

# Encoding space in time: Stimulus deflector + LED display

09/15/2014

Previously...

Why do the results differ from Experiment 1, 2 and 3?


1. CRT phosphor persistence is biasing the result
2. Experiment 4 is too difficult
3. The results (Exp. 1, 2 and 3) are artifact

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Previously...

Possible solutions

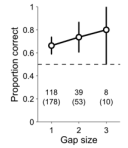
1. CRT phosphor persistence is biasing the result
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Previously...

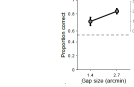
Preliminary results: day 1 + day 2



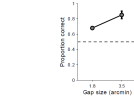
Gap size	Proportion correct	n
1	0.65	118 (178)
2	0.75	39 (53)
3	0.85	8 (10)

4

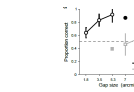
Previously...



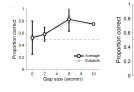
- Experiment 1: CRT



- Experiment 2: LED + 20 ms stimulus presentation



- Experiment 3: LED + ~10ms stimulus presentation



- Experiment 4: stimulus deflector

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Today

- Review of how to use/calibrate the stimulus deflector
- “default” conversion voltage to arcmin for a particular observer
- control experiment: stimulus deflector + LED display
  - experimental design and preliminary result

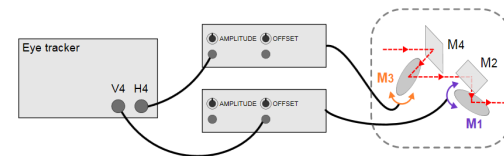
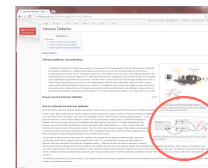
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[wiki.bu.edu/aplab/index.php/Stimulus\\_Deflector](http://wiki.bu.edu/aplab/index.php/Stimulus_Deflector)



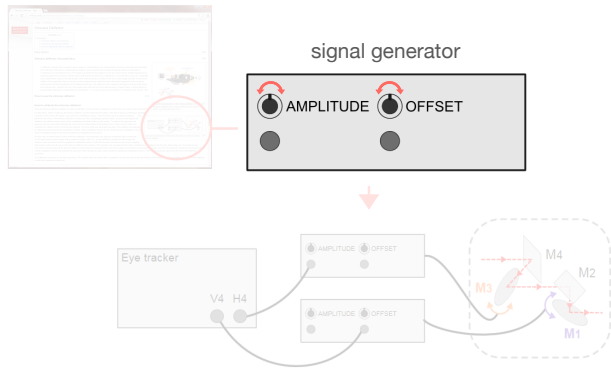
7

[wiki.bu.edu/aplab/index.php/Stimulus\\_Deflector](http://wiki.bu.edu/aplab/index.php/Stimulus_Deflector)



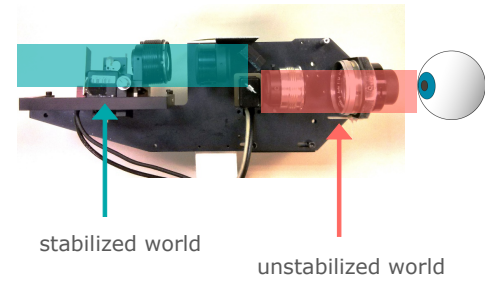
8

[wiki.bu.edu/aplab/index.php/Stimulus\\_Deflector](http://wiki.bu.edu/aplab/index.php/Stimulus_Deflector)



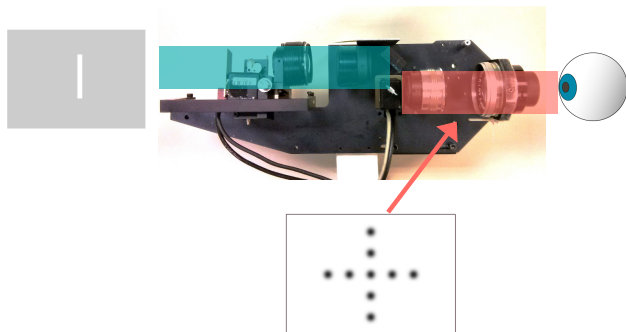
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Stimulus deflector calibration



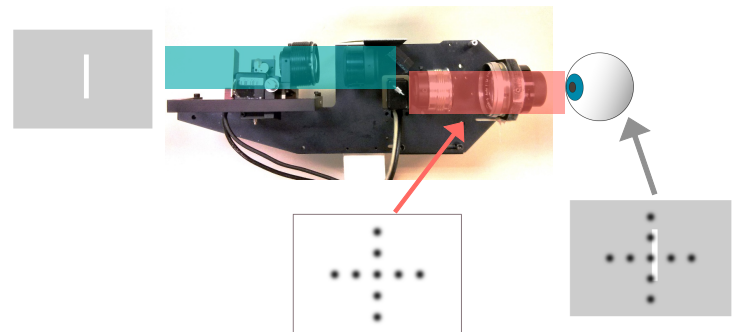
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Stimulus deflector calibration



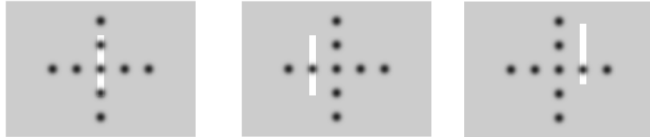
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Stimulus deflector calibration

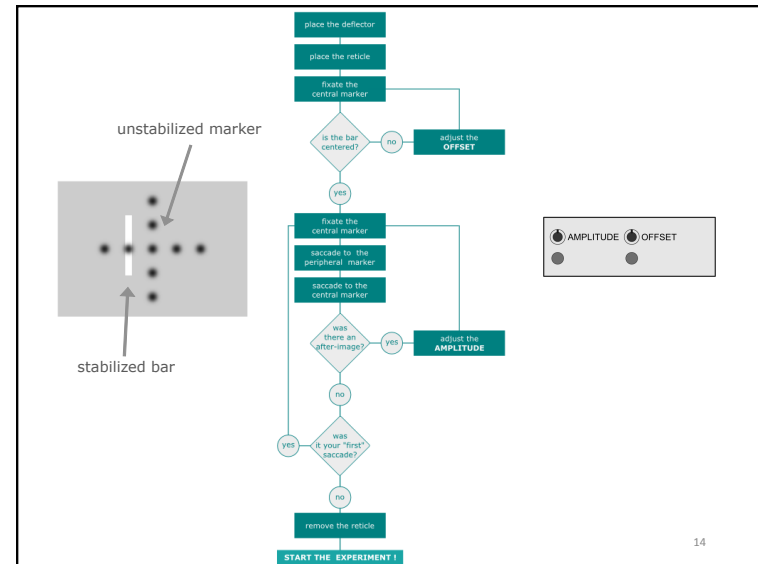


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Some example of what would you perceive as observer

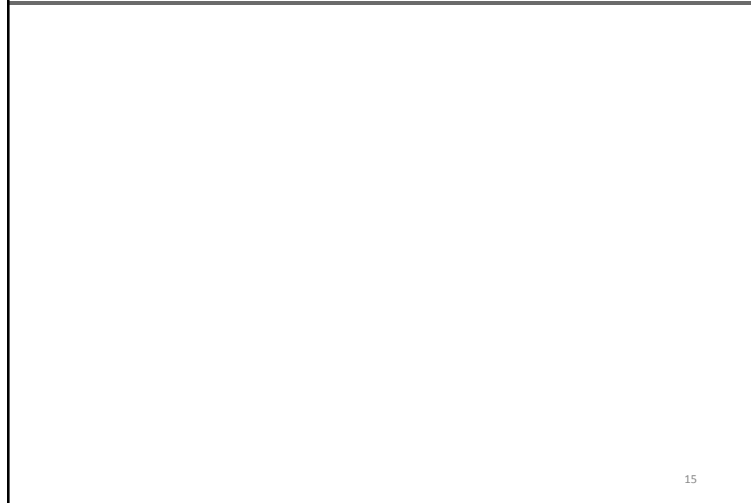


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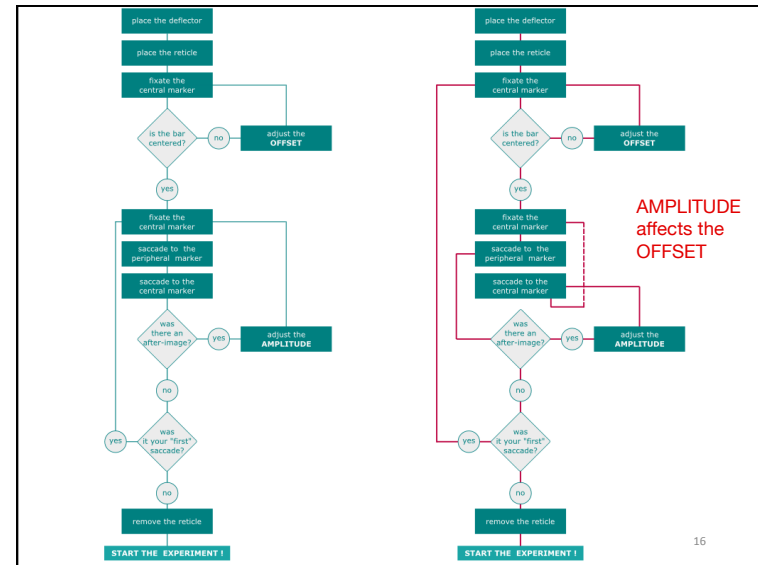


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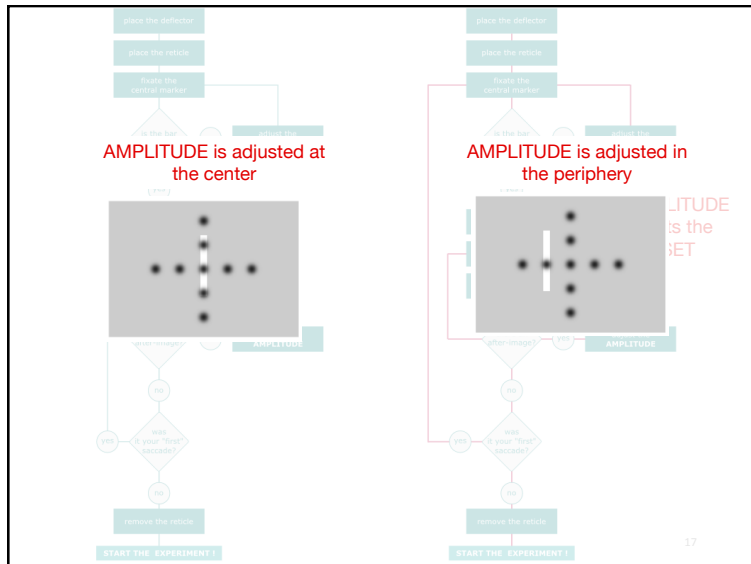
What did go wrong in the previous experiments with the stimulus deflector?



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Advantages of the new ('correct') calibration procedure

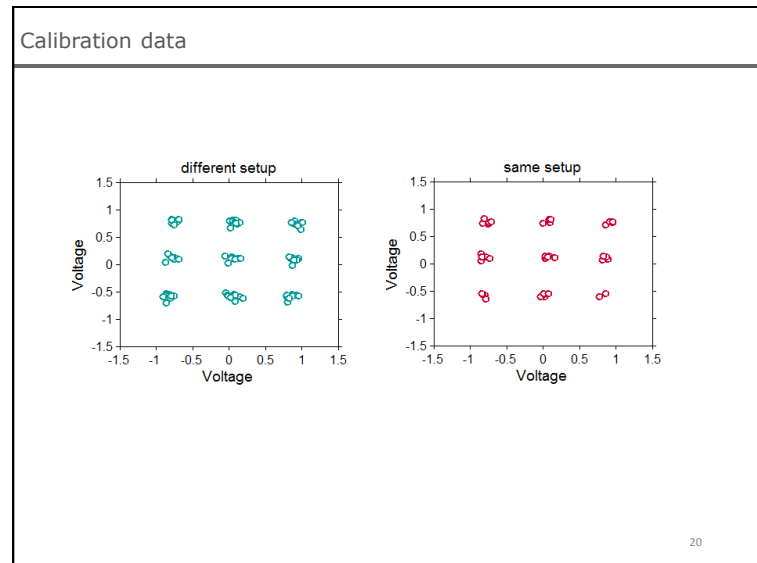
- OFFSET and AMPLITUDE are independent
- less time-consuming?

The output data from EyeRIS

Since the EyeRIS calibration was skipped to save time, the EyeRIS output are in **voltages**

↓

"average" calibration for a particular observer for the conversion to **arcmin**



### Calibration data

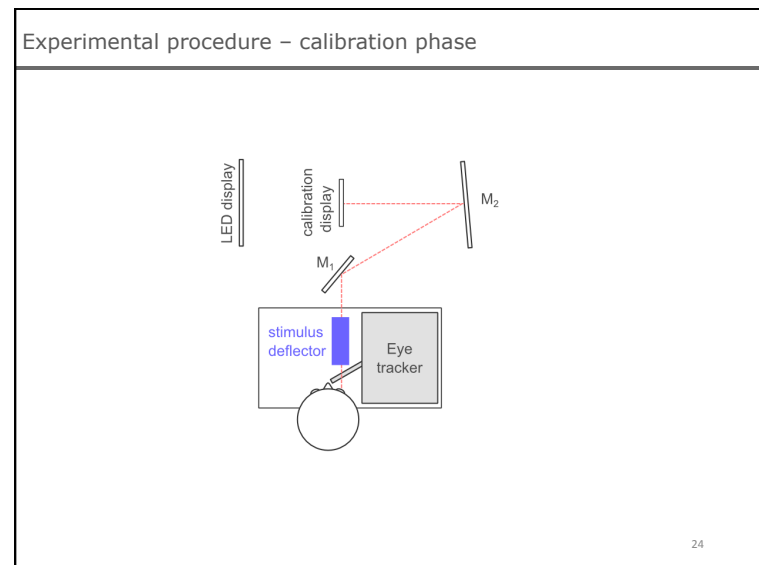
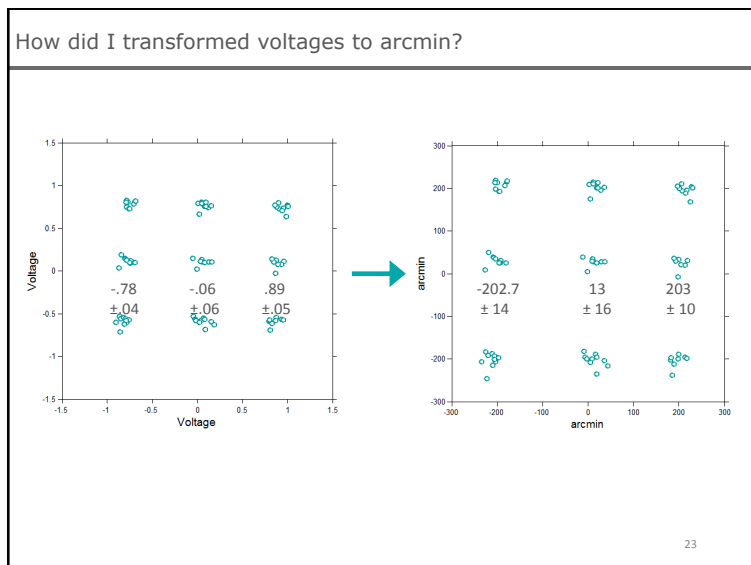
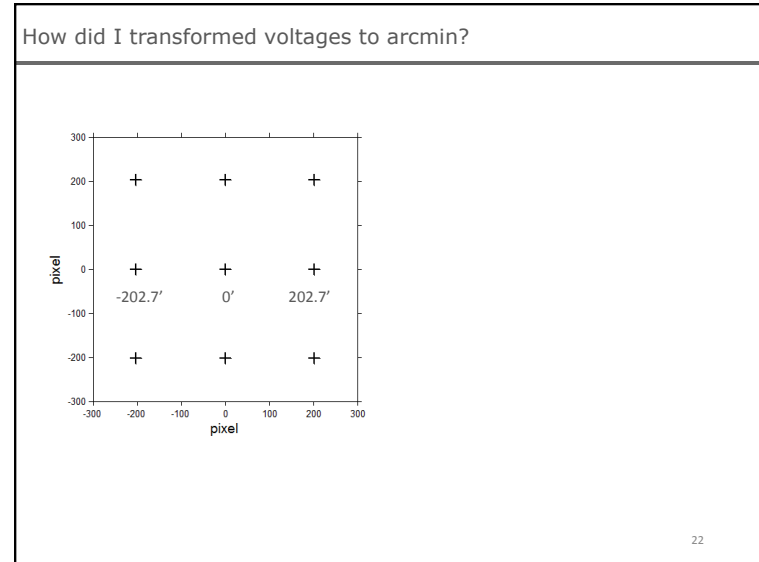
1
2
3
4
5
6
7
8
9
10
11
12
13
14
mean
std
mean
std

		x Centers calibration session														mean	std	mean	std
g r i d P o i n t	1	-0.78	-0.78	-0.77	-0.79	-0.69	-0.71	-0.76	-0.68	-0.75	-0.74	-0.82	-0.80	-0.71	-0.75	0.04	-0.77	0.05	
	2	0.05	0.01		0.05	0.10	0.02	0.08	0.12	0.16	0.10		0.00	0.08	0.11	0.08	0.05	0.07	0.05
	3	0.90	0.91	0.88	0.86	1.00	0.99	0.95	0.94	1.01		0.96	0.86	0.92	0.95	0.94	0.05	0.92	0.05
	4	-0.80	-0.80	-0.84	-0.74	-0.87	-0.74	-0.75	-0.69		-0.78	-0.85	-0.85	-0.83	-0.73	-0.78	0.06	-0.81	0.05
	5	0.05	0.06	0.04	-0.05	0.13	-0.01		0.08		0.16	0.09	0.03	0.03	0.07	0.06	0.06	0.08	0.05
	6	0.87	0.85	0.83	0.96	0.87	0.94			0.90	0.87	0.82	0.82			0.89	0.05	0.85	0.04
	7	-0.86	-0.85	-0.81	-0.90	-0.79	-0.86	-0.78	-0.81	-0.76	-0.79		-0.79	-0.84		-0.82	0.04	-0.81	0.03
	8	-0.04	-0.03	0.04	-0.01	0.07	0.09	0.15	0.19	0.09	0.03	-0.83	-0.03	0.01	0.07	0.06	0.25	-0.15	0.38
	9	0.88	0.80	0.80	0.94	0.81	0.87	0.83	0.96		0.01	0.77		0.86		0.86	0.26	0.55	0.46
		different					same												

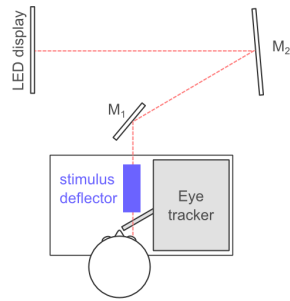
  

		y Centers calibration session														mean	std	mean	std
g r i d P o i n t	1	0.82	0.75	0.80	0.80	0.81	0.78	0.73	0.82	0.73	0.75	0.73	0.82	0.77	0.78	0.04	0.76	0.04	
	2	0.81	0.79		0.79	0.80	0.66	0.76	0.74	0.76	0.76		0.73	0.80	0.81	0.76	0.04	0.78	0.04
	3	0.80	0.73	0.75	0.77	0.77	0.63	0.73	0.71	0.76		0.75	0.71	0.76	0.76	0.74	0.04	0.74	0.02
	4	0.15	0.14	0.19	0.12	0.03	0.09	0.10	0.10		0.13	0.18	0.05	0.12	0.09	0.12	0.05	0.11	0.05
	5	0.13	0.10	0.11	0.15	0.11	0.02		0.09		0.10	0.14	0.09	0.14	0.13	0.10	0.04	0.12	0.02
	6	0.13	0.11	0.14	0.11	-0.03	0.07			0.08	0.11	0.06	0.14			0.09	0.05	0.10	0.03
	7	-0.53	-0.56	-0.55	-0.60	-0.56	-0.71	-0.60	-0.63	-0.57	-0.58		-0.65	-0.55		-0.59	0.05	-0.59	0.05
	8	-0.53	-0.57	-0.58	-0.58	-0.55	-0.68	-0.59	-0.63	-0.57	-0.60	-0.56	-0.61	-0.55	-0.55	-0.59	0.04	-0.57	0.03
	9	-0.55	-0.59	-0.57	-0.57	-0.69	-0.58	-0.62	-0.57		-0.57	-0.60		-0.54		-0.59	0.04	-0.57	0.03
		different					same												

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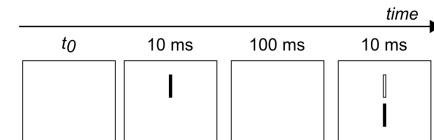


Experimental procedure



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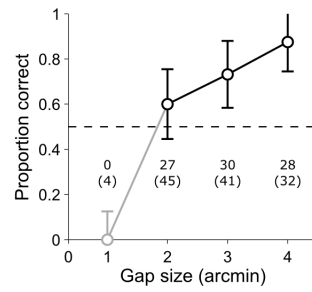
The experiment



Is the top line to the left or to the right of the bottom line? [Button X dedicated to "not perceived" stimuli]

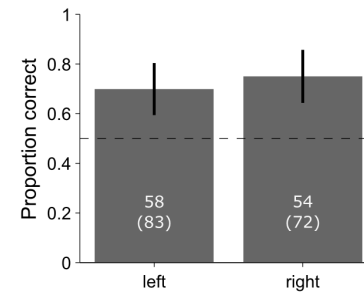
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Preliminary results



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Preliminary results



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Conclusions

The observer was able to correctly determine the direction of the displacement caused by ocular drift during the interstimulus interval.

- compared to previous experiments, the gap size needs to be bigger in order to achieve performance above chance level

In general, these results are congruent with those of Experiment 1, 2 and 3