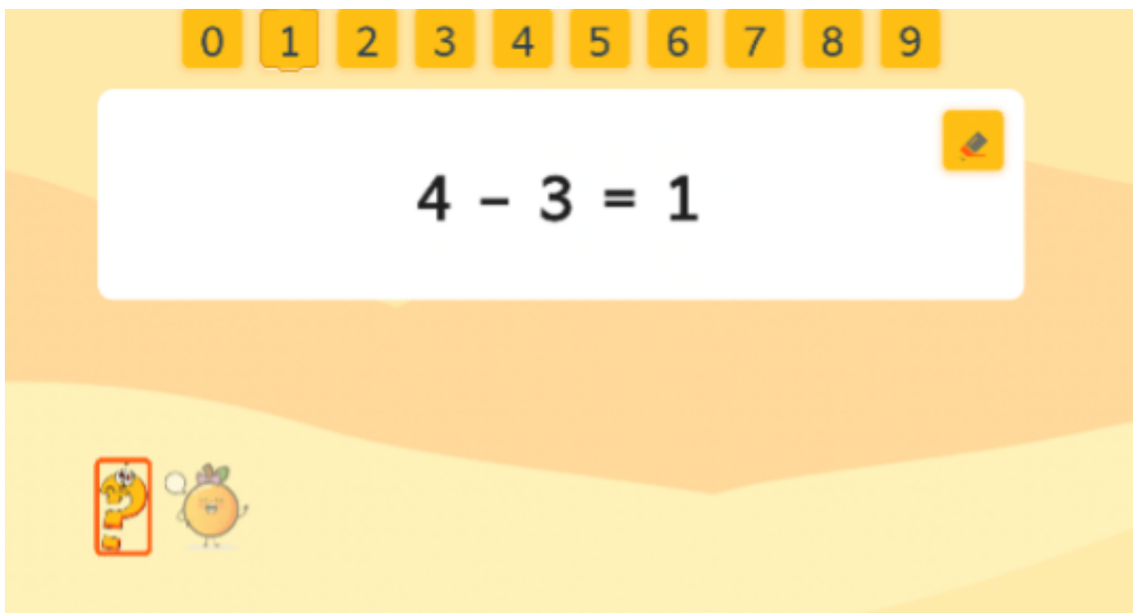
20, __, 40, 50

10 | 15 | 20 | 8

(Android app)



Addition/Subtraction



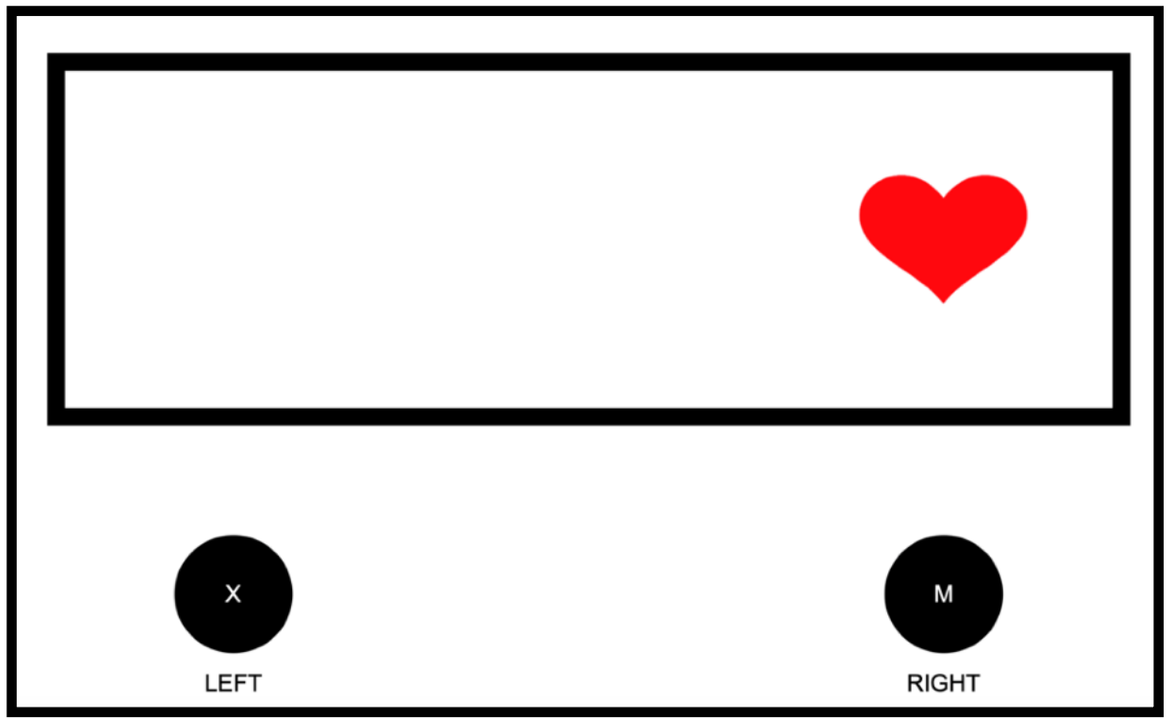
Choose the number to fill the blank.

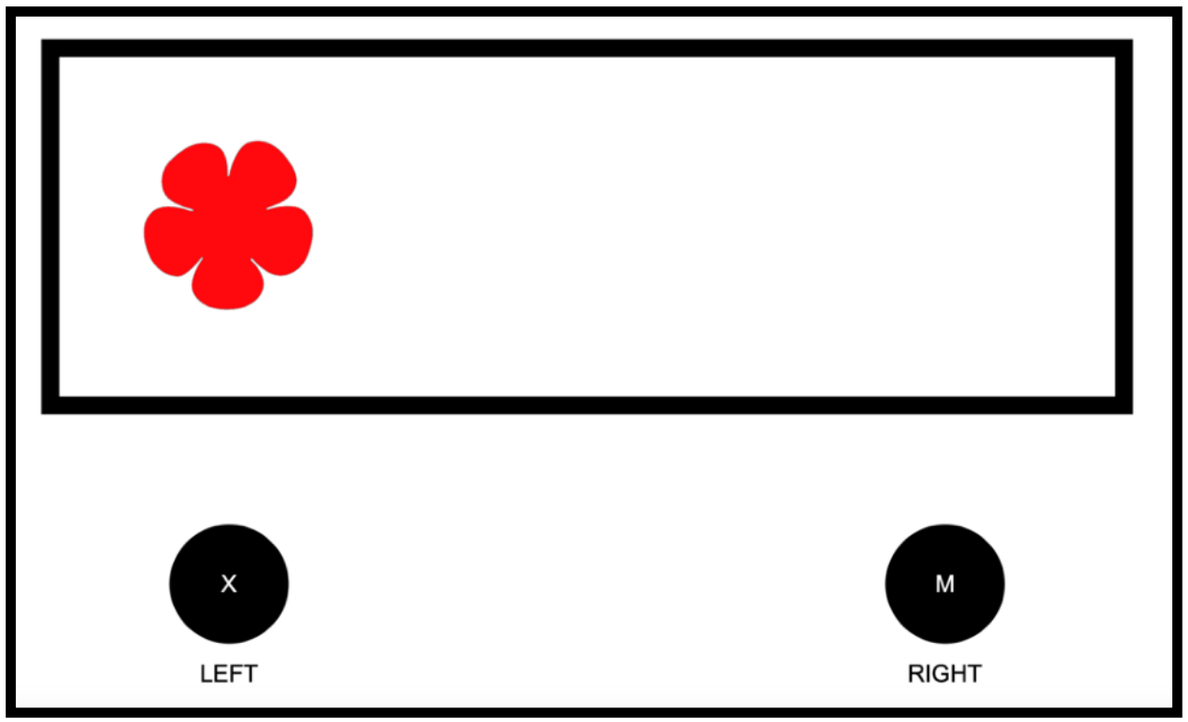
4 - 3 = __

1 | 2 | 4 | 3

EF: Hearts & Flowers

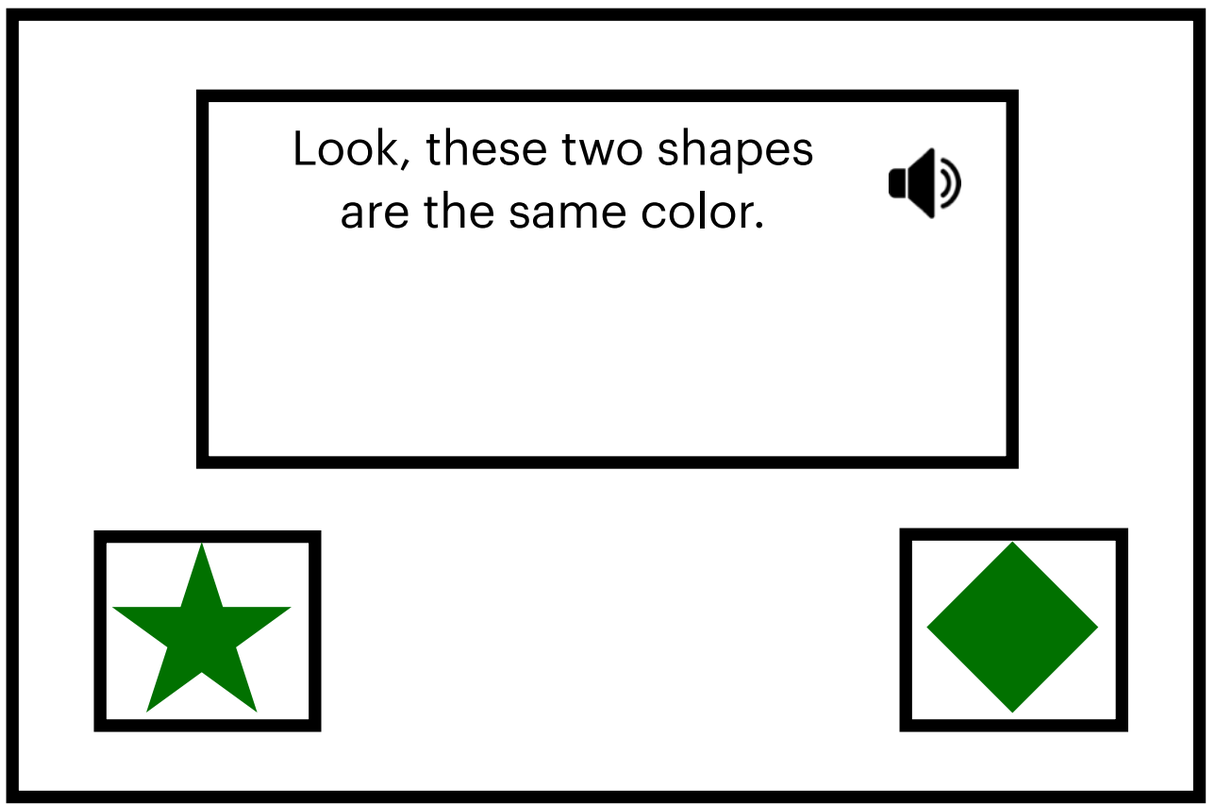
This can be adapted to fit the design, although we may not want to show instructions on every trial—just at the beginning of each block, when the new task is introduced.



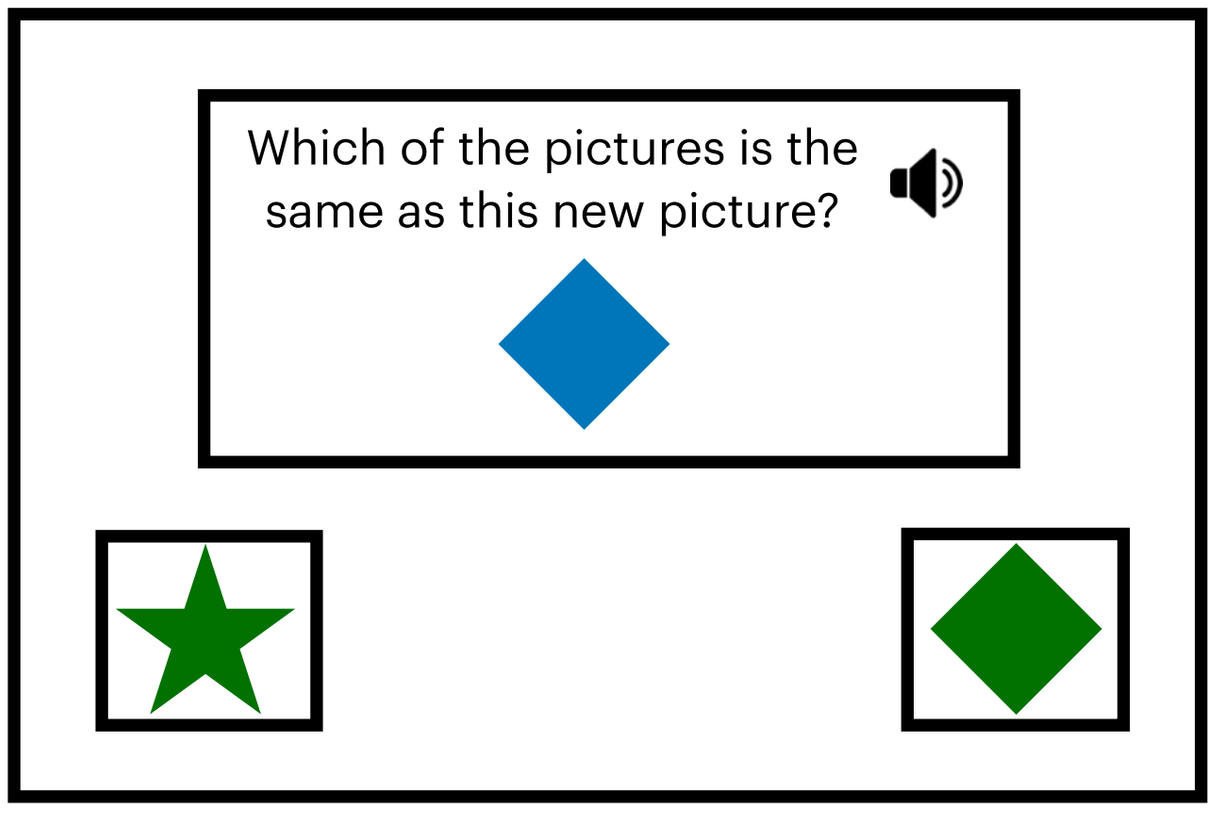


EF: Something's the Same

This fits the design (2AFC), although each trial has two phases.



For stimuli, we'll want to use a mix of shapes and animals. (Laura Kuhn can't share the original stim.)

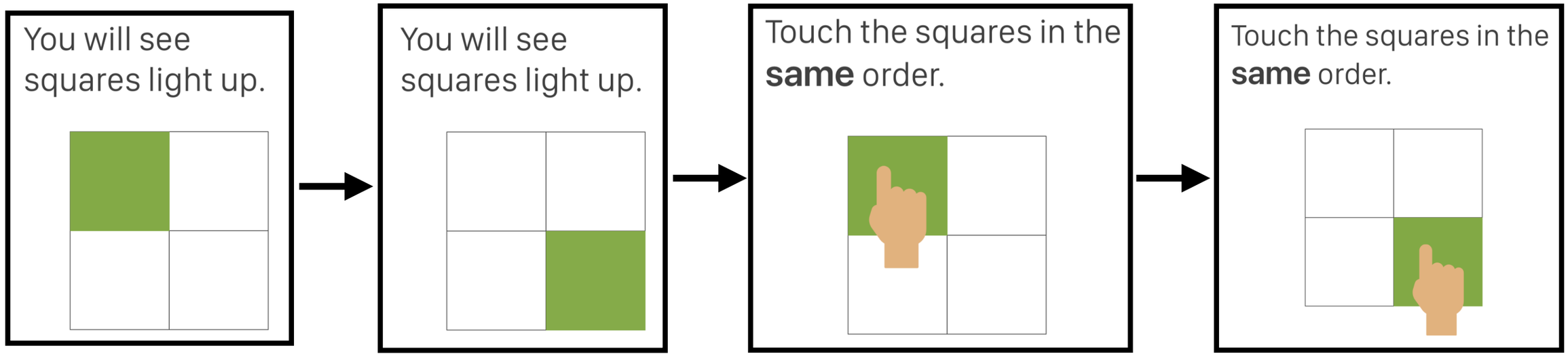


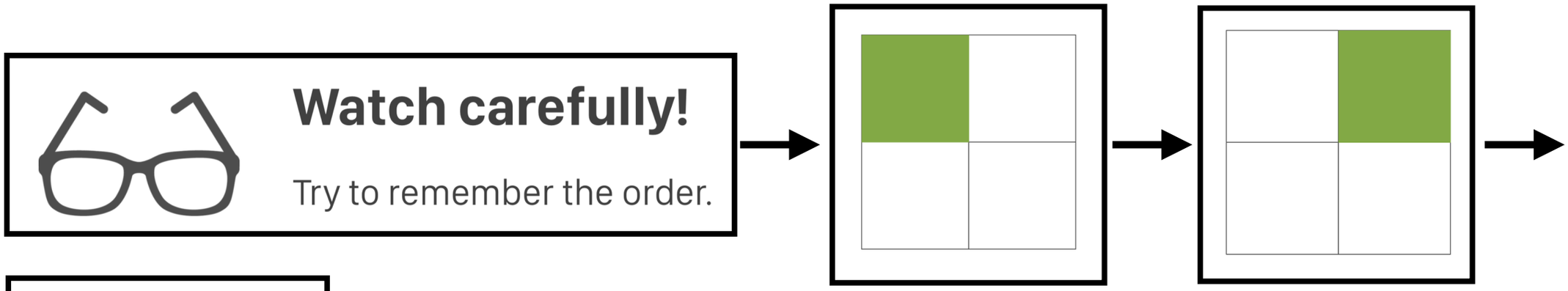
Phase I presents two images and notes similarity on one dimension (content, color, or size).

Phase II presents a new image similar to one of the images on a different dimension, and asks children to select the image that matches it.

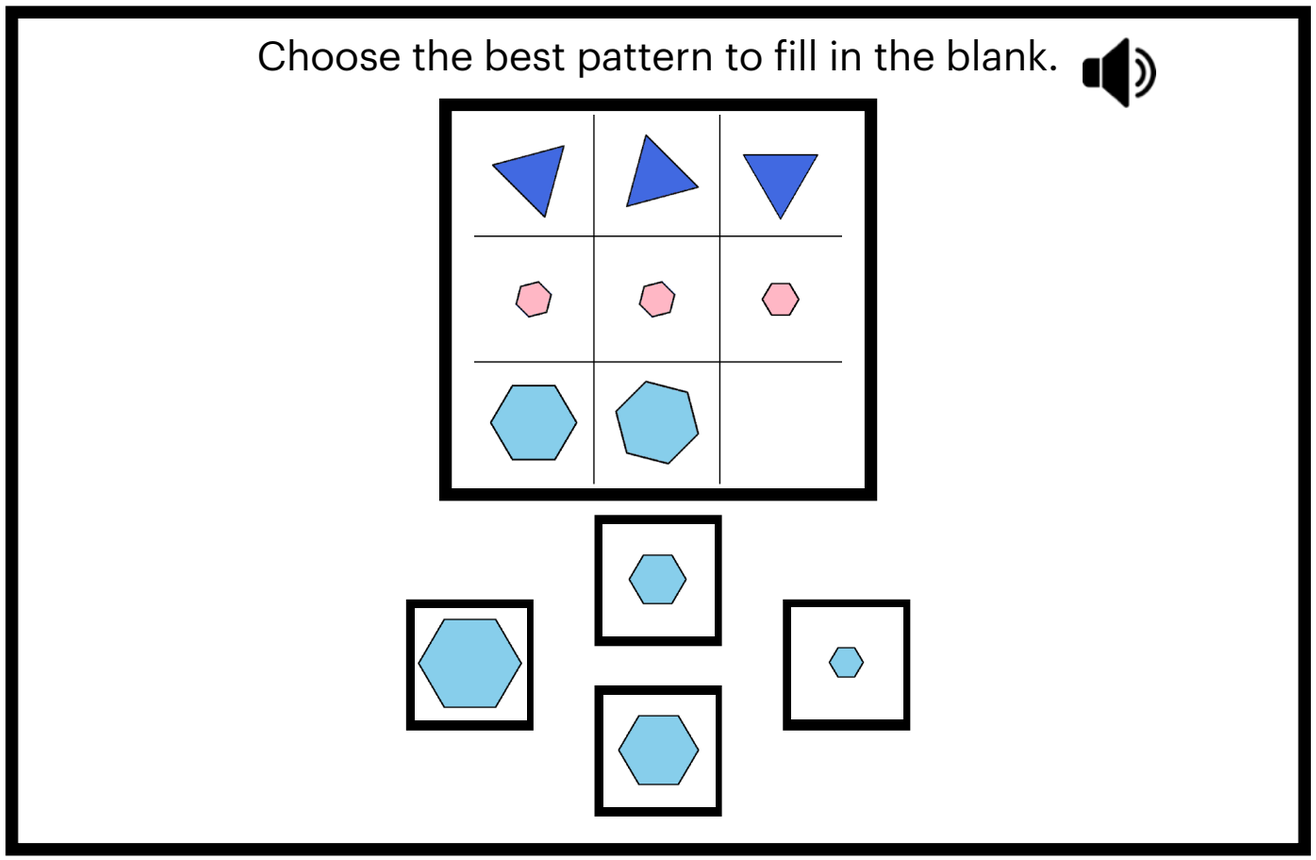
EF: Dot Matrix Memory Game

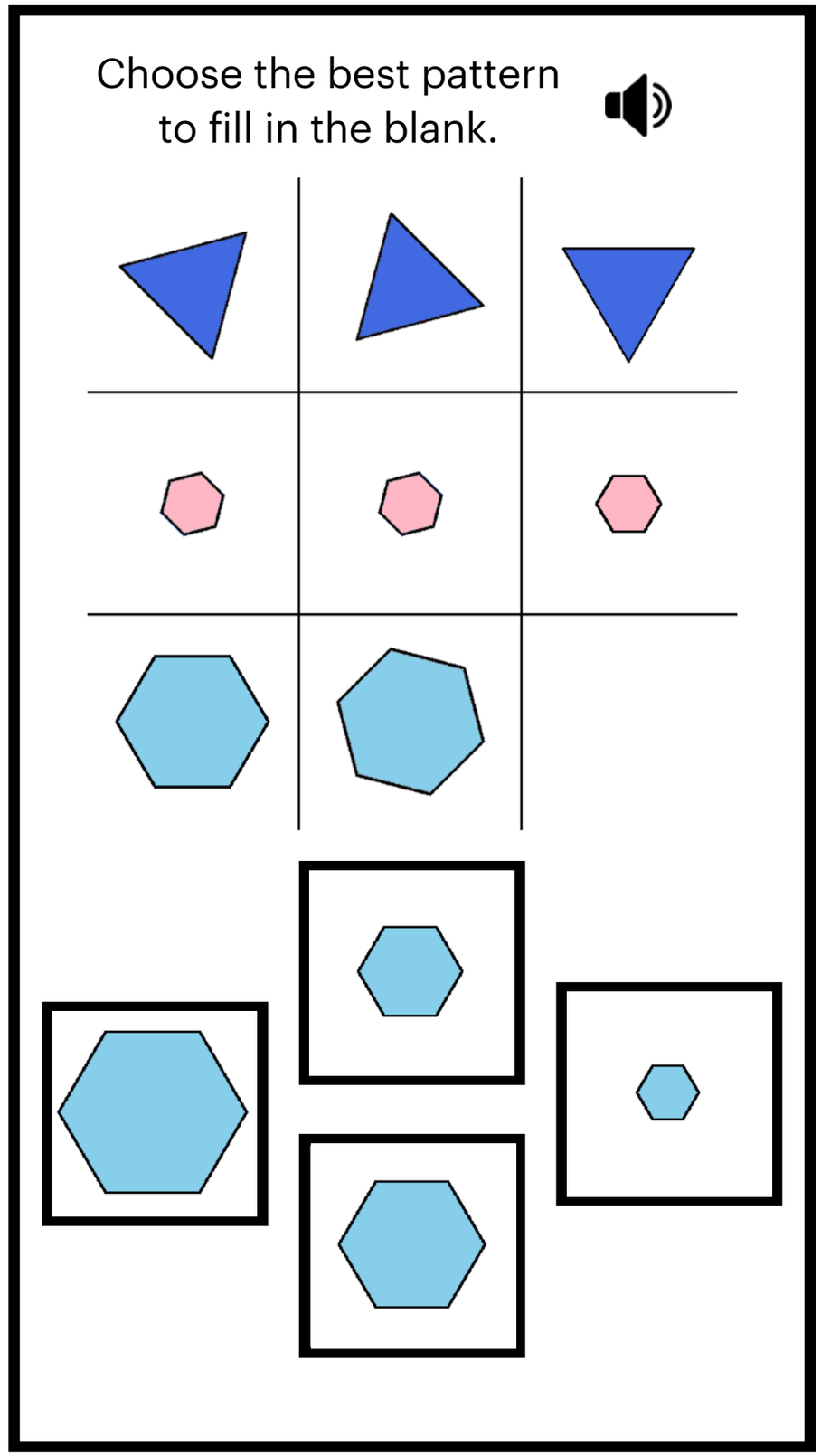
The Corsi/dot matrix memory task 1) does not fit the mAFC design, and 2) requires more instructions.





Reasoning: Matrix Reasoning

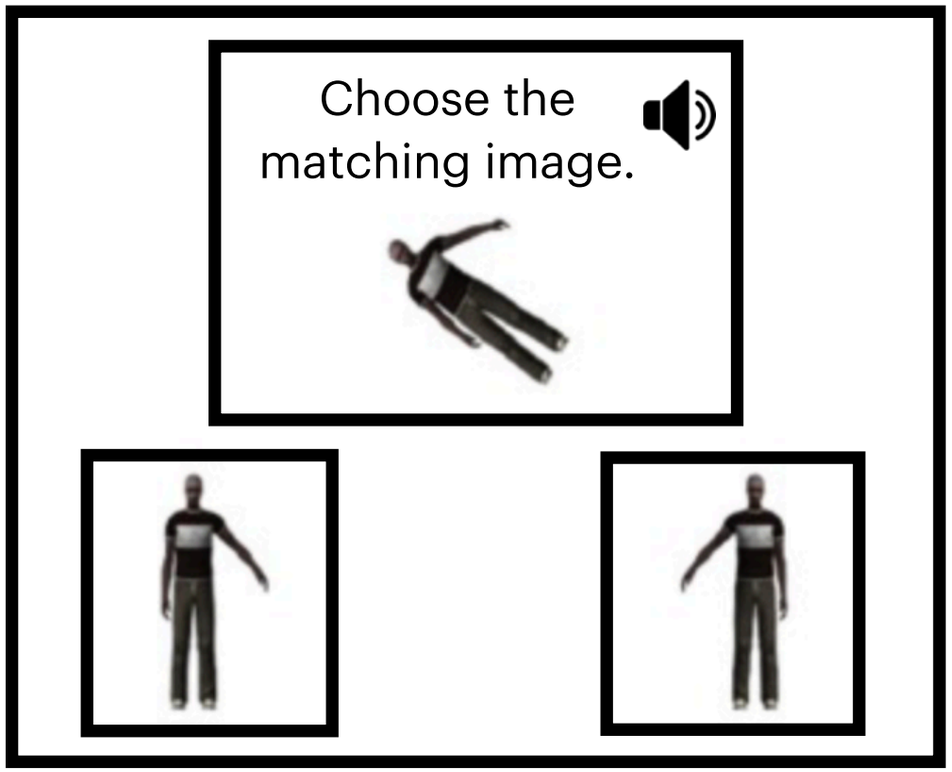




Rogier Kievit and Nick Judd are selecting and piloting stimuli.

Spatial: Mental Rotation

- 1 animated match-to-sample instruction trial
- 2D: 2AFC, 3 types of stimuli
- 3D: 2AFC or 4AFC?



3D Shepard-Metzler