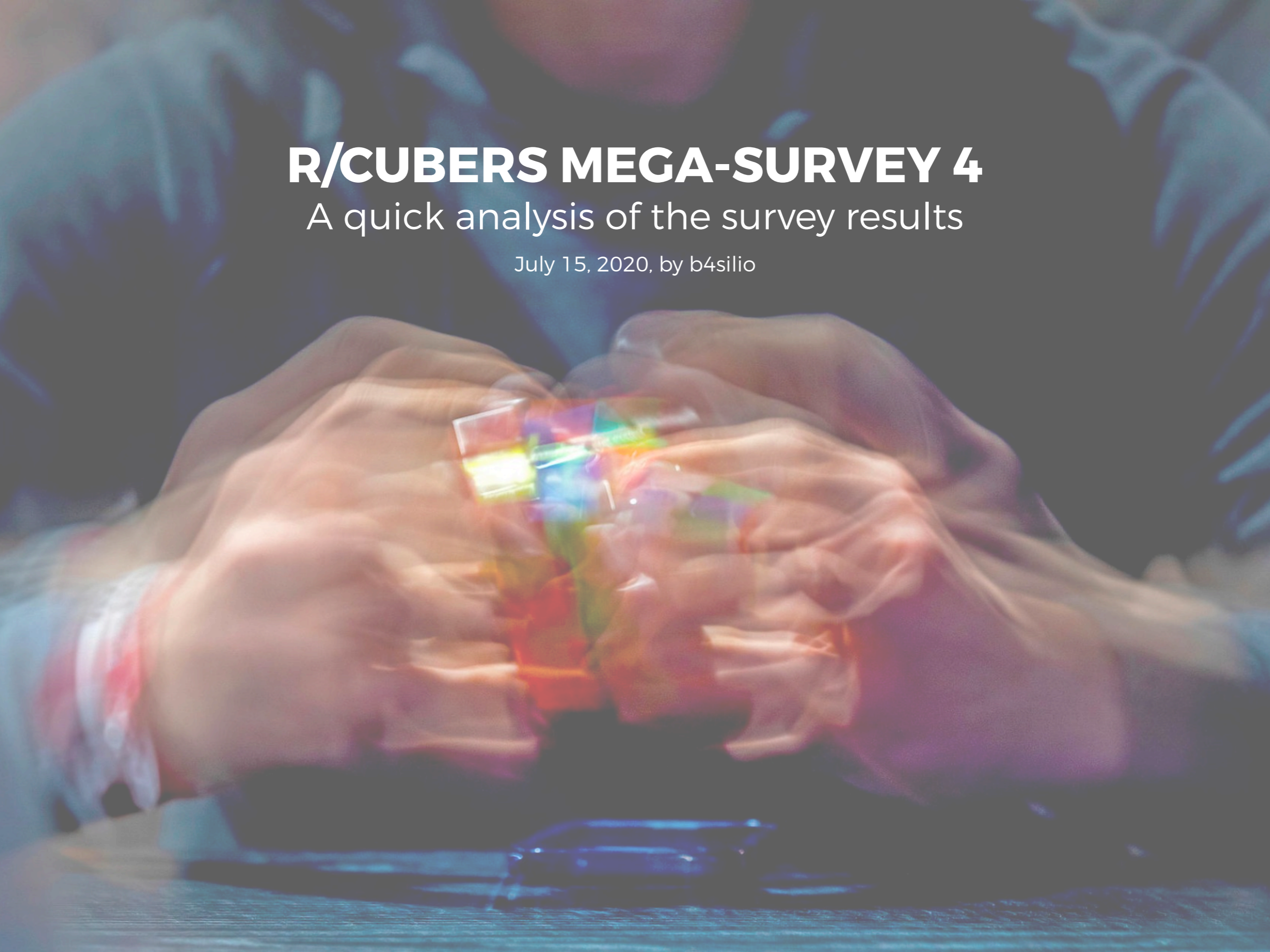# R/CUBERS MEGA-SURVEY 4

A quick analysis of the survey results

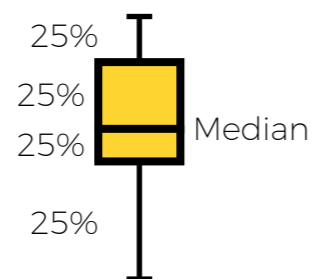July 15, 2020, by b4silio

FOREWORD AND A COUPLE OF CAVEATS

The following slides present a quick analysis of the data from the r/Cubers Mega-Survey 4. A couple of caveats should be acknowledged before going through the rest of this document :
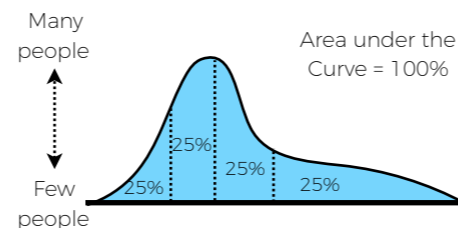
- There is a passable amount of **data cleanup that had to be performed**, which introduces bias and approximations (and sometimes guesswork)

- **No analysis for significance** has been made, this is not an academic paper, and the goal is to find interesting insights, not prove scientific truths

- The **focus was put on the most common events** with the largest number of participants, in part because of lack of data on the other events, in part due to laziness

- **Some results relate to biological differences** (such as sex, age or handedness) that might be sensitive topics to some people, if that's the case for you, you can decide yourself if you want to read this document

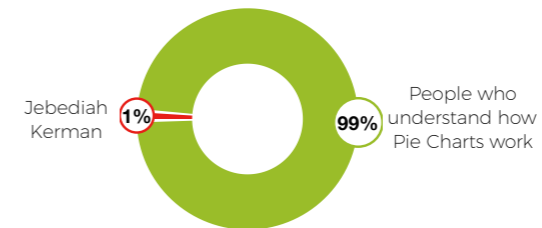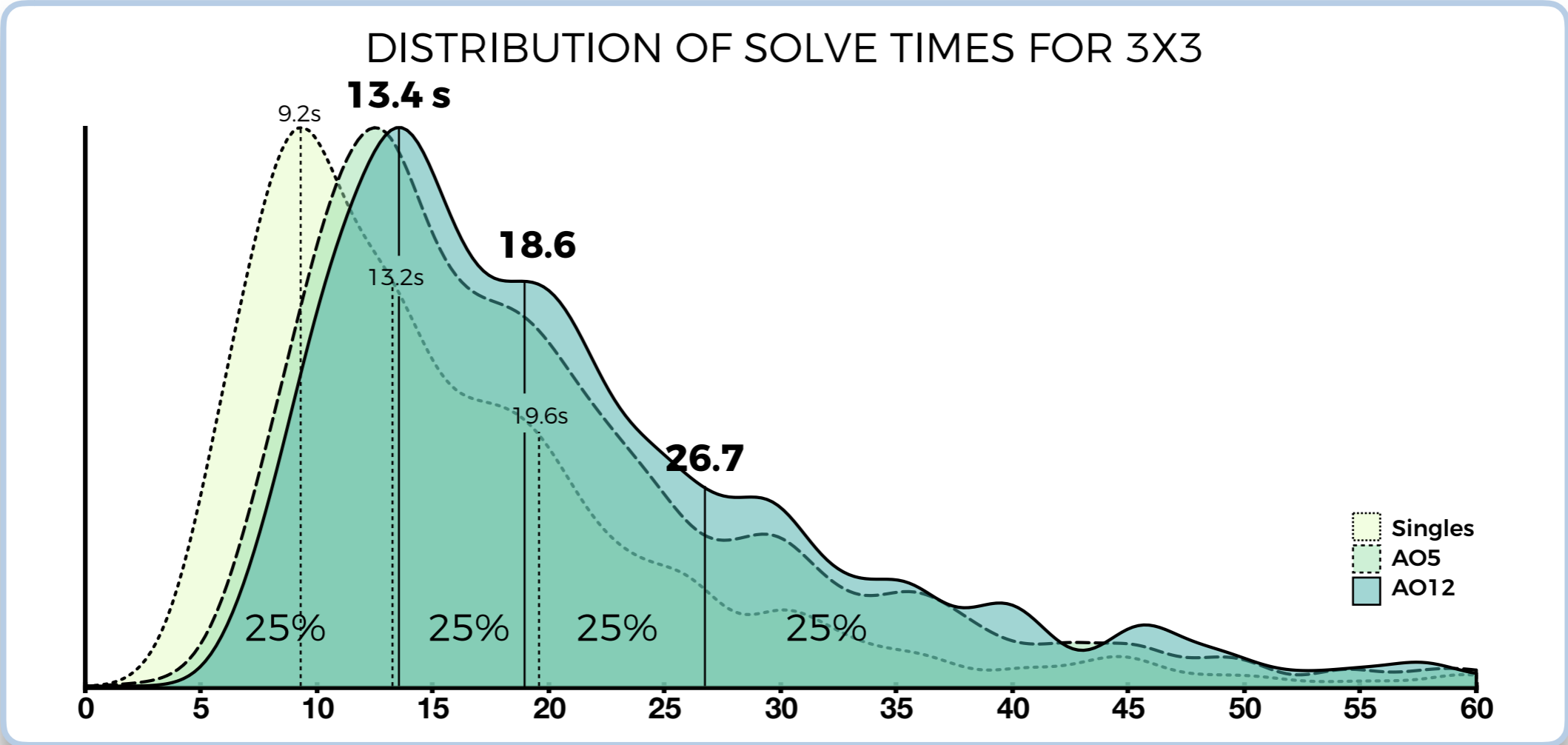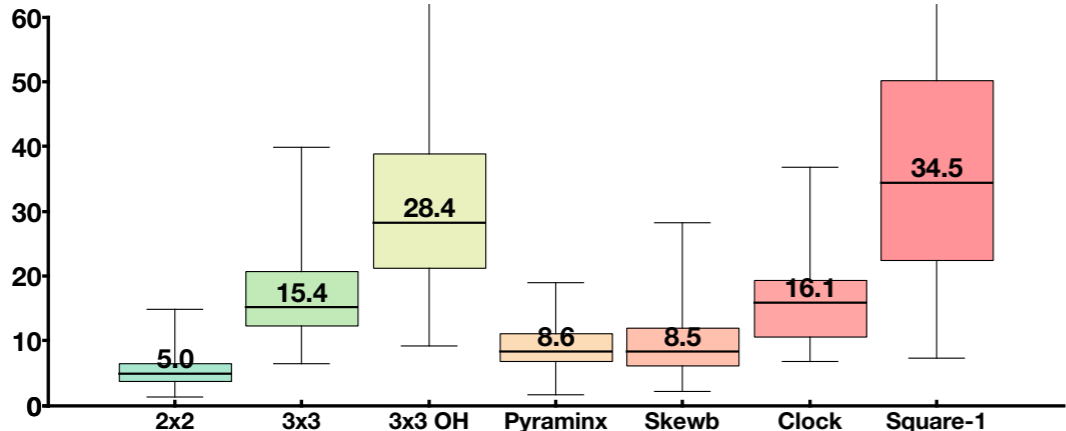## A VERY SHORT CRASH COURSE ON DATA VISUALIZATION

Box Plots

25%
25%
25% — Median
25%

Density Estimator

Many people
Area under the Curve = 100%
25%
25%
25%
25%
Few people

Pie Charts

Jebediah Kerman — 1%
99% — People who understand how Pie Charts work

HOW FAST CAN R/CUBERS SOLVE THE CUBE

DISTRIBUTION OF SOLVE TIMES FOR 3X3

9.2s

13.4 s

18.6

13.2s

19.6s

26.7

Singles
AO5
AO12

25%   25%   25%   25%

0   5   10   15   20   25   30   35   40   45   50   55   60

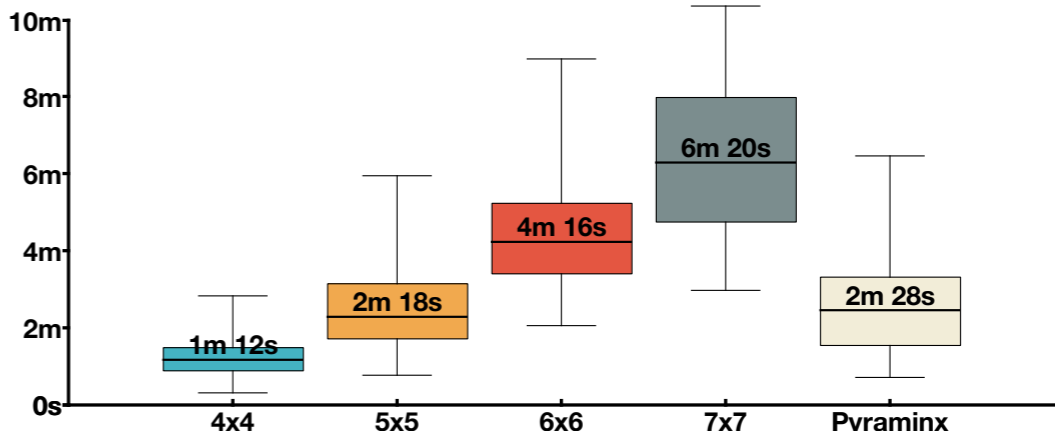**Solve time peaks at 13, 20 and 30 seconds (AO12)**

Singles tend to be on average 29% faster than AO12

Best AO12 times for smaller puzzles

60

50

40

28.4

34.5

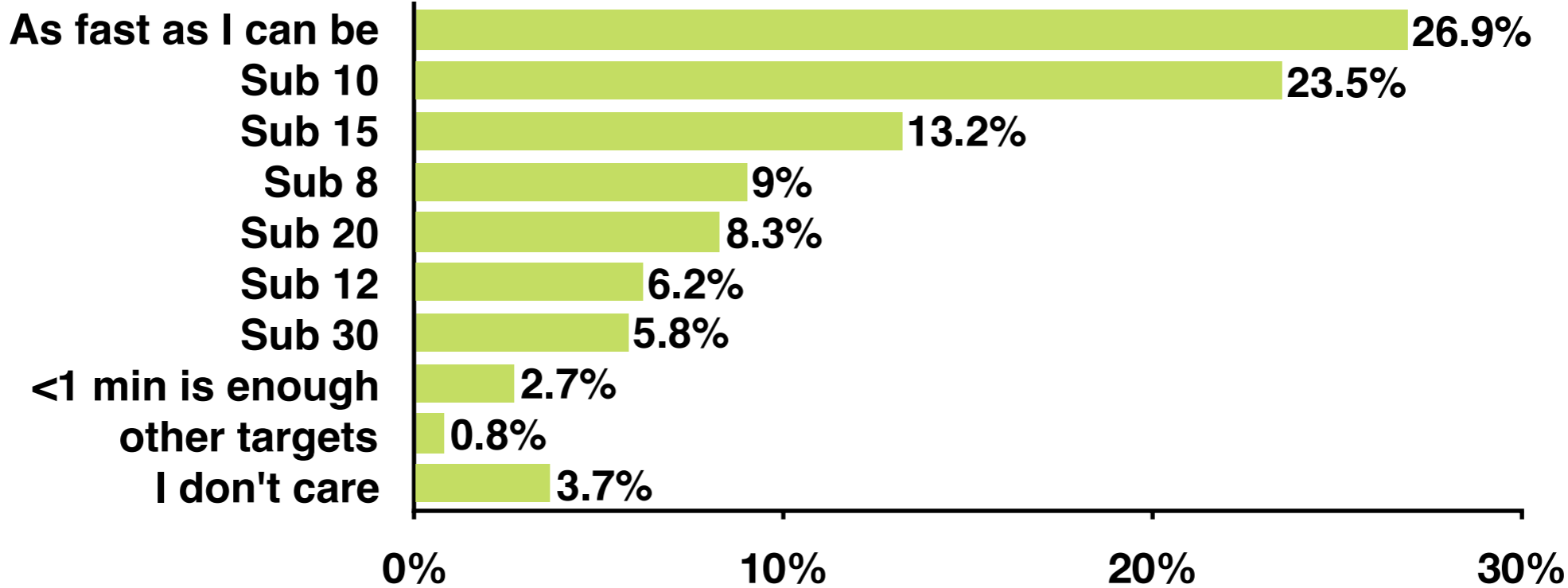30
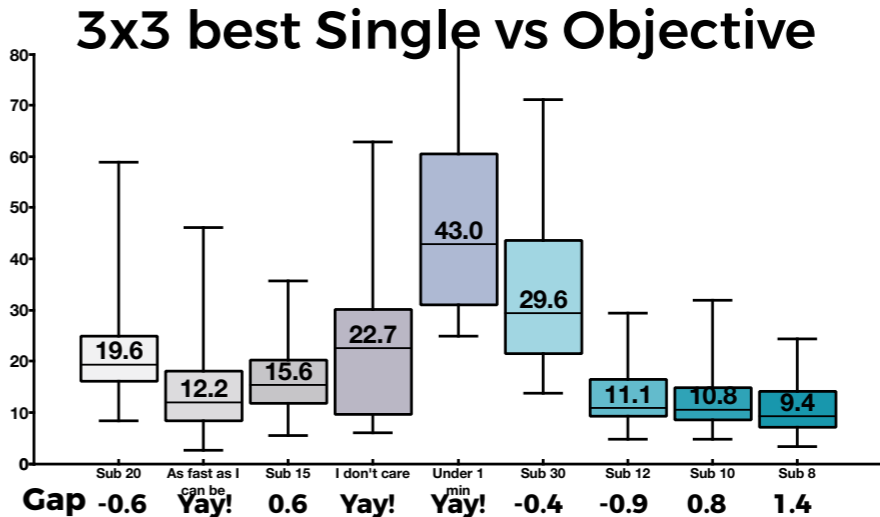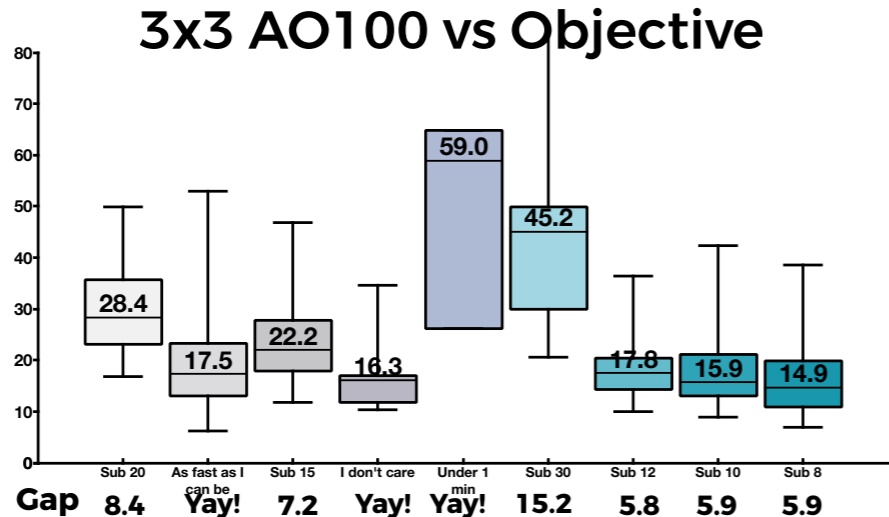
20

15.4

16.1

10

5.0

8.6   8.5

0

2x2   3x3   3x3 OH   Pyraminx   Skewb   Clock   Square-1

Best AO12 times for larger puzzles

10m

8m

6m 20s

6m

4m 16s

4m

2m 18s

2m 28s

2m

1m 12s

0s

4x4   5x5   6x6   7x7   Pyraminx

GLOBAL AVERAGE OBJECTIVES FOR 3X3

WHAT WOULD YOU LIKE YOUR 3X3 GLOBAL AVERAGE TO BE, ULTIMATELY?

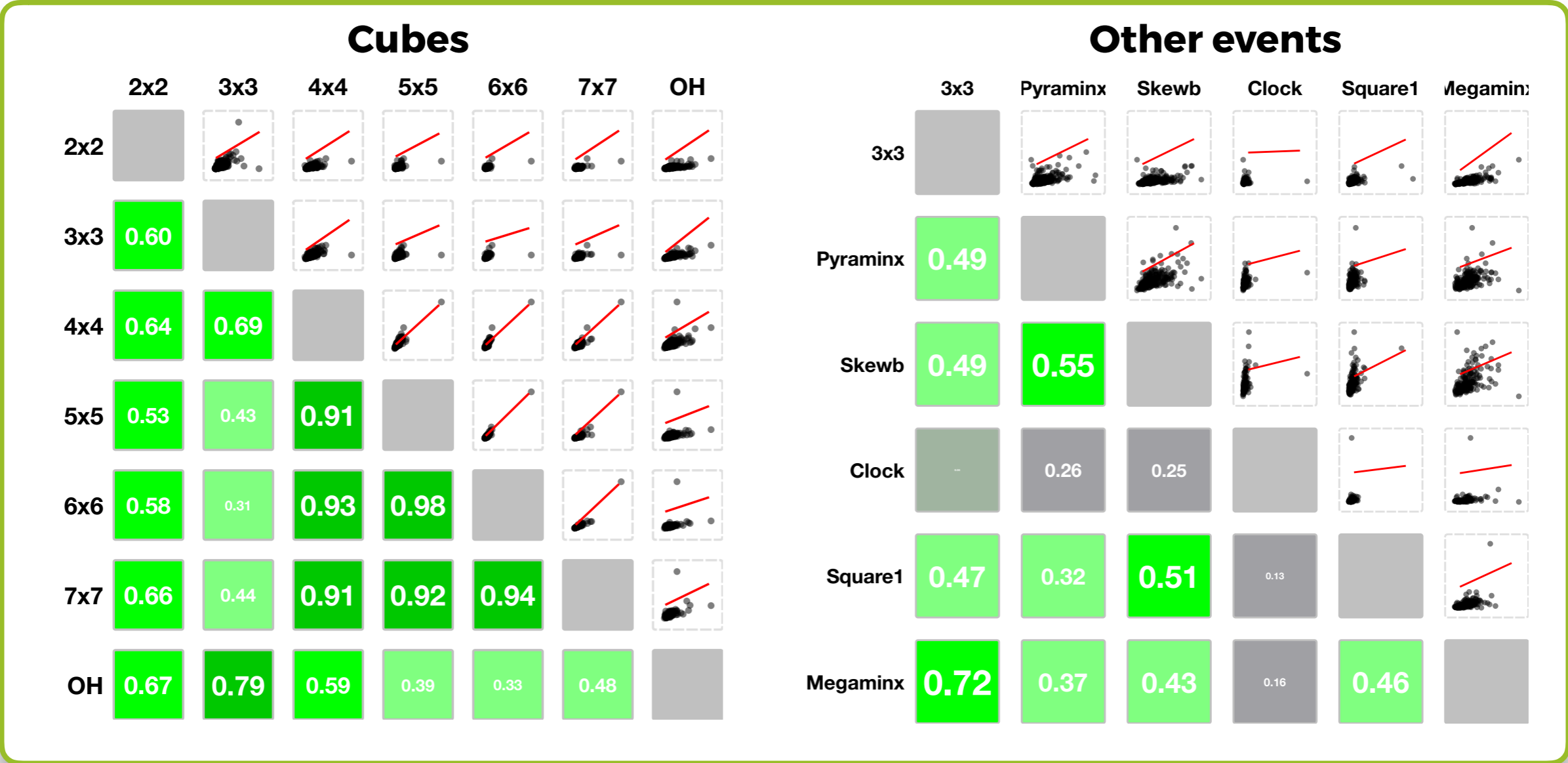| Objective	Percentage
As fast as I can be	26.9%
Sub 10	23.5%
Sub 15	13.2%
Sub 8	9%
Sub 20	8.3%
Sub 12	6.2%
Sub 30	5.8%
<1 min is enough	2.7%
other targets	0.8%
I don't care	3.7%

Sub 10 and Sub 15 are the favorites, but 1/3 of cubers don't really have a target

People who set themselves targets, choose between 6 and 8 seconds below their current AO100, but within 1 sec of their current best single

3x3 AO100 vs Objective

	Sub 20	As fast as I can be	Sub 15	I don't care	Under 1 min	Sub 30	Sub 12	Sub 10	Sub 8
Value	28.4	17.5	22.2	16.3	59.0	45.2	17.8	15.9	14.9
Gap	8.4	Yay!	7.2	Yay!	Yay!	15.2	5.8	5.9	5.9

3x3 best Single vs Objective

	Sub 20	As fast as I can be	Sub 15	I don't care	Under 1 min	Sub 30	Sub 12	Sub 10	Sub 8
Value	19.6	12.2	15.6	22.7	43.0	29.6	11.1	10.8	9.4
Gap	-0.6	Yay!	0.6	Yay!	Yay!	-0.4	-0.9	0.8	1.4

HOW WELL DO SKILLS TRANSLATE ACROSS EVENTS?

CORRELATION ACROSS EVENTS

How much does being good/bad at one event tells us about being good/bad on another

Cubes

	2x2	3x3	4x4	5x5	6x6	7x7	OH
2x2							
3x3	0.60						
4x4	0.64	0.69					
5x5	0.53	0.43	0.91				
6x6	0.58	0.31	0.93	0.98			
7x7	0.66	0.44	0.91	0.92	0.94		
OH	0.67	0.79	0.59	0.39	0.33	0.48	

Other events

	3x3	Pyraminx	Skewb	Clock	Square1	Megaminx
3x3						
Pyraminx	0.49					
Skewb	0.49	0.55				
Clock	--	0.26	0.25			
Square1	0.47	0.32	0.51	0.13		
Megaminx	0.72	0.37	0.43	0.16	0.46	

Solvers good at 4x4 through 7x7 are (for the most part) equally good at all of them
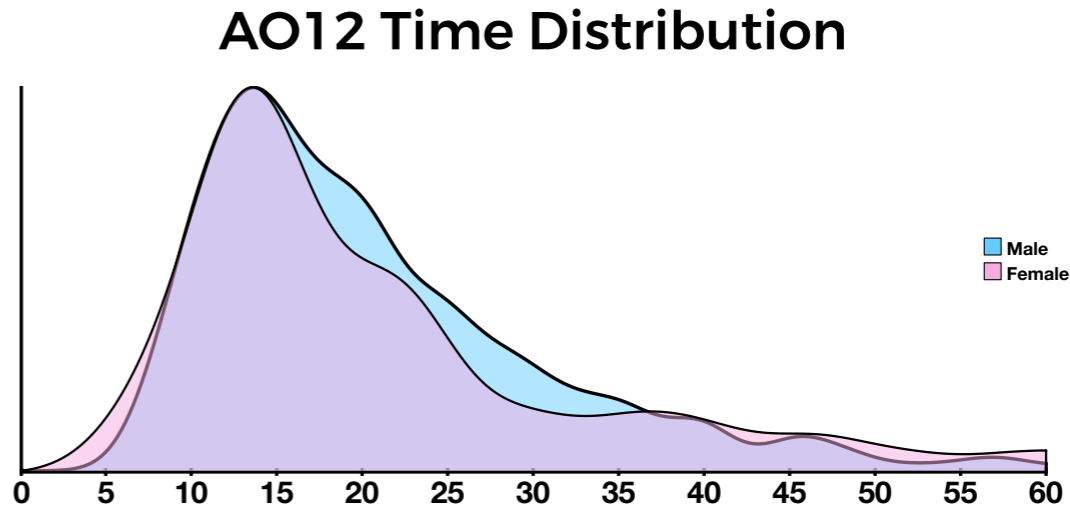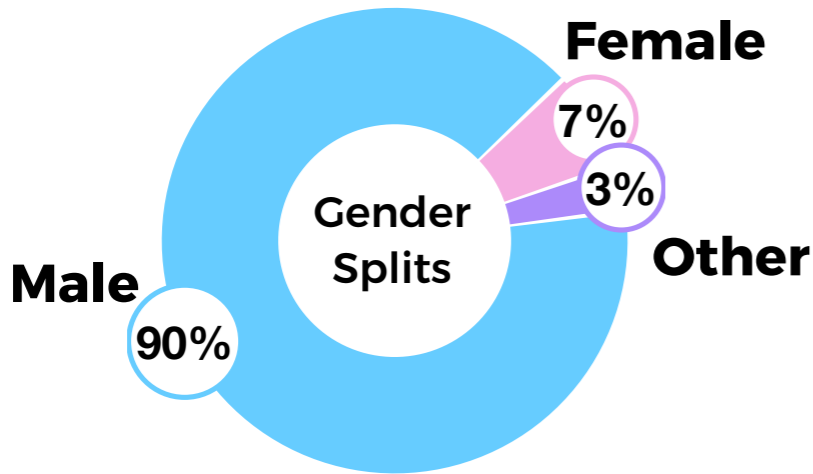
Lower correlation for other events with Megaminx being the most
closely related to 3x3 (warning: data for other events is scarce)
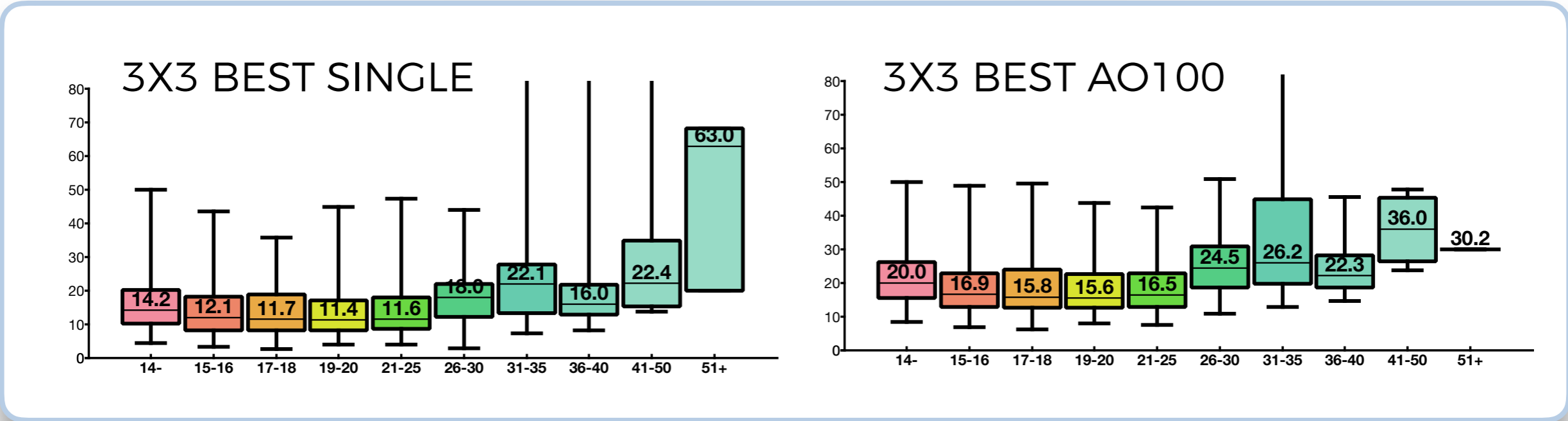
GENDER DIFFERENCES IN 3X3 SOLVING

3X3 SINGLES

	Male	Other/Undefined	Female
	13.1	11.5	15.0

3X3 AO12

	Male	Other/Undefined	Female
	18.1	15.2	16.1

3X3 AO100

	Male	Other/Undefined	Female
	18.7	15.7	16.6
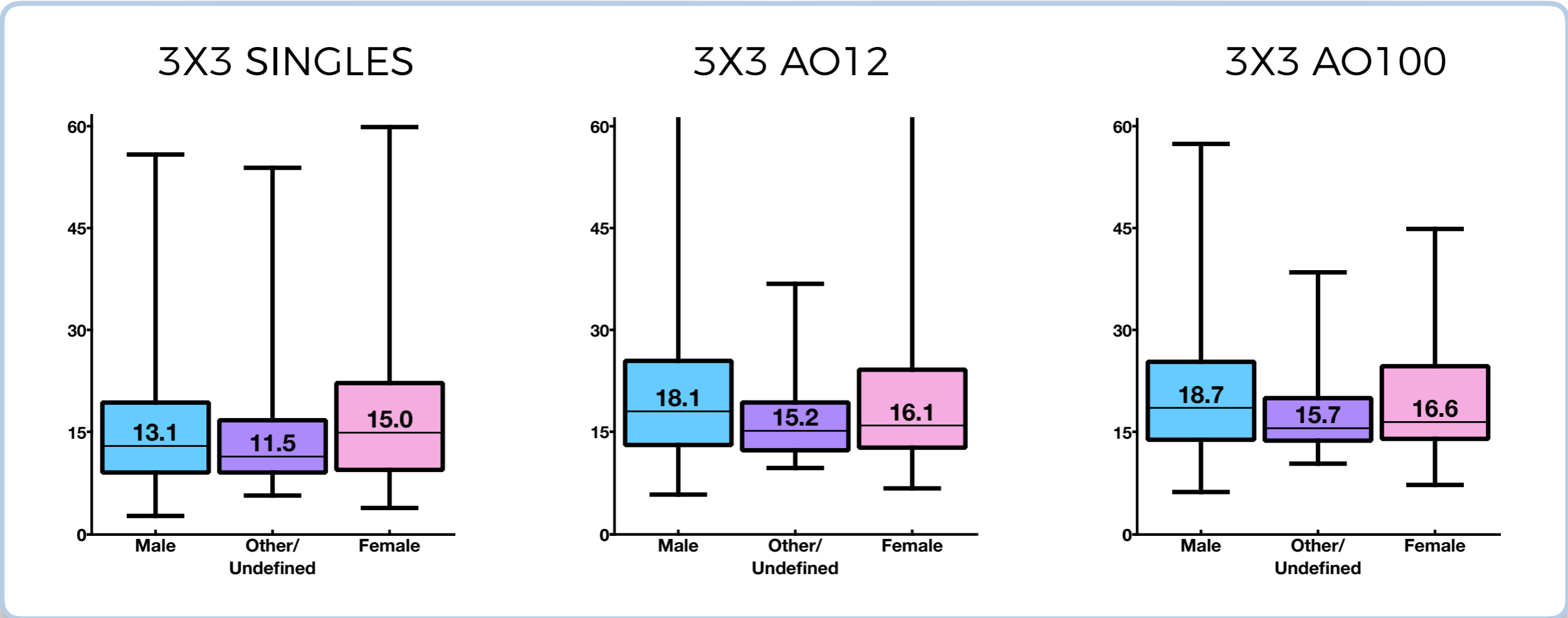
Boys are faster at singles, but girls get better averages.

Note: the larger pool of male cubers means more chances of having top performers (which is why the fastest solvers tend to be male)
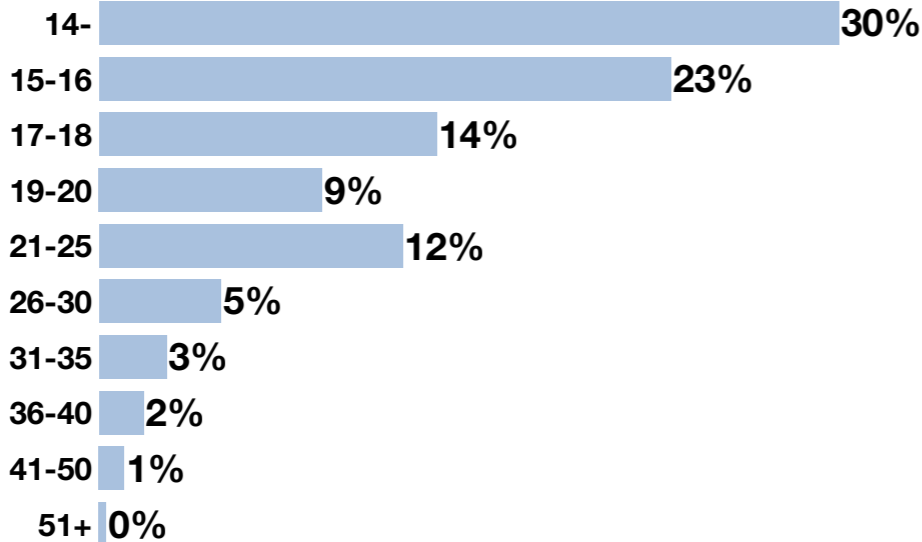
Gender Splits

- Male 90%
- Female 7%
- Other 3%

AO12 Time Distribution

Male
Female

IMPACT OF AGE ON SOLVING TIMES

3X3 BEST SINGLE

Box plot values by age group:
- 14-: 14.2
- 15-16: 12.1
- 17-18: 11.7
- 19-20: 11.4
- 21-25: 11.6
- 26-30: 16.0
- 31-35: 22.1
- 36-40: 16.0
- 41-50: 22.4
- 51+: 63.0

3X3 BEST AO100

Box plot values by age group:
- 14-: 20.0
- 15-16: 16.9
- 17-18: 15.8
- 19-20: 15.6
- 21-25: 16.5
- 26-30: 24.5
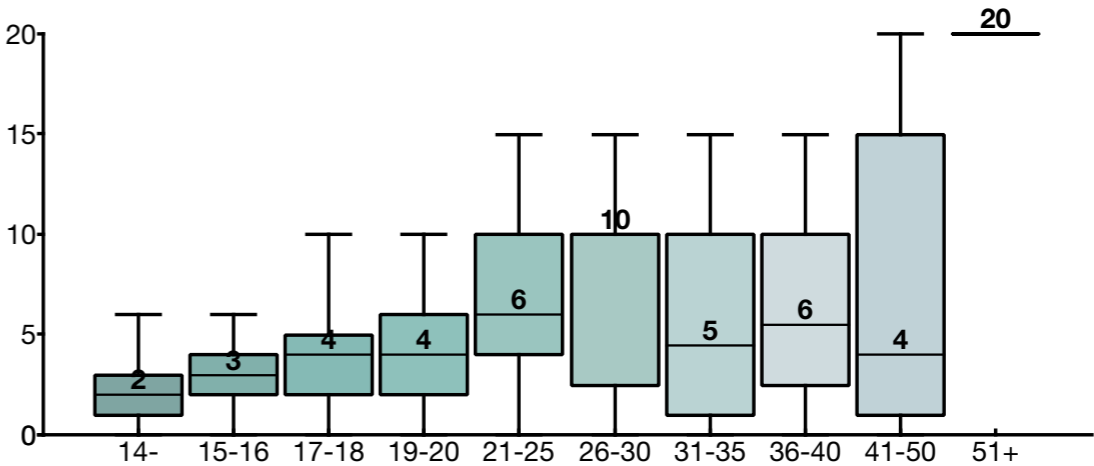- 31-35: 26.2
- 36-40: 22.3
- 41-50: 36.0
- 51+: 30.2

Younger cubers perform better, from 25 years onward it's a downhill battle
But the youngest people have gathered less experience on average, which explains
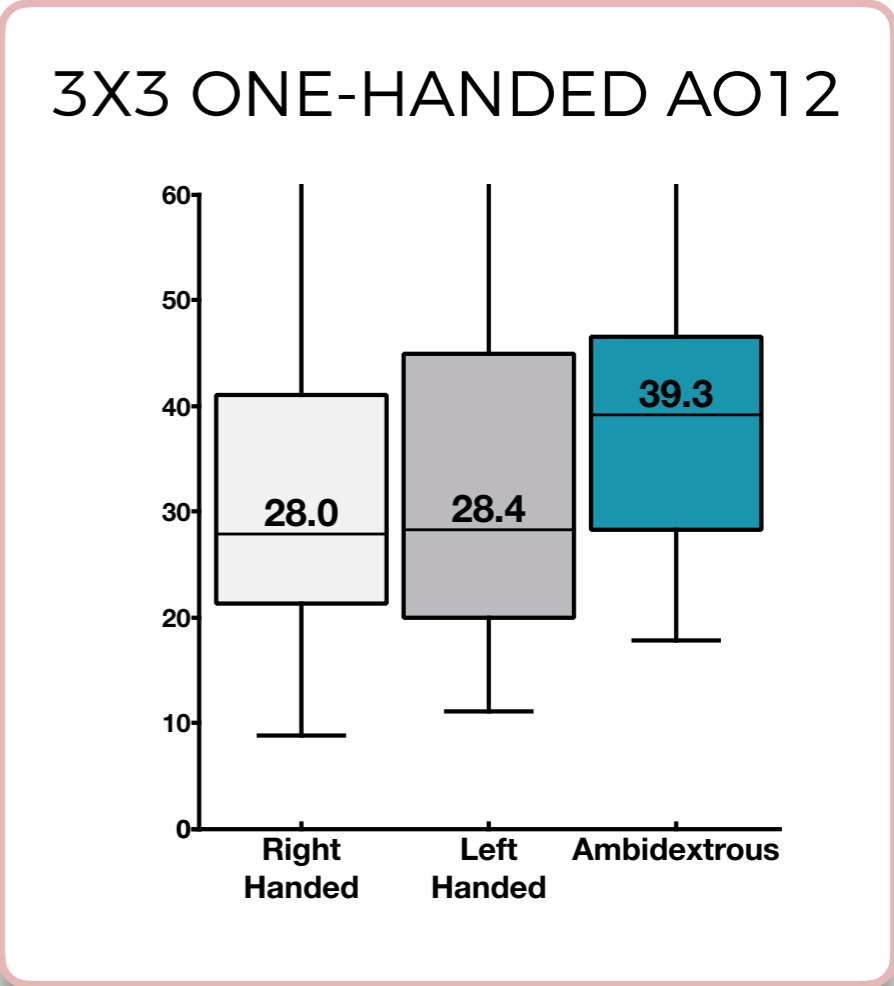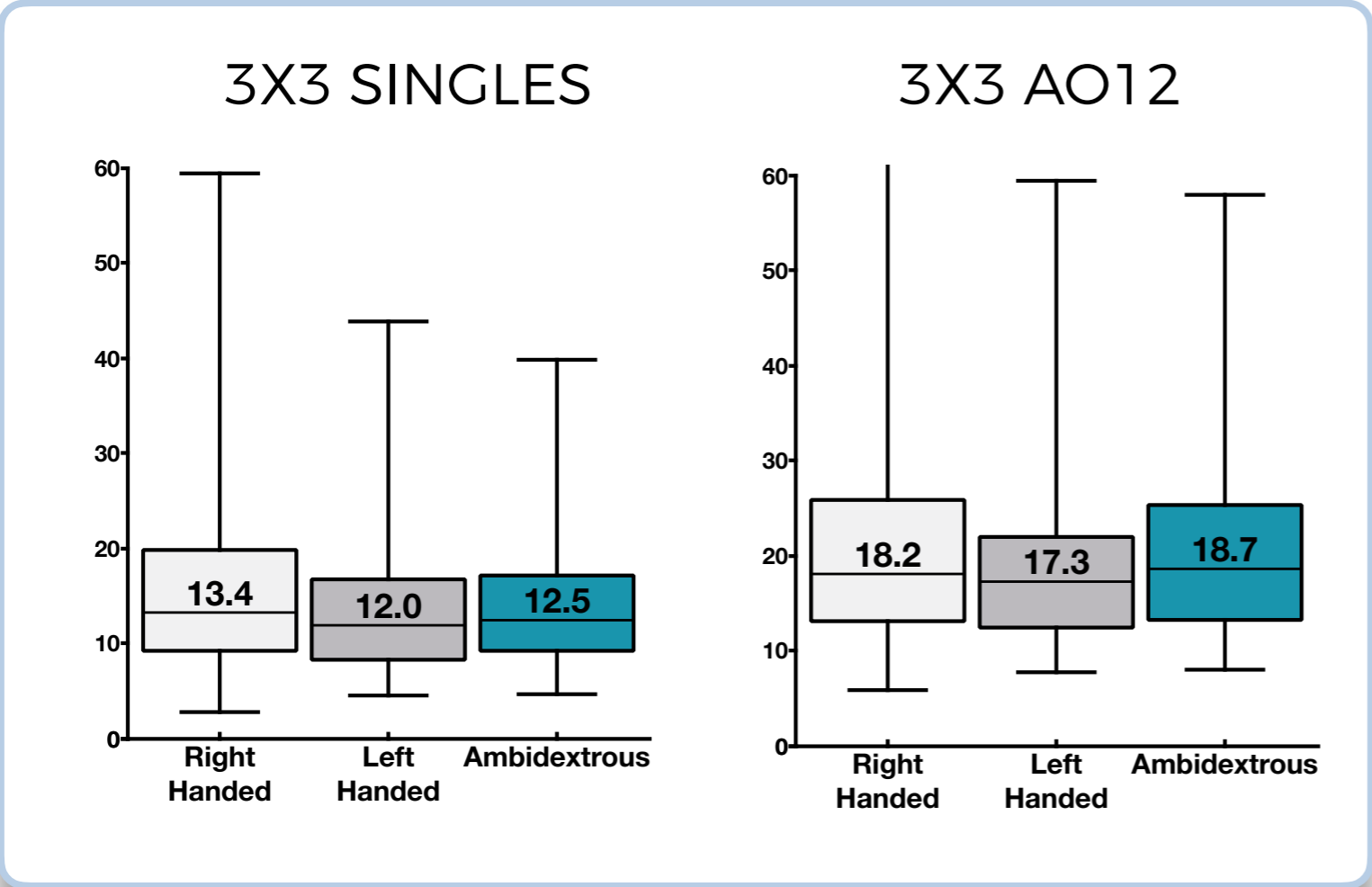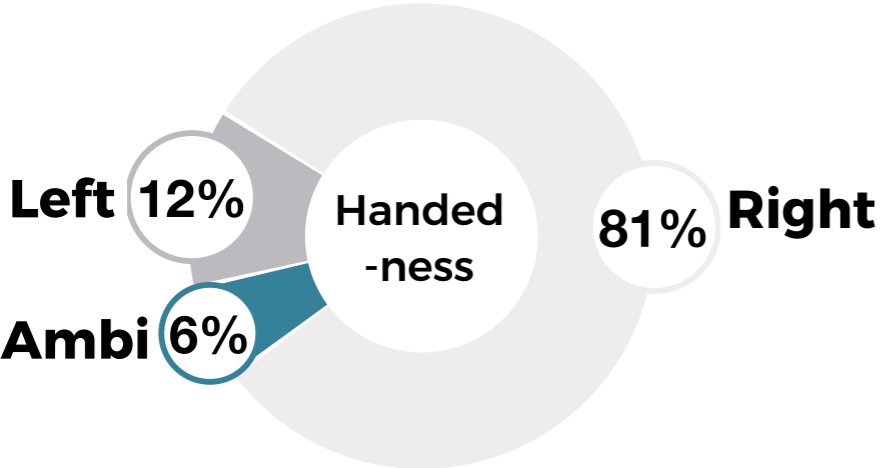why 19-20 year olds have the best overall scores

Age Distribution

- 14-: 30%
- 15-16: 23%
- 17-18: 14%
- 19-20: 9%
- 21-25: 12%
- 26-30: 5%
- 31-35: 3%
- 36-40: 2%
- 41-50: 1%
- 51+: 0%

Years of cubing experience by age

Box plot values by age group:
- 14-: 2
- 15-16: 3
- 17-18: 4
- 19-20: 4
- 21-25: 6
- 26-30: 10
- 31-35: 5
- 36-40: 6
- 41-50: 4
- 51+: 20

HANDEDNESS AND 3X3

3X3 SINGLES

	Right Handed	Left Handed	Ambidextrous
	13.4	12.0	12.5

3X3 AO12

	Right Handed	Left Handed	Ambidextrous
	18.2	17.3	18.7

3X3 ONE-HANDED AO12

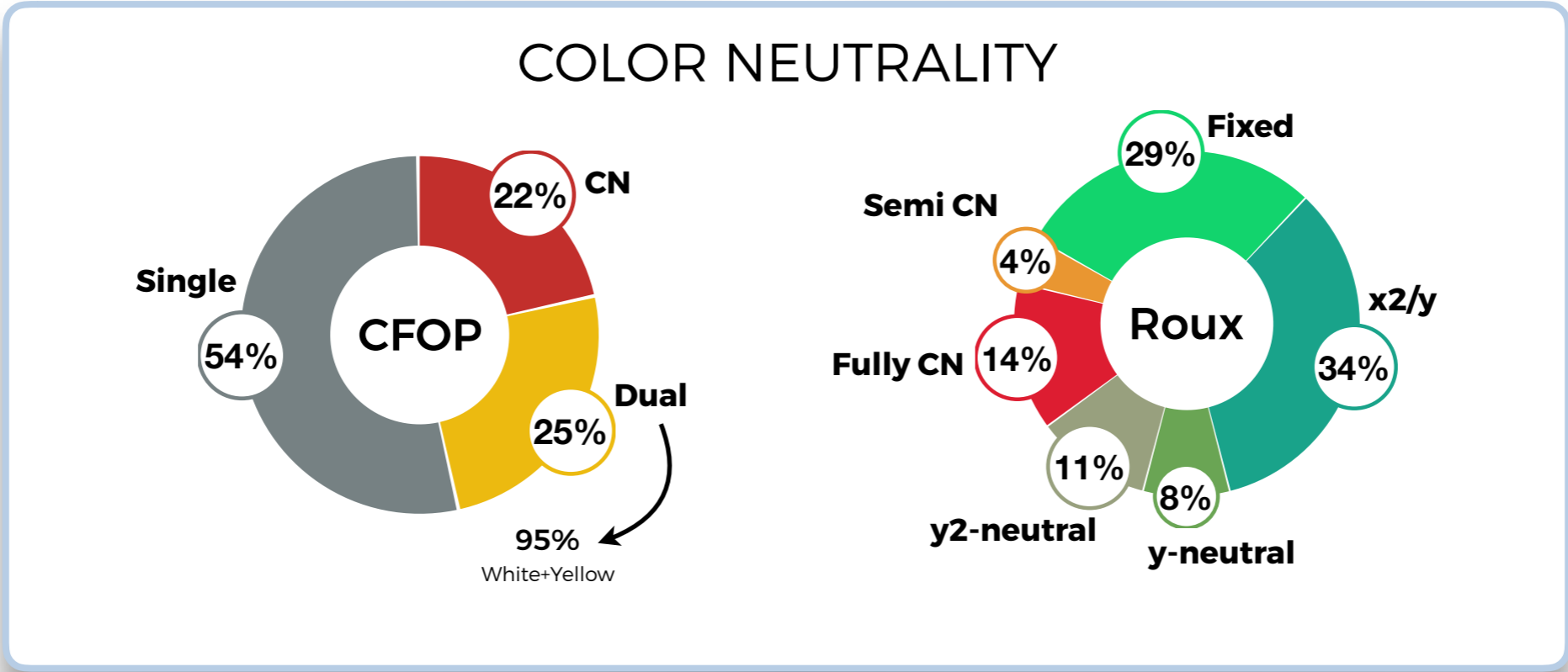|	Right Handed	Left Handed	Ambidextrous
	28.0	28.4	39.3

Left-handed cubers tend to be slightly faster, but they do just the same on OH

Note: the larger pool of right-handed cubers explains why top times are faster
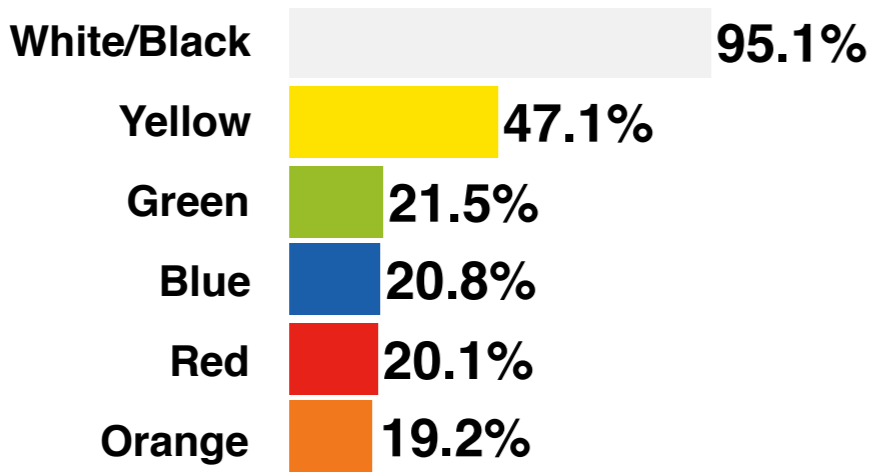(more chances of having a top-performer)

Left 12% Handed-ness 81% Right

Ambi 6%

COLOR NEUTRALITY ON 3X3

COLOR NEUTRALITY

CFOP

- CN — 22%
- Single — 54%
- Dual — 25%
  - 95% White+Yellow

Roux

- Fixed — 29%
- Semi CN — 4%
- x2/y — 34%
- Fully CN — 14%
- y2-neutral — 11%
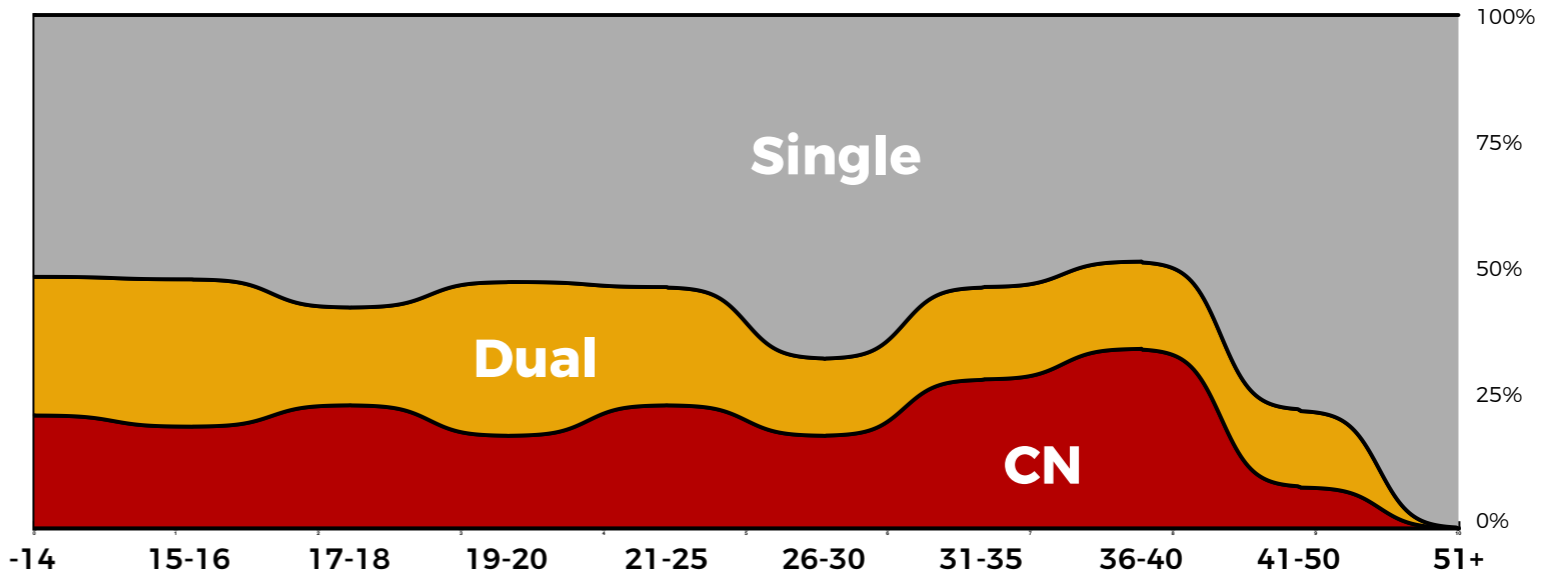- y-neutral — 8%

Almost half of cubers are either Dual (White/Yellow) or full CN

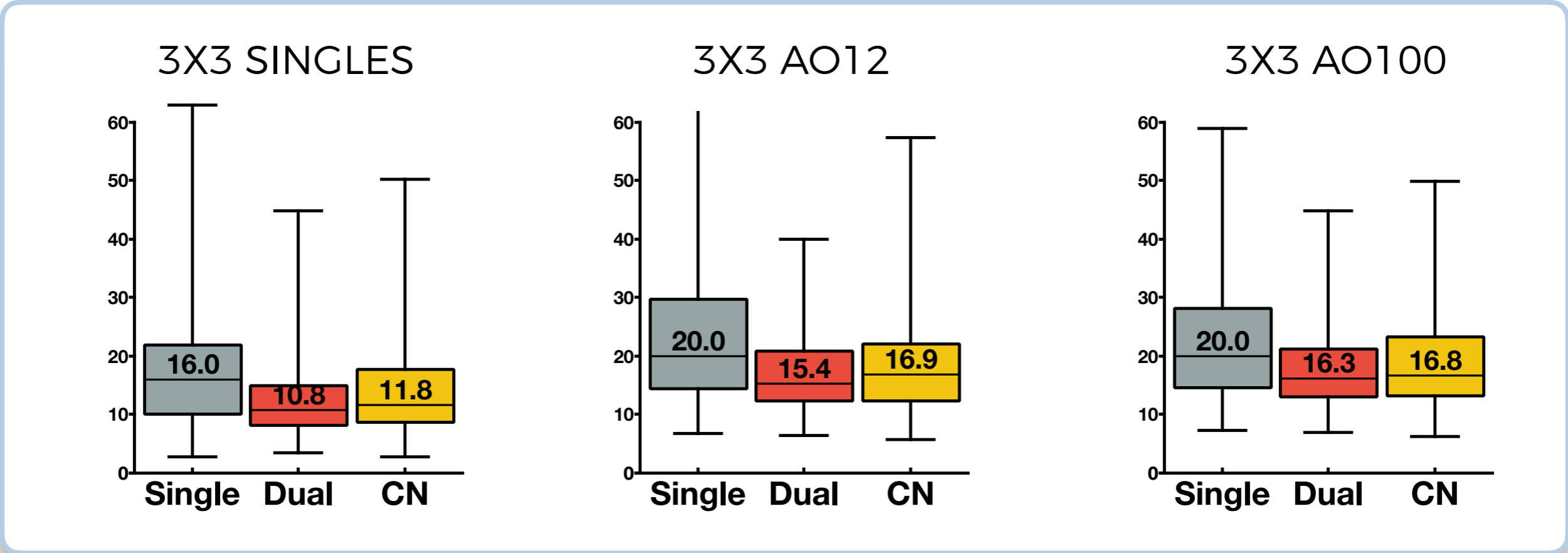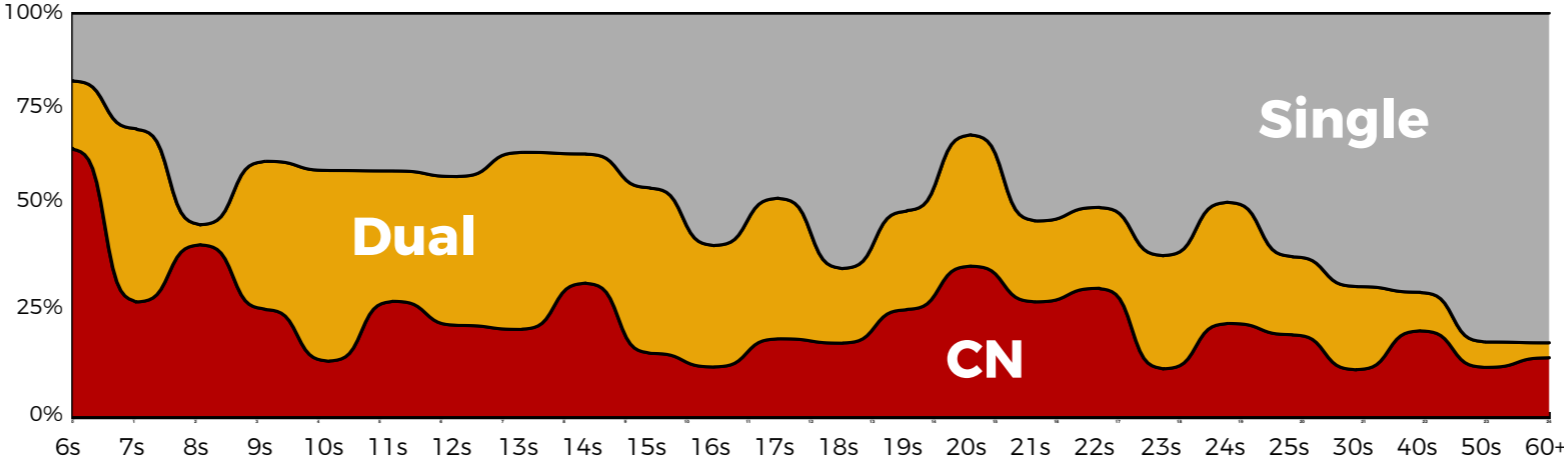Older cubers (40+) tend to be much more Single color (White)

Color Preferences

Color	Percentage
White/Black	95.1%
Yellow	47.1%
Green	21.5%
Blue	20.8%
Red	20.1%
Orange	19.2%

CN by Age Groups

- Single
- Dual
- CN

Age groups: -14, 15-16, 17-18, 19-20, 21-25, 26-30, 31-35, 36-40, 41-50, 51+

(Y-axis: 0%, 25%, 50%, 75%, 100%)

COLOR NEUTRALITY ON 3X3

3X3 SINGLES

Single: 16.0
Dual: 10.8
CN: 11.8

3X3 AO12

Single: 20.0
Dual: 15.4
CN: 16.9

3X3 AO100

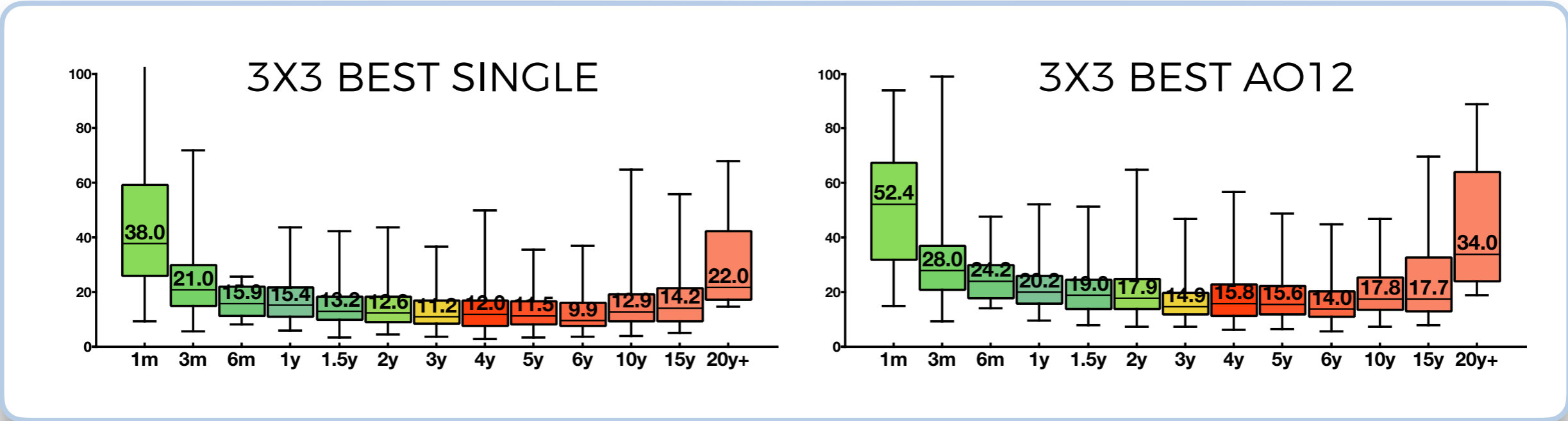Single: 20.0
Dual: 16.3
CN: 16.8

Dual color neutrality seems to be the best compromise on average
Performers at the very top, however are much more often full CN
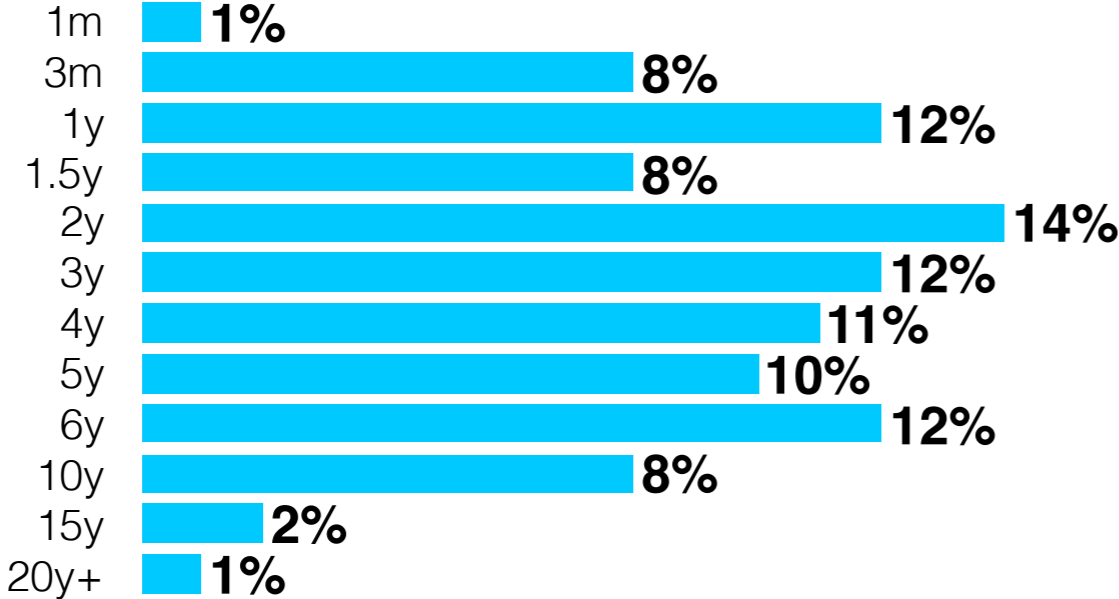
CN split by AO12 time

Single

Dual

CN

6s 7s 8s 9s 10s 11s 12s 13s 14s 15s 16s 17s 18s 19s 20s 21s 22s 23s 24s 25s 30s 40s 50s 60+

IMPACT OF CUBING EXPERIENCE - 3X3

3X3 BEST SINGLE

Experience	Value
1m	38.0
3m	21.0
6m	15.9
1y	15.4
1.5y	13.2
2y	12.6
3y	11.2
4y	12.0
5y	11.5
6y	9.9
10y	12.9
15y	14.2
20y+	22.0

3X3 BEST AO12

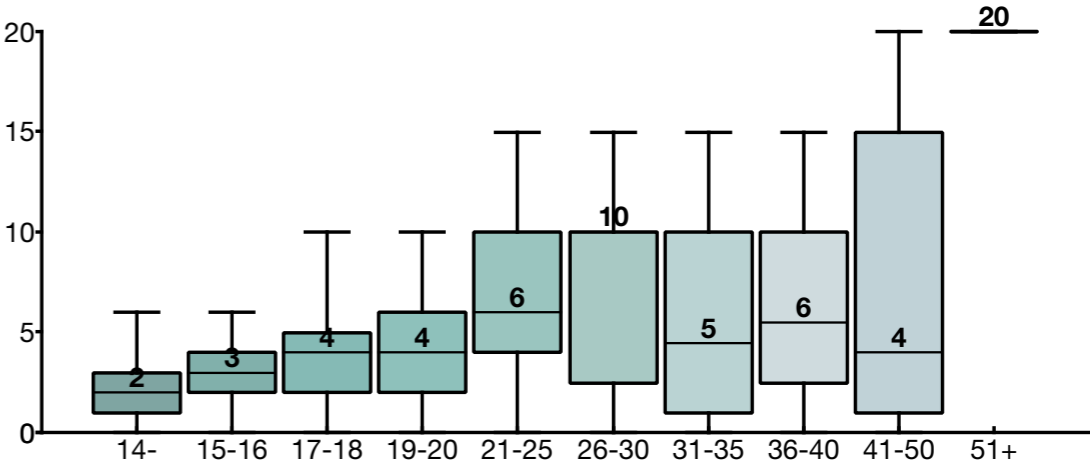| Experience	Value
1m	52.4
3m	28.0
6m	24.2
1y	20.2
1.5y	19.0
2y	17.9
3y	14.9
4y	15.8
5y	15.6
6y	14.0
10y	17.8
15y	17.7
20y+	34.0

Most cubers hit their best times after 3 years of experience
The fastest cubers have 4-6 years of experience

Cubing experience

- 1m **1%**
- 3m **8%**
- 1y **12%**
- 1.5y **8%**
- 2y **14%**
- 3y **12%**
- 4y **11%**
- 5y **10%**
- 6y **12%**
- 10y **8%**
- 15y **2%**
- 20y+ **1%**

Years of cubing experience by age group

Age group	Median
14-	2
15-16	3
17-18	4
19-20	4
21-25	6
26-30	10
31-35	5
36-40	6
41-50	4
51+	20

IMPACT OF CUBING EXPERIENCE - OTHER CUBES
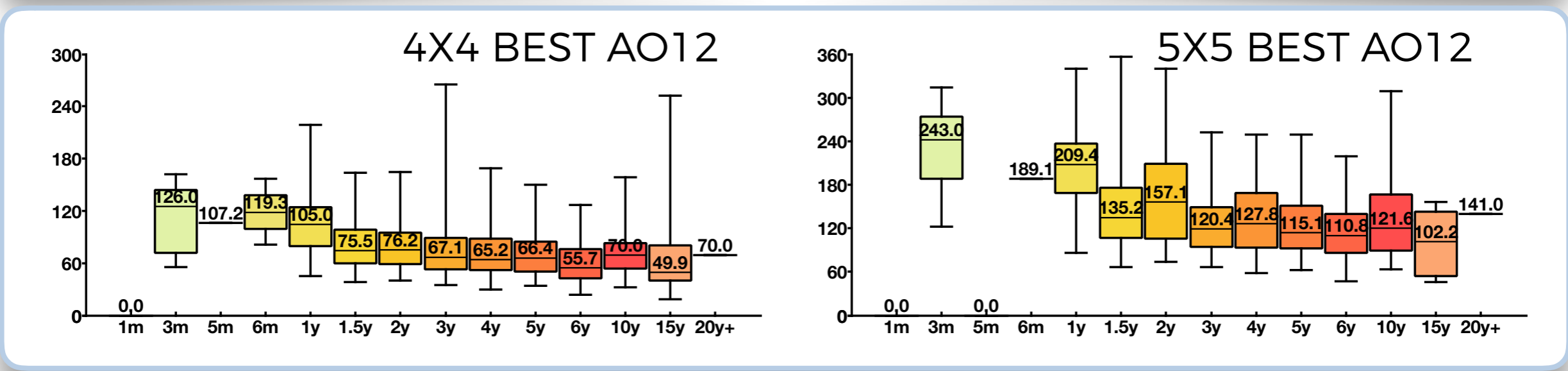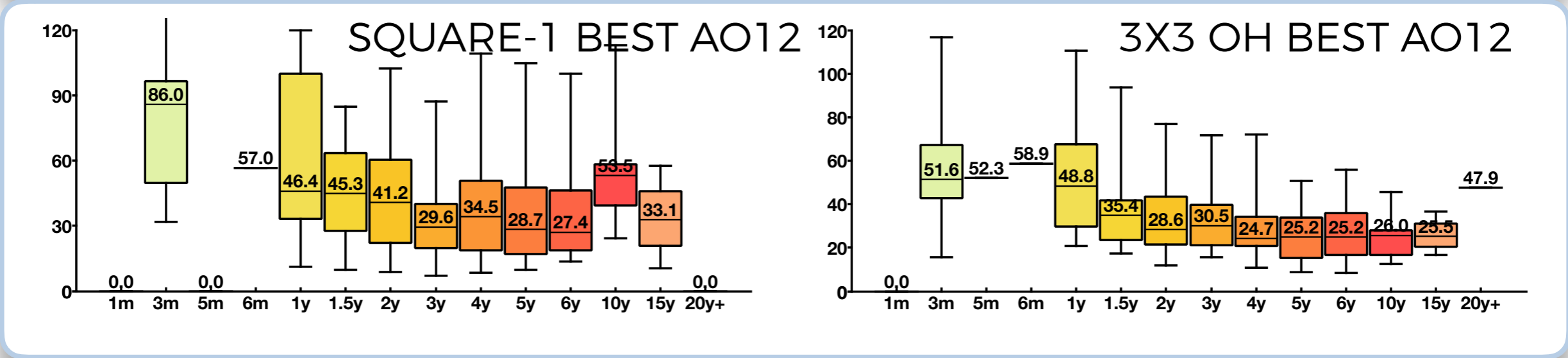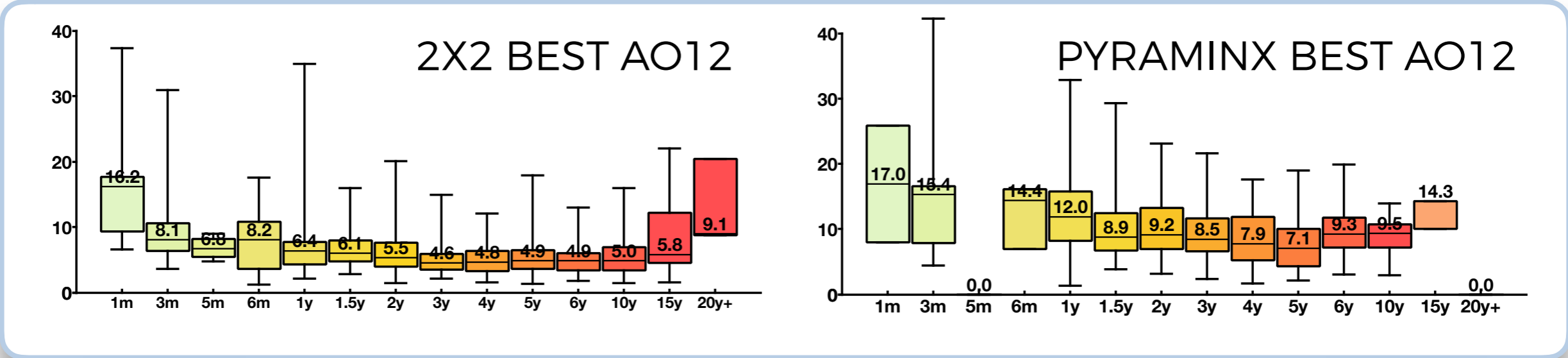
BLIND SOLVING : IT TAKES YEARS TO MASTER

Blind 3x3x (Mo3)

BY CUBING EXPERIENCE

BY AGE GROUP
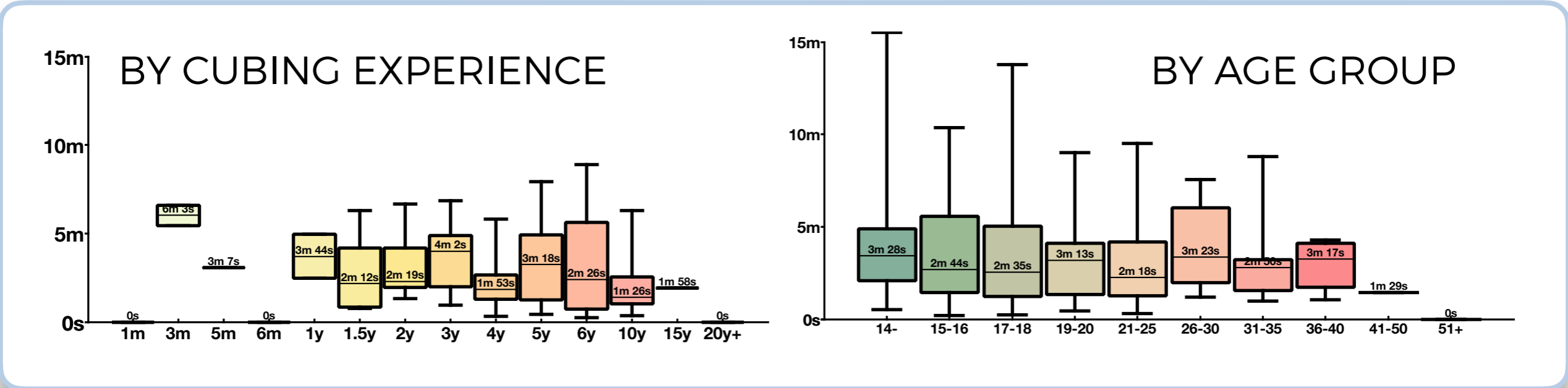
Blind gets better after a longer time, with the fastest 3x3 at 6-10 years of experience

For larger and multi-cubes, only the most experienced even start learning them

Larger cubes by Cubing Experience

4X4 BLD SINGLE

5X5 BLD SINGLE

MULTI BLIND (# OF SOLVED)
(Higher is better)