

An automated accommodative facility test with unpredictable stimuli

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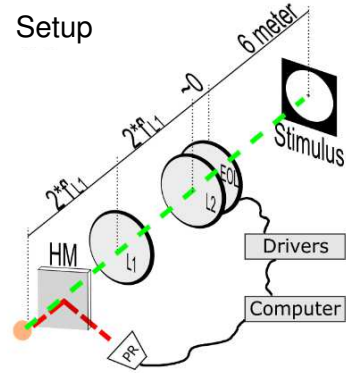
PURPOSE

To study the accommodative dynamics for predictable and unpredictable stimuli using manual and automated accommodative facility tests

MATERIAL & METHODS

17 young healthy subjects were tested monocularly in 2 sessions, using 5 different conditions:

Method	Distance	Accommodative Transitions [D]	Response variables
1 Manual Flippers	Far	0.17 / 2.17	Cycles/minute
2 Manual Flippers	Near	0.50 / 4.50	Cycles/minute
3 Automated (EOL system)	Far	0.17 / 2.17	Cycles/minute Latency Accommodative response Response time
4 Automated (EOL system)	Near	0.50 / 4.50	Cycles/minute Latency Accommodative response Response time
5 Automated (EOL system)	Far & Near (hybrid approach)	0.17 / 0.50 / 2.17 / 4.50	Latency Accommodative response Response time



RESULTS

diff.: difference. SD: standard deviation. S_w : within-subject standard deviation. cpm: cycles per minute. *Statistically significant ($p < 0.05$).

1 Repeatability

Test distance	Manual Flippers			Automated (EOL system)		
	Mean diff. \pm SD [cpm]	S_w [cpm]	p-value	Mean diff. \pm SD [cpm]	S_w [cpm]	p-value
Near	-1 \pm 1	1	<0.01*	-3 \pm 4	3	0.02*
Far	-1 \pm 1	1	<0.01*	-5 \pm 4	4	<0.01*

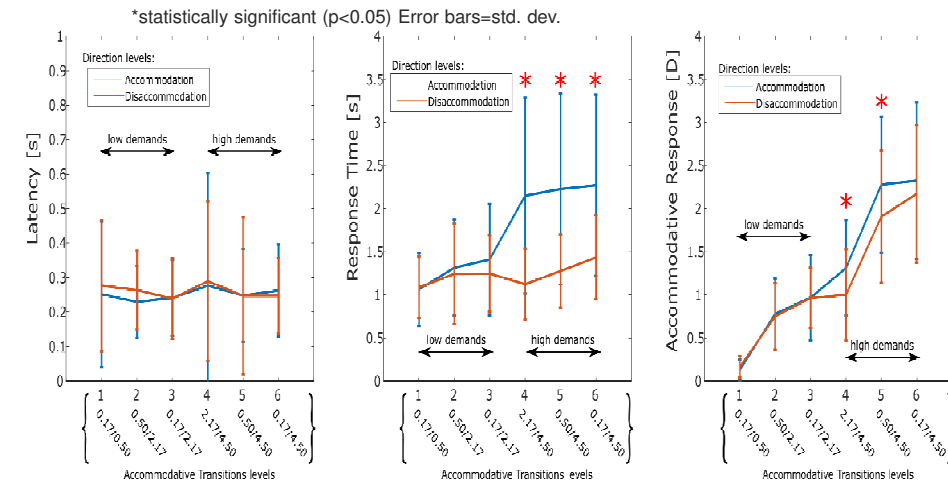
2 Agreement

Test distance	Manual Flippers - Automated		
	Mean diff. [cpm]	LoA sup, inf [cpm]	p-value
Near	-6	12, -18	0.13
Far	-3	3, -15	<0.01*

3 Accommodation dynamics differences among cond 3, 4 and 5

p > 0.05

4 Hybrid Accommodative Facility Test



CONCLUSIONS

- The automated accommodative facility test does not agree with the manual flipper test results. Operator delays in flipping the lens may account for these differences.
- This novel test, using unpredictable stimuli, provides a more comprehensive examination of accommodative dynamics than conventional manual accommodative facility tests.
- Unexpectedly, the unpredictability of the stimulus did not affect accommodation dynamics.
- Further studies are needed to evaluate the sensitivity of this novel hybrid technique on individuals with accommodative anomalies.