

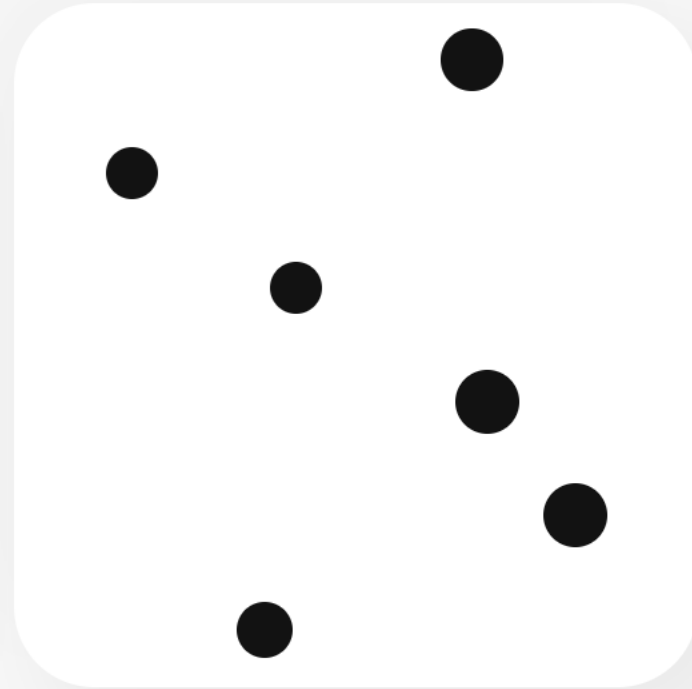
# TNB

103 students

- 5 years old:  $N = 16$
- 6 years old:  $N = 40$
- 7 years old:  $N = 19$
- 8 years old:  $N = 28$

Python, Pandas, SPSS

# Dots Comparison



# Dots Comparison

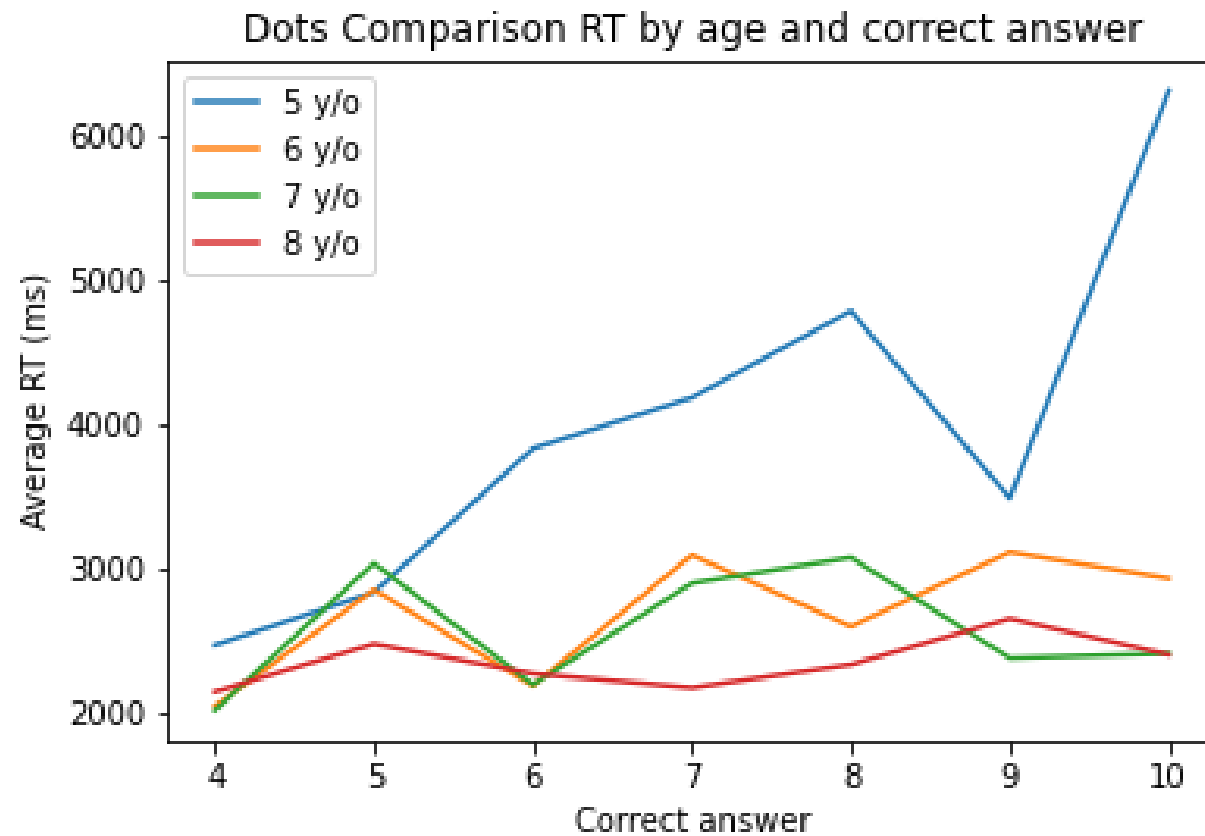
## Response Time

	5 y/o			6 y/o			7 y/o			8 y/o		
Correct*	N	M	SD	N	M	SD	N	M	SD	N	M	SD
4	4	2474,25	364,51	25	2051,08	1122,63	16	2023	1451,92	11	2151,36	926,75
5	15	2839,6	1541,51	37	2857,65	2843,65	11	3042,18	2352,32	26	2482,27	2100,44
6	16	3837,75	2435,12	38	2192	1731,43	21	2199,62	1584,64	39	2276,38	1572,94
7	29	4190,28	4525,02	67	3098,87	3008,37	28	2903,5	2156,95	34	2178,71	1345,55
8	24	4791	3806,49	60	2603,18	2765,71	26	3081,54	2830,57	37	2338,78	2138,01
9	36	3492,03	3279,89	68	3119,25	3664,53	33	2383,39	1887,28	54	2658,2	2464,34
10	30	6321,3	14247,14	80	2936,55	3646,97	50	2416,4	2173,2	60	2407,3	2517,17
General	160	4286,54	6967,78	400	2769,85	3020,91	190	2539,81	2133,38	280	2381,33	2082,19

\* Ratio would be better

# Dots Comparison

## Response Time



# Dots Comparison

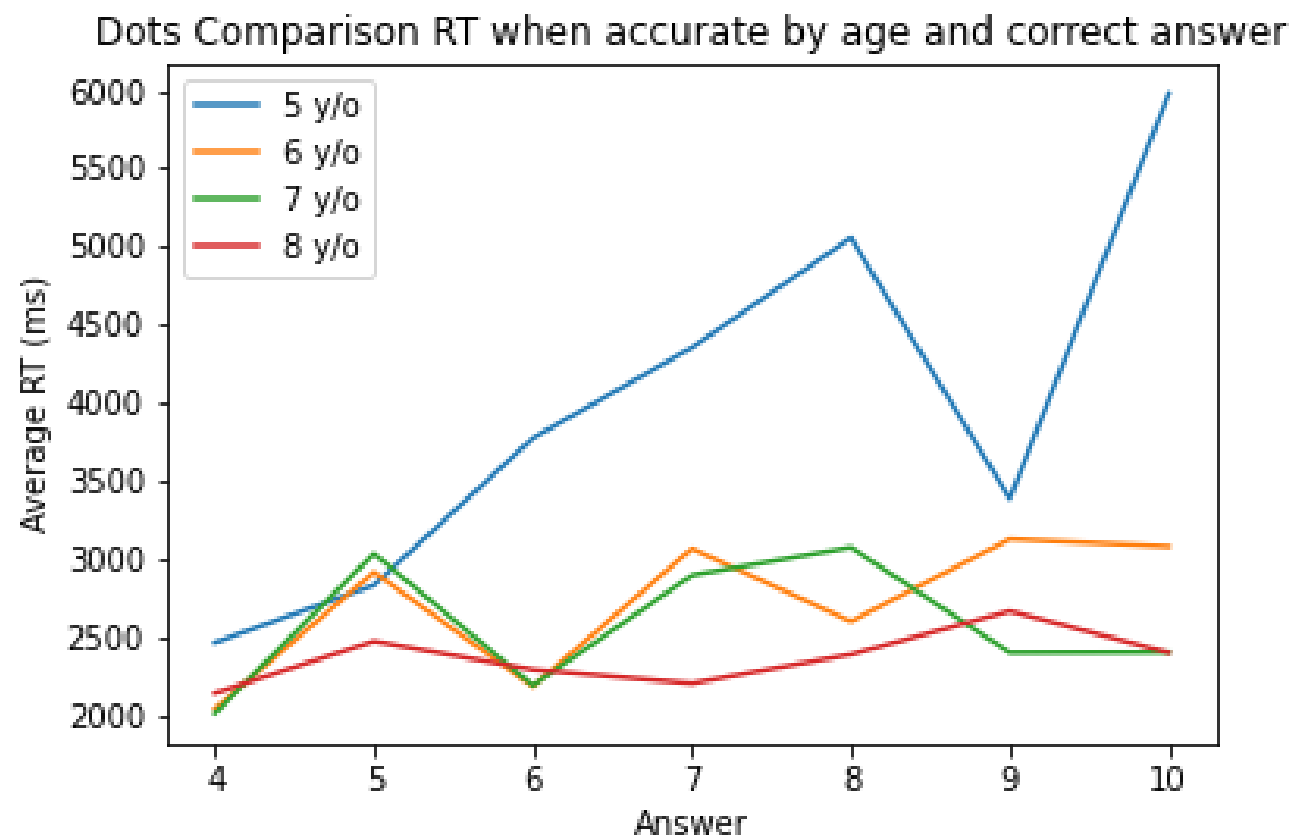
Response Time when accurately answered

	5 y/o			6 y/o			7 y/o			8 y/o		
Correct*	N	M	SD	N	M	SD	N	M	SD	N	M	SD
4	4	2474,25	364,51	25	2051,08	1122,63	16	2023	1451,92	11	2151,36	926,75
5	15	2839,6	1541,51	36	2923,36	2855,03	11	3042,18	2352,32	26	2482,27	2100,44
6	14	3779,5	2591,14	37	2193,22	1754,66	21	2199,62	1584,64	38	2300,71	1586,25
7	26	4357,77	4748,85	65	3073,94	3031,2	28	2903,5	2156,95	33	2213,15	1350,94
8	22	5058,18	3866,35	56	2609,09	2842,86	26	3081,54	2830,57	36	2397,81	2137,56
9	32	3391,66	3386,72	67	3134,67	3689,58	30	2409,2	1969,23	53	2674,89	2484,46
10	28	5981,43	14645,42	72	3087,21	3806,91	47	2412	2205,08	57	2408,81	2575,43
General	147	4259,16	7191,76	373	2801,53	3072,04	184	2547,46	2156,43	263	2400,92	2100,58

\* Ratio would be better

# Dots Comparison

Response Time when accurately answered



# Dots Comparison

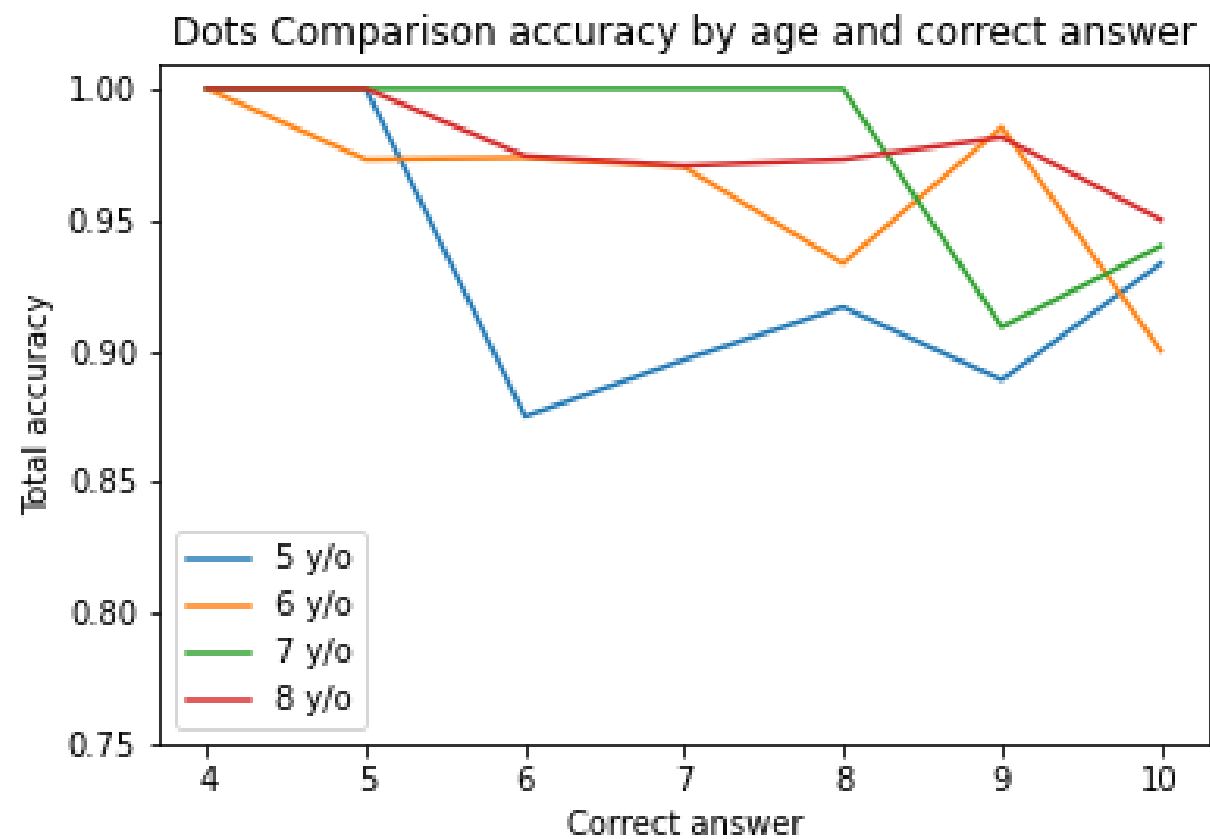
## Accuracy

	5 y/o		6 y/o		7 y/o		8 y/o	
Correct*	N	Accuracy	N	Accuracy	N	Accuracy	N	Accuracy
4	4	1	25	1	16	1	11	1
5	15	1	37	0,97	11	1	26	1
6	16	0,88	38	0,97	21	1	39	0,97
7	29	0,9	67	0,97	28	1	34	0,97
8	24	0,92	60	0,93	26	1	37	0,97
9	36	0,89	68	0,99	33	0,91	54	0,98
10	30	0,93	80	0,9	50	0,94	60	0,95

\* Ratio would be better

# Dots Comparison

## Accuracy





# Match Sample



# Match Sample



# Match Sample

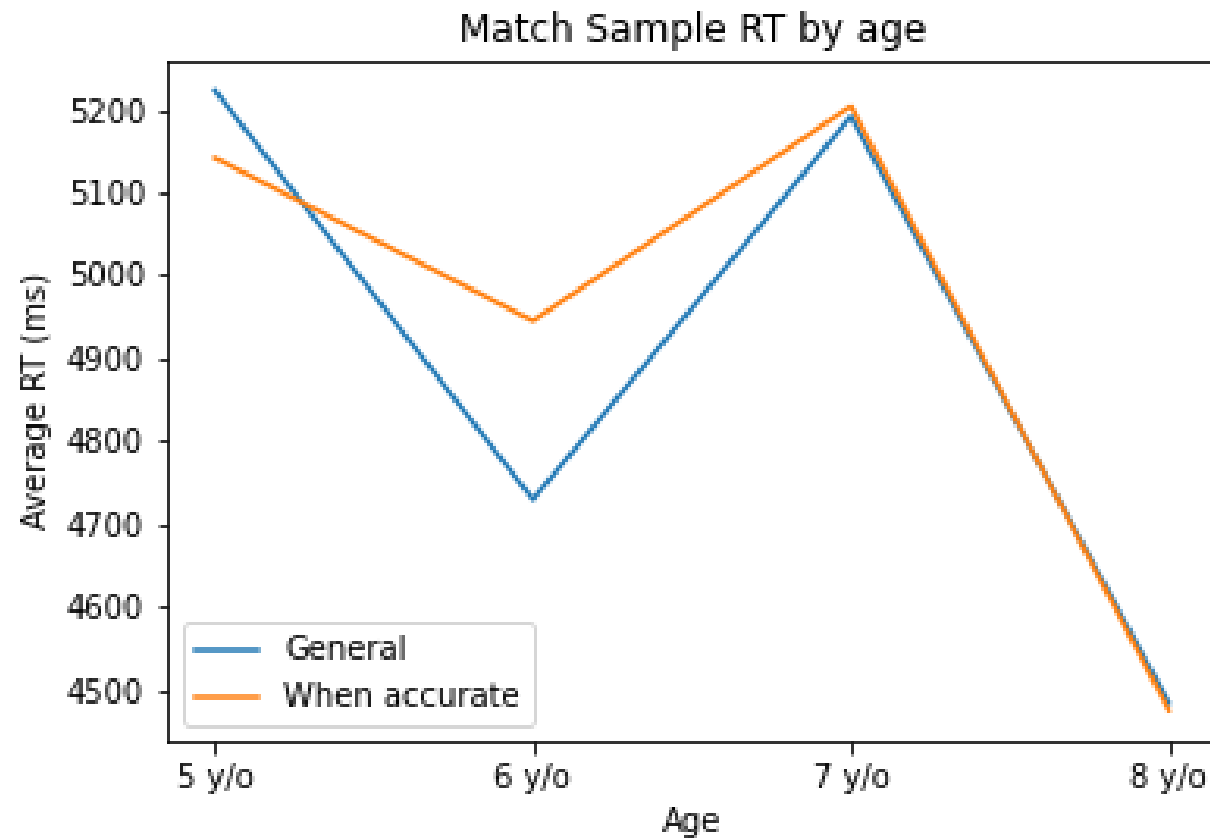
	5 y/o	6 y/o	7 y/o	8 y/o
Accuracy	0,63	0,66	0,7	0,79
N*	144	360	171	252
RT M	5223,26	4729,71	5191,6	4484,16
RT S	3525,6	2906,08	2574,67	2245,71
N when accurate*	91	238	120	200
RT when accurate M	5141,85	4945,18	5204,18	4475,56
RT when accurate SD	3933,32	2817,81	2627,77	1936,55

\* Notice this is #samples, not #users

Could not separate by correct answer

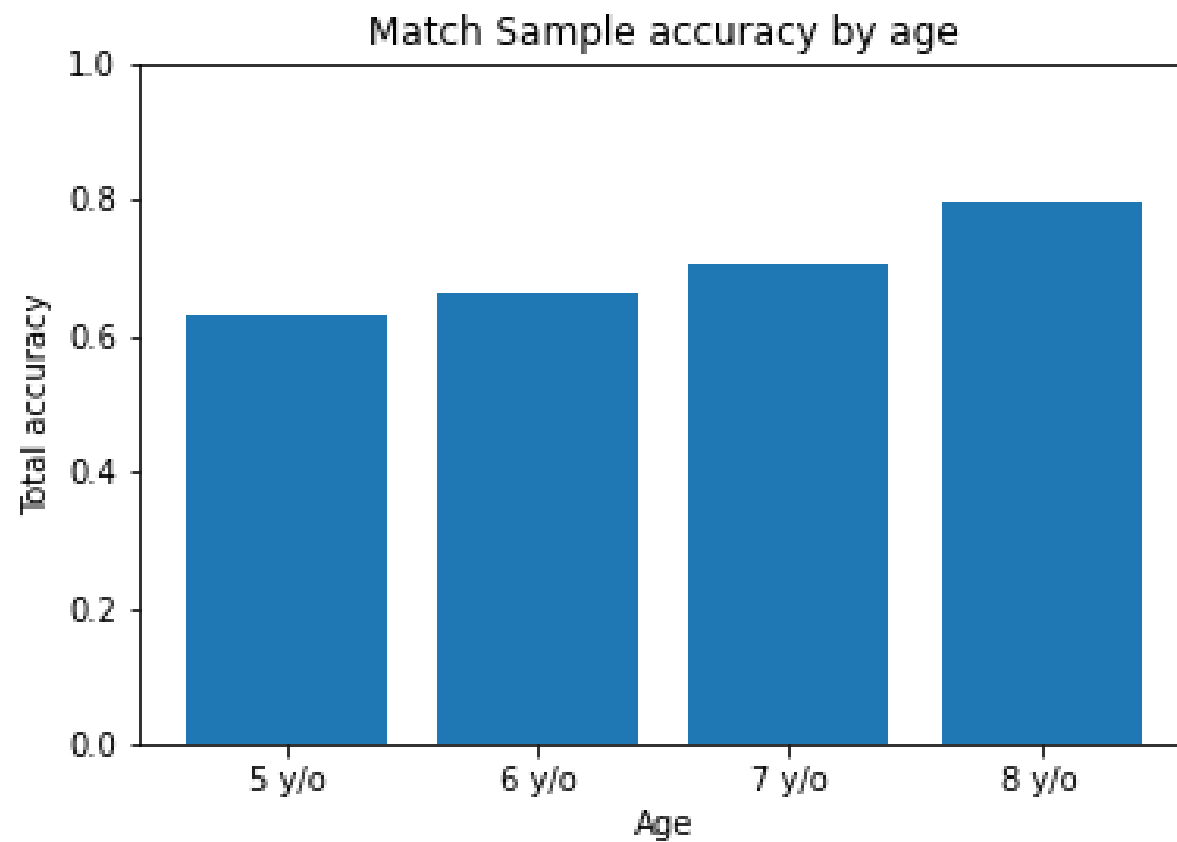
# Match Sample

## Response Time

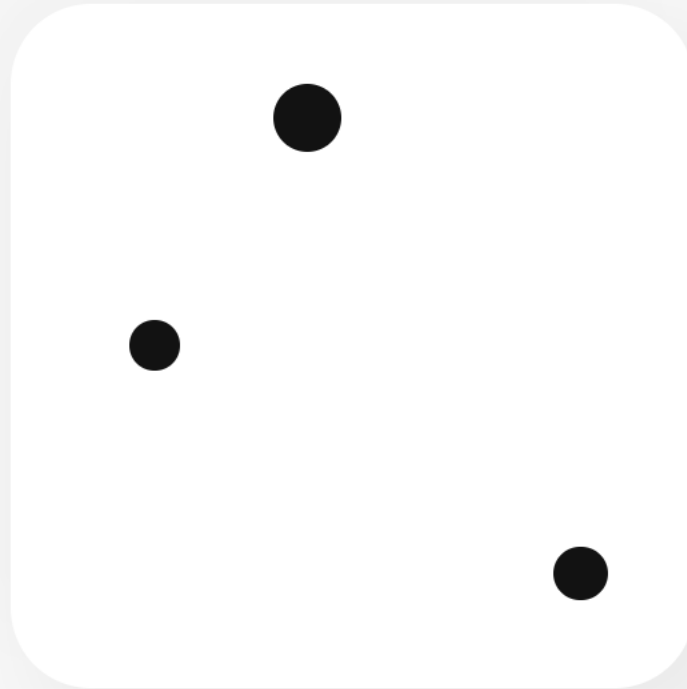


# Match Sample

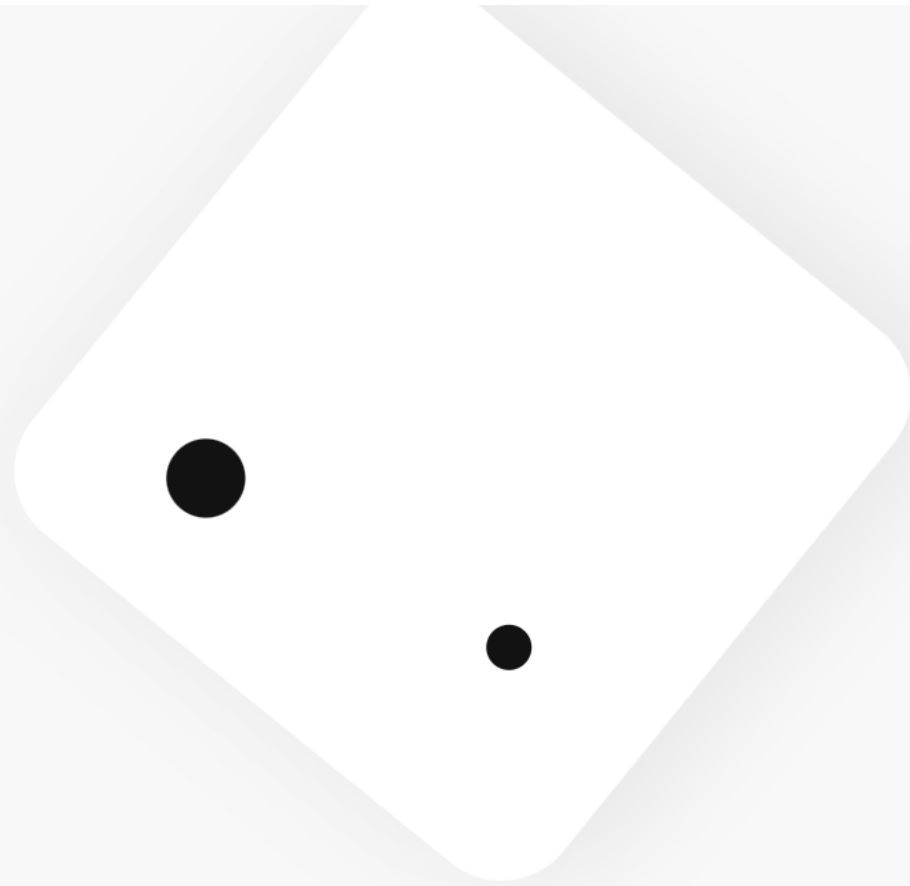
## Accuracy



# Match Sample Rotate



# Match Sample Rotate



# Match Sample Rotate

	5 y/o	6 y/o	7 y/o	8 y/o
Accuracy	0,62	0,71	0,74	0,87
N*	144	360	171	252
RT M	4888,19	4512,24	4621,92	4430,1
RT S	2877,78	2190,36	1962,44	1637,48
N when accurate*	90	256	127	218
RT when accurate M	4669,48	4395,57	4559,38	4436,1
RT when accurate SD	2817,66	2016,09	1993,51	1663,68

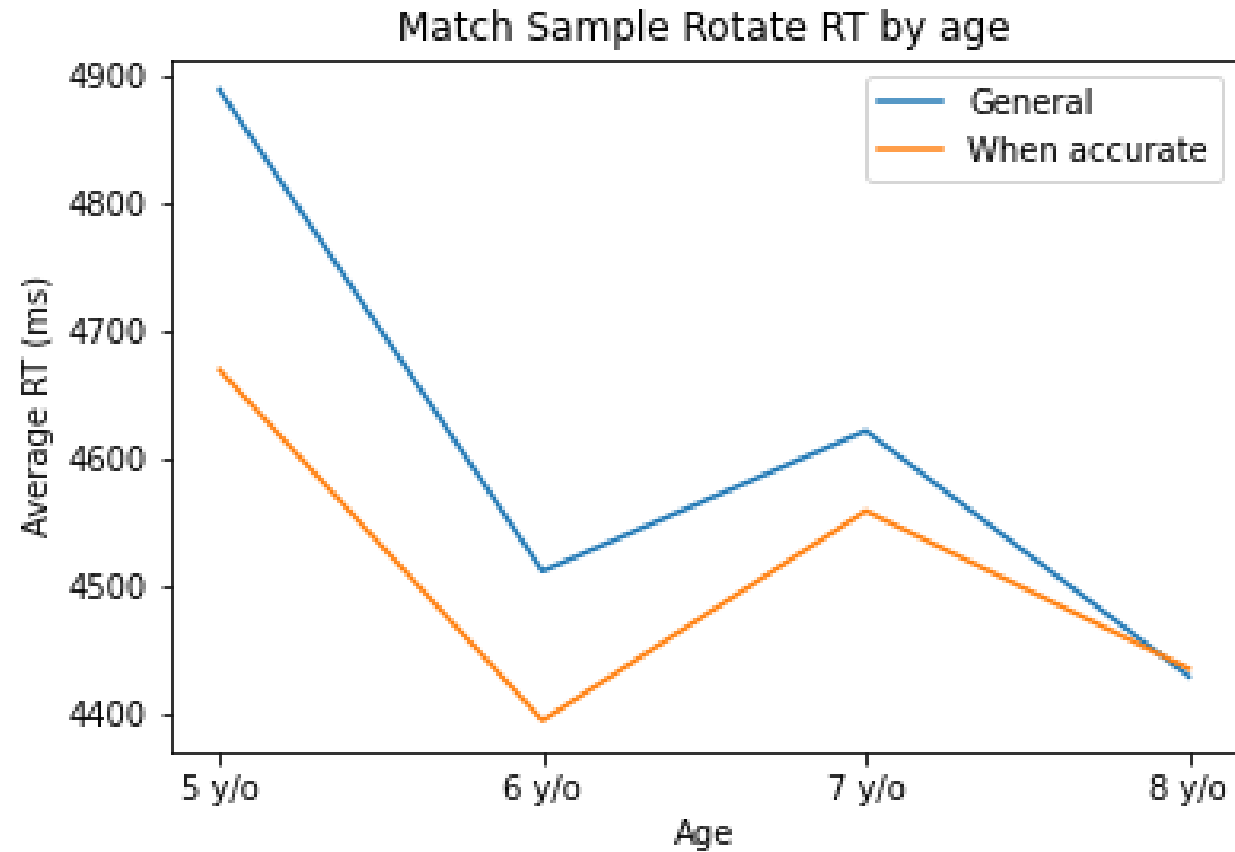
\* Notice this is #samples, not #users

Could not separate by correct answer



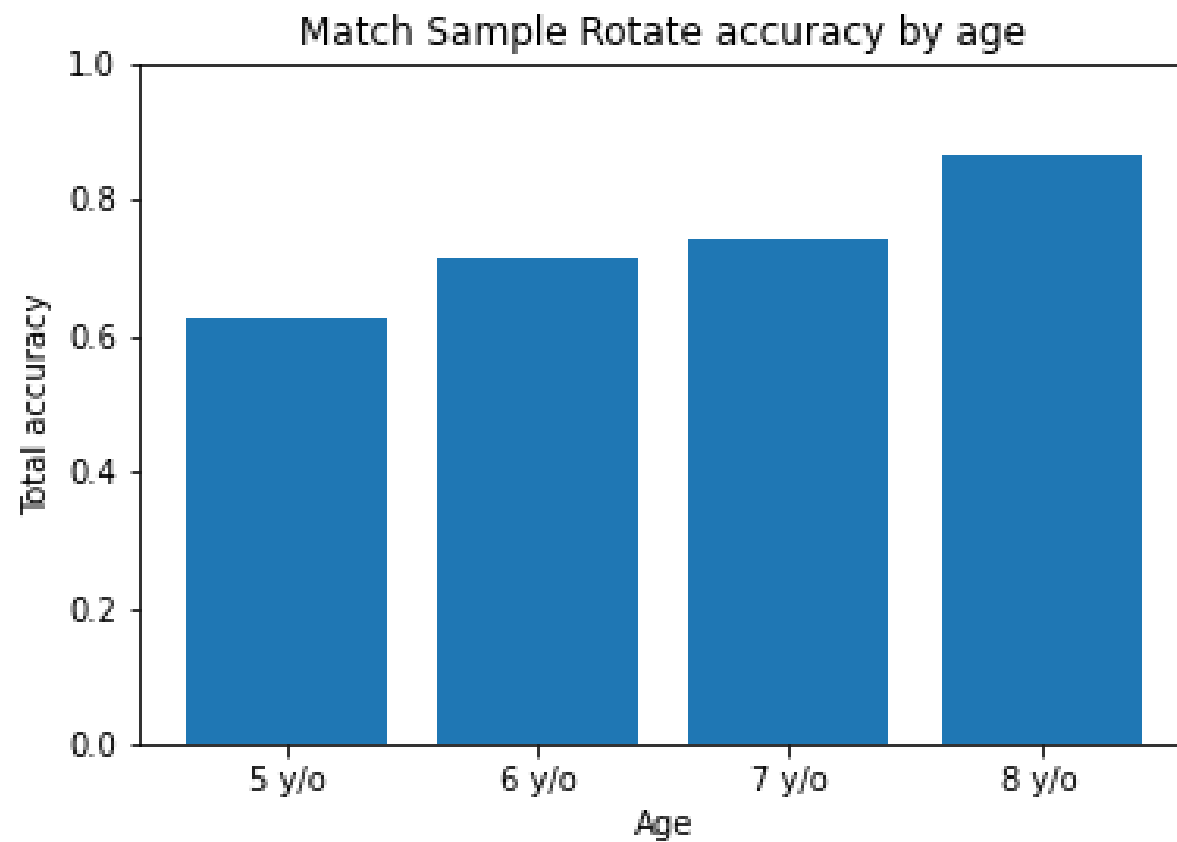
# Match Sample Rotate

## Response Time



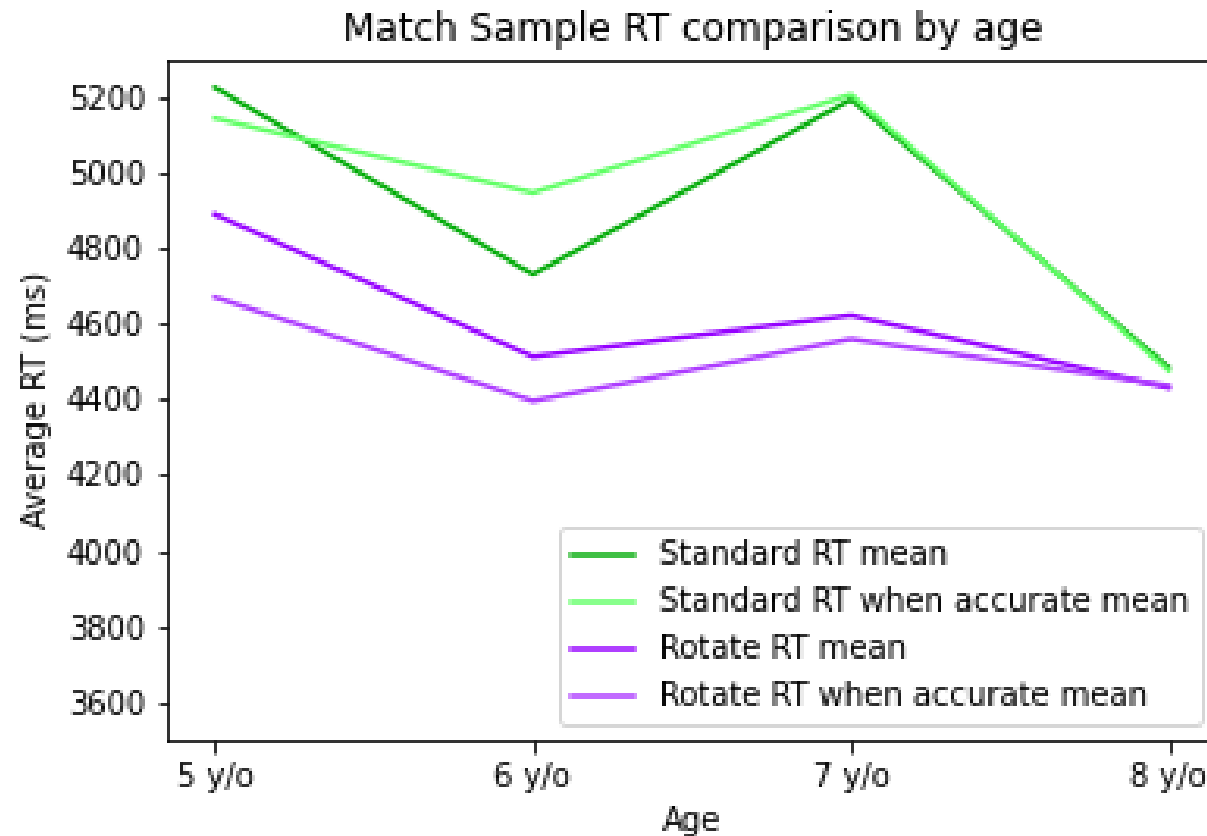
# Match Sample Rotate

## Accuracy



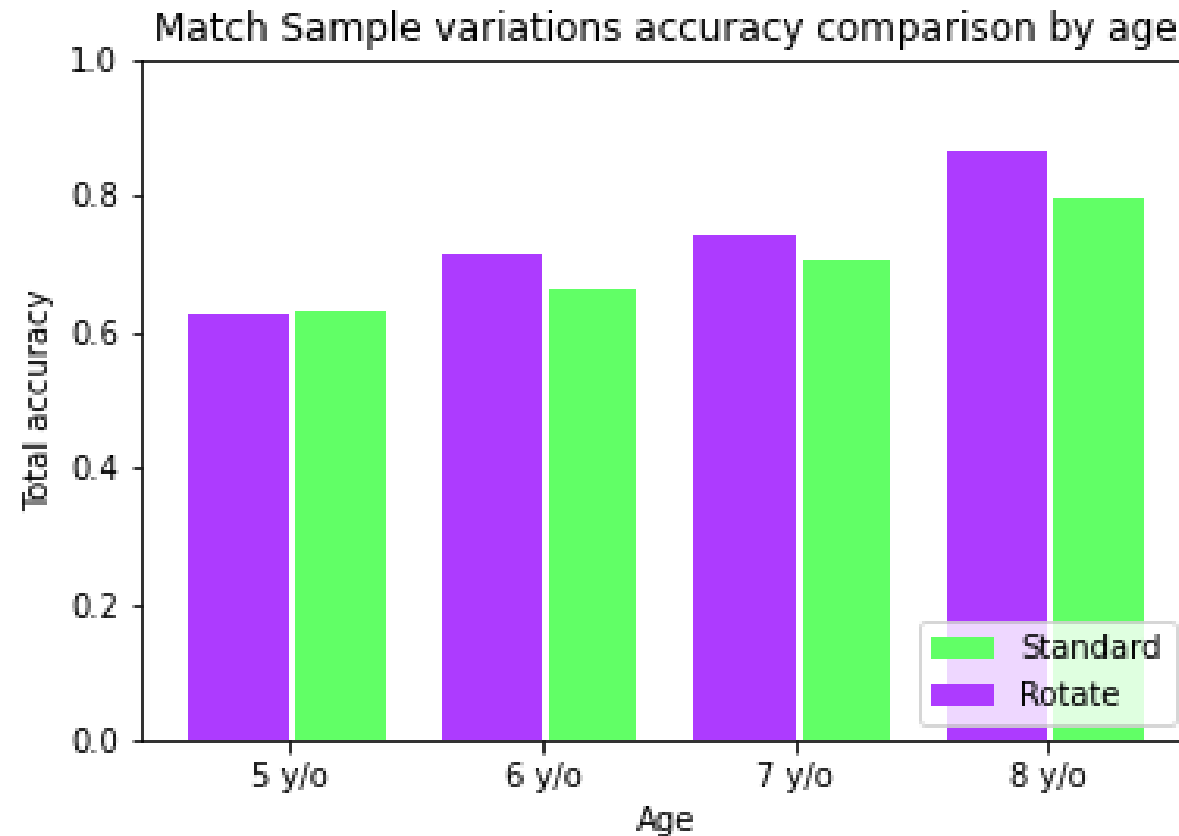
# Match Sample variations comparison

## Response Time

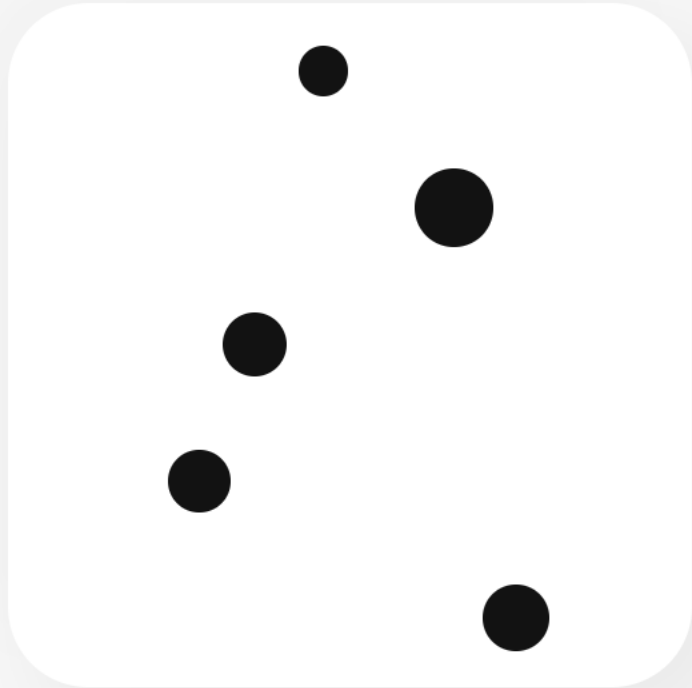


# Match Sample variations comparison

Accuracy



# Match Points Number



# Match Points Number

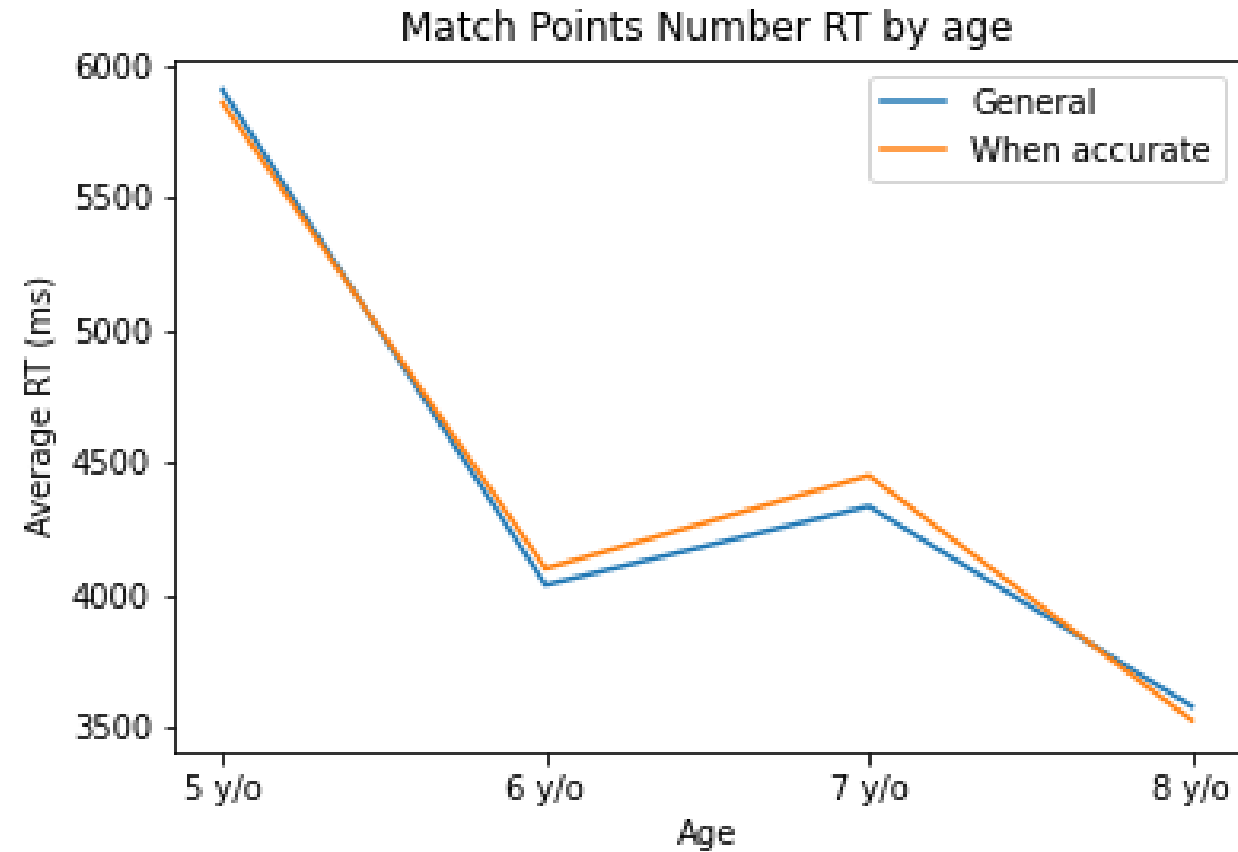
	5 y/o	6 y/o	7 y/o	8 y/o
Accuracy	0,92	0,91	0,94	0,94
N*	135	360	171	216
RT M	5908,23	4038,27	4335,91	3579,44
RT S	3433,84	2406,59	2789,43	2303,78
N when accurate*	124	329	161	204
RT when accurate M	5859,35	4100,3	4452,12	3526,34
RT when accurate SD	3346,87	2404,02	2792,98	2282,26

\* Notice this is #samples, not #users

Could not separate by correct answer

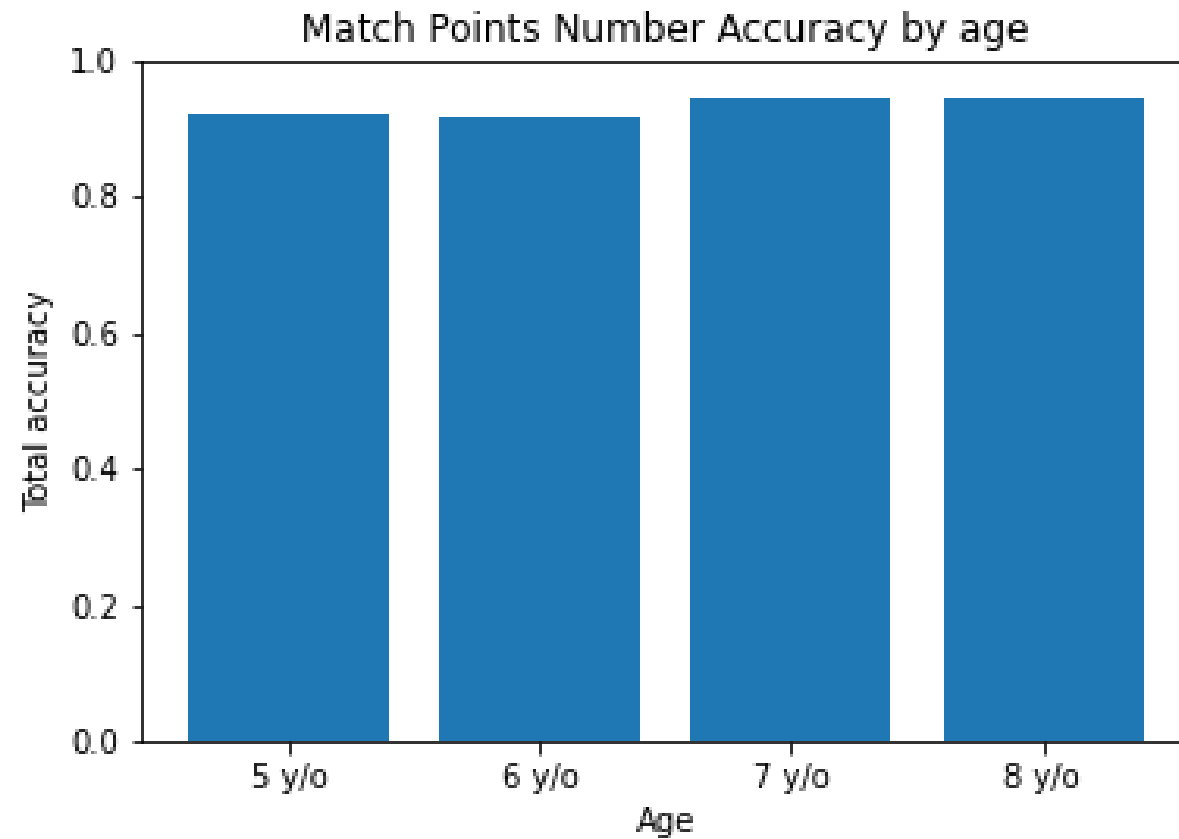
# Match Points Number

## Response Time



# Match Points Number

## Accuracy





# Symbolic Magnitude

4

2

# Symbolic Magnitude

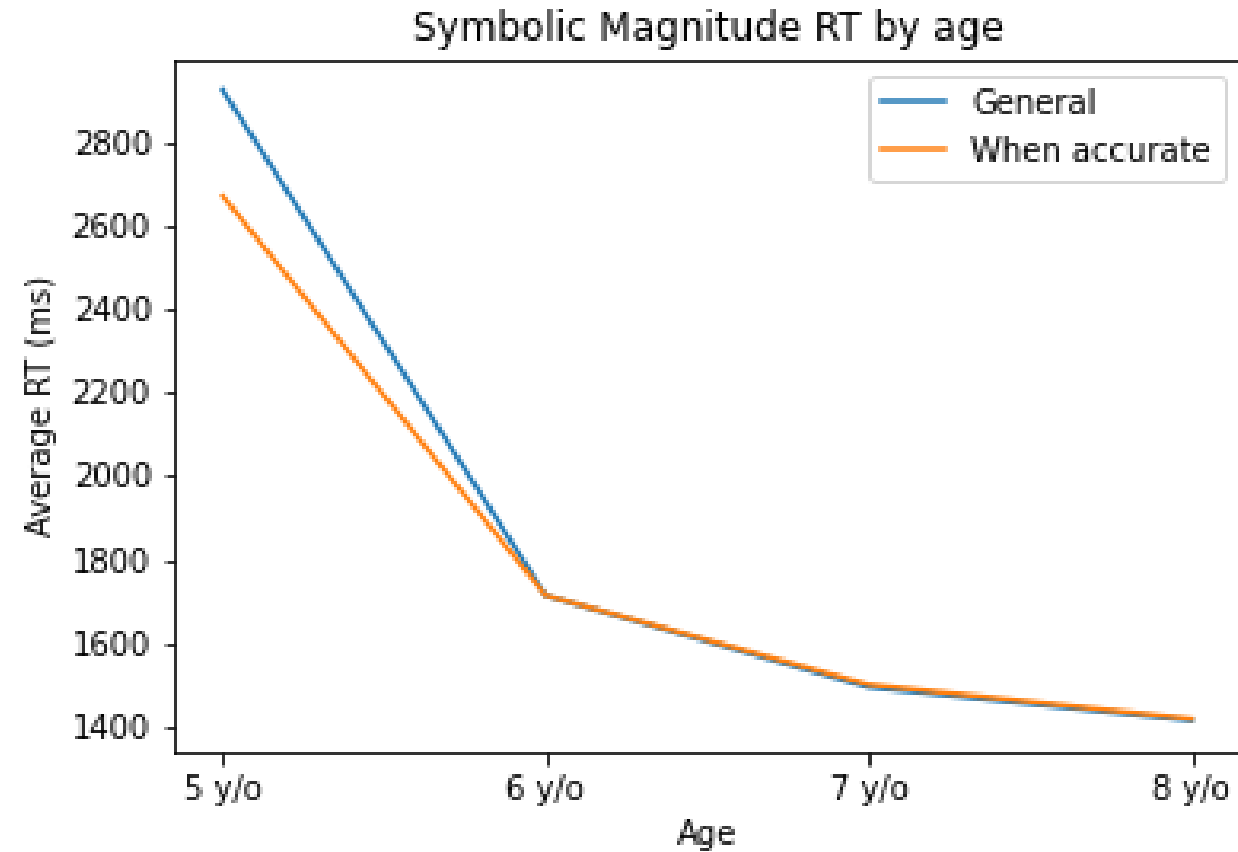
	5 y/o	6 y/o	7 y/o	8 y/o
Accuracy	0,87	0,96	0,97	0,99
N*	144	360	162	243
RT M	2922,45	1714,45	1495,3	1415,6
RT S	2109,59	788,47	486,46	453,21
N when accurate*	125	347	157	241
RT when accurate M	2669,33	1715,01	1501,59	1419,63
RT when accurate SD	1829,1	786,67	490,84	452,88

\* Notice this is #samples, not #users

Could not separate by correct answer

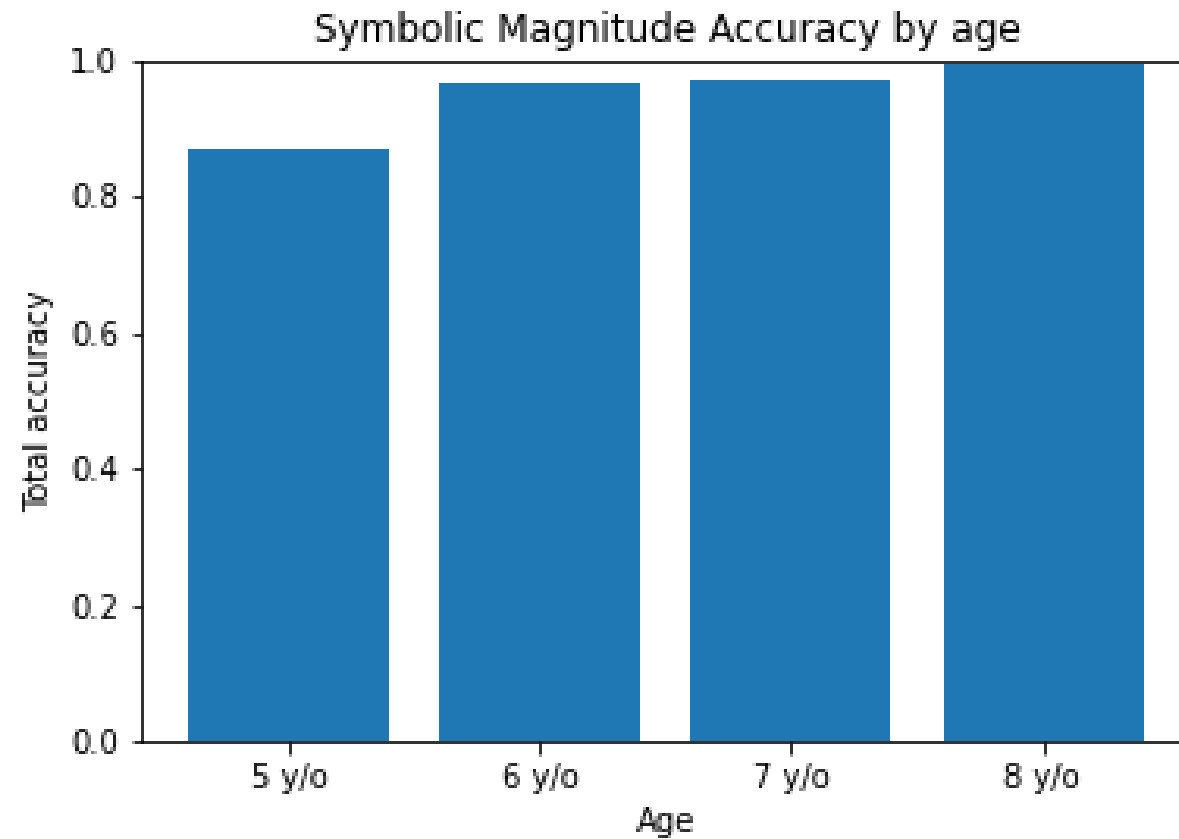
# Symbolic Magnitude

## Response Time

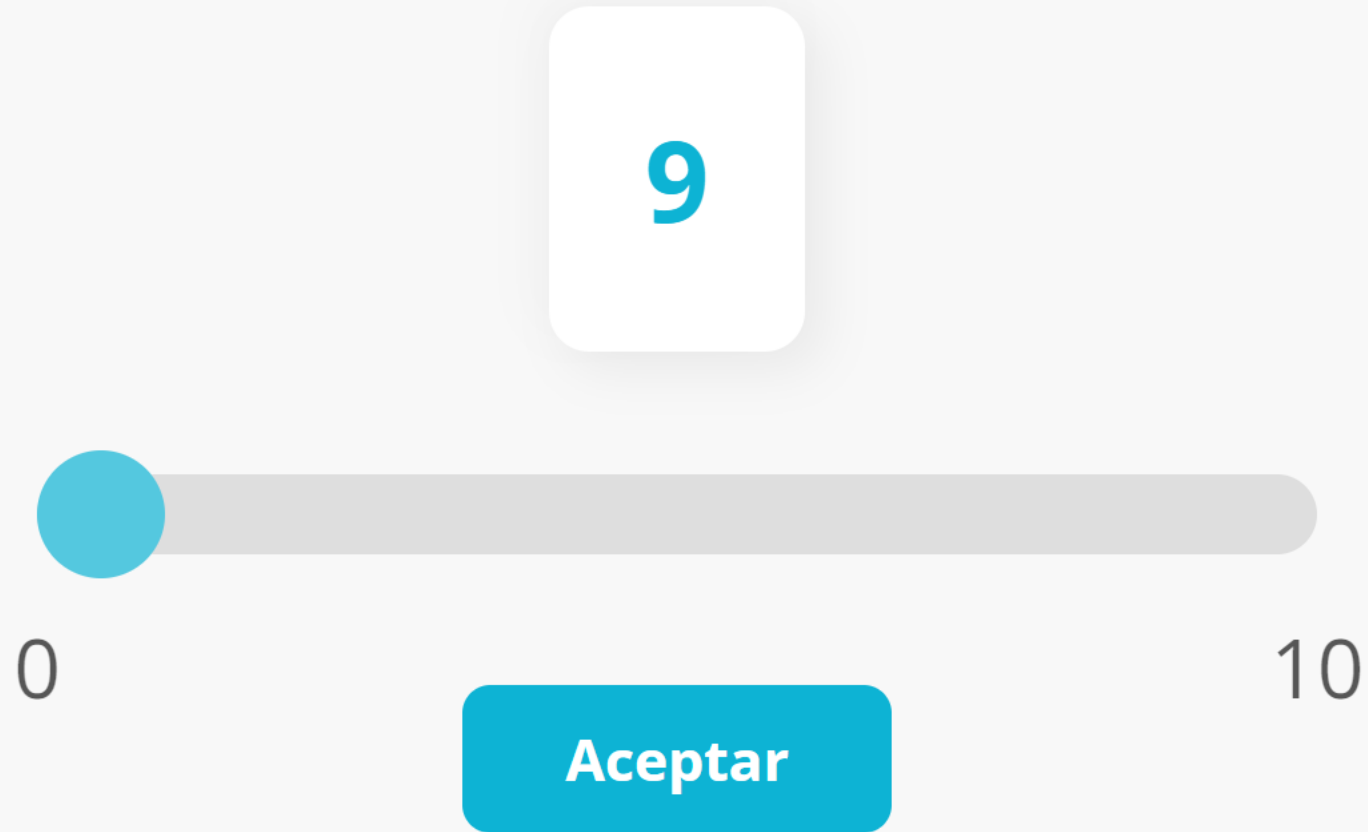


# Symbolic Magnitude

## Accuracy



# Numeric Line



# Counting Forward

6

7

?

1

2

3

4

5

6

7

8

9

0

# Counting Backward

8

7

?

1

2

3

4

5

6

7

8

9

0

# Simple Arithmetic Plus

$$1 + 5 = ?$$

1

2

3

4

5

6

7

8

9

0



# Simple Arithmetic Minus

$$3 - 2 = ?$$

1

2

3

4

5

6

7

8

9

0

	5		6		6		8	
	M	SD	M	SD	M	SD	M	SD
<b>Dots Comparison</b>	4578,54	4291,77	2769,85	2163,62	2539,81	971,88	2381,33	1068,92
<b>Match Sample</b>	5414,62	1883,5	4725,64	1607,35	5084,61	1198,52	4473,62	1047,61
<b>Match Sample Rotate</b>	4963,46	1754,26	4502,91	1345,1	4574,74	937,16	4341,26	829,47
<b>Match Points Number</b>	5853,57	1585,63	4067,36	1510,3	4412,73	1597,52	3596,18	1257,81
<b>Symbolic Magnitude</b>	2987,85	1494,73	1718,31	540,13	1496,63	285,25	1415,34	300,89
<b>Numeric Line</b>	8038,52	4699,53	5556,2	2622,46	6017,02	2353,34	5242,38	1927,35
<b>Counting Forward</b>	7615,75	3442,83	4295,81	1796,28	3775,83	873,38	3488,63	883,06
<b>Counting Backward</b>	9341,83	4015,32	5101,35	2393,99	4535,13	1236,9	3535,52	1027,03
<b>Simple Arithmetic Plus</b>	14393,51	4764,16	6731,64	3923,76	5782,57	2959,64	4141,15	1815,39
<b>Simple Arithmetic Minus</b>	16255,57	4743,78	7664,42	4403,67	7056,29	2852,79	4831,63	1620,94