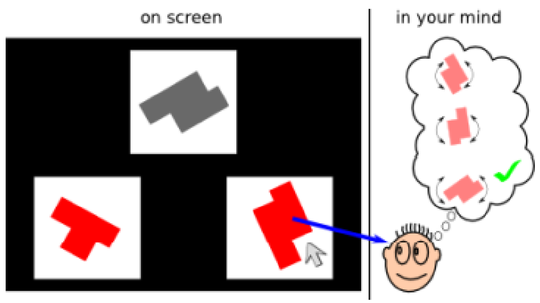
ONLINE 3D ASSESSMENT OF VISUOSPATIAL FUNCTION USING THE SHEPARD-METZLER MENTAL ROTATION TASK

Randy Etornam Essikpe, Biomedical Engineering, MSE.
Mentor: Dr. Sydney Schaefer, PhD.
School of Biological and Health Systems Engineering

Introduction

Scientists over the years have researched into ways of understanding how we perceive our environment spatially. Among the many experimentation methods that researchers have come up with, the Mental Rotation Task (MRT) seems to provide a firm understanding of how people perceive their visuospatial environment and how they interact with it. The MRT involves displaying different shapes and allowing the participant to determine whether the shapes are the same or different as fast as they can.

The MRT has been used on several occasions in different ways and has proven to be a very useful test. Notwithstanding, there are discrepancies that arise concerning the dimensions of the shapes used in the test and gender biases that arise from the use of the different shapes.

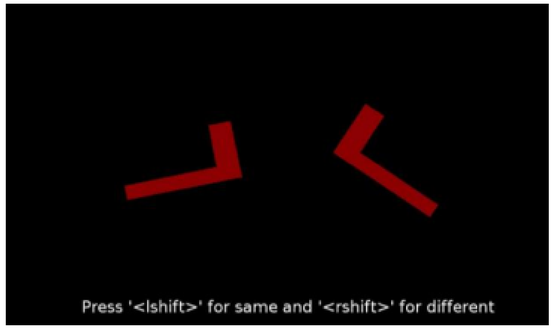


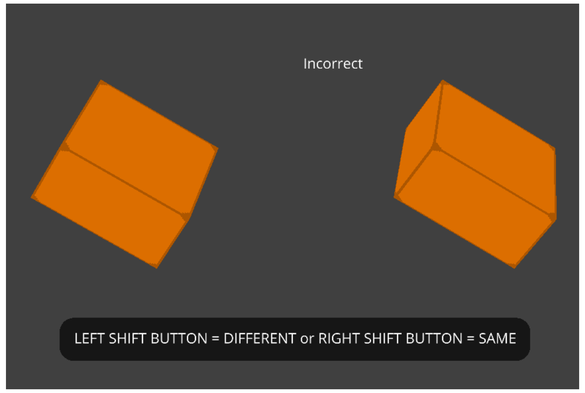
Goal

Build an online 3D model of the Shepard-Metzler Mental Rotation Task to assess visuospatial function.

Methods and Results

Participants perform the tasks online within 6-8 minutes. They are allowed 3 seconds to answer each question as the shapes appear on the screen. Parameters that are measured as the test is done include reaction time and accuracy.





Python programming language was exploited using the Ursina Game Engine to develop the online 3D MRT model. In the Motor Rehabilitation and Learning Lab, a 2D online model is currently being used called the Psychology Experiment Building Language (PEBL) that is being used to assess visuospatial function.

Next Steps

Data collected from the test are exported into an Excel sheet format. Participants are assigned identity codes and their data mapped to them. These data are then analyzed and helps to make concrete conclusions on the best model of the MRT that helps to assess visuospatial function.

	A	B	C	D	E	F	G	H	I
1	SubID	Type	TrialNum	Cond	StimId	Rot	Resp	Cor	RT
2	13577_001	PRACTICE	-3	1	2	0	<RSHIFT>	1	10376
3	13577_001	PRACTICE	-2	1	1	-1	<LSHIFT>	0	6732
4	13577_001	PRACTICE	-1	0	1	4	<RSHIFT>	0	1562
5	13577_001	PRACTICE	0	0	2	-2	<RSHIFT>	0	1825
6	13577_001	TEST	1	0	1	1	<TIMEOUT	0	3002
7	13577_001	TEST	2	0	2	4	<LSHIFT>	1	1450
8	13577_001	TEST	3	1	2	-2	<LSHIFT>	0	1739
9	13577_001	TEST	4	1	1	0	<RSHIFT>	1	1775
10	13577_001	TEST	5	0	2	-3	<RSHIFT>	0	2058
11	13577_001	TEST	6	1	2	-1	<LSHIFT>	0	1518
12	13577_001	TEST	7	1	1	-2	<RSHIFT>	1	1558

Impact

The results and conclusion of this research study will help inform other researchers about more improved ways of assessing visuospatial. It will also help in the design of better therapeutic routines for patients with motor impairments.

What I learned

- Improved Python Programming Skill
- Learned to develop a game using the Ursina 3D Engine
- Improved project management skill
- Improved design thinking skill

Acknowledgement

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