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The Significance of Preattentive Visual Search (PAVS) in Glaucoma

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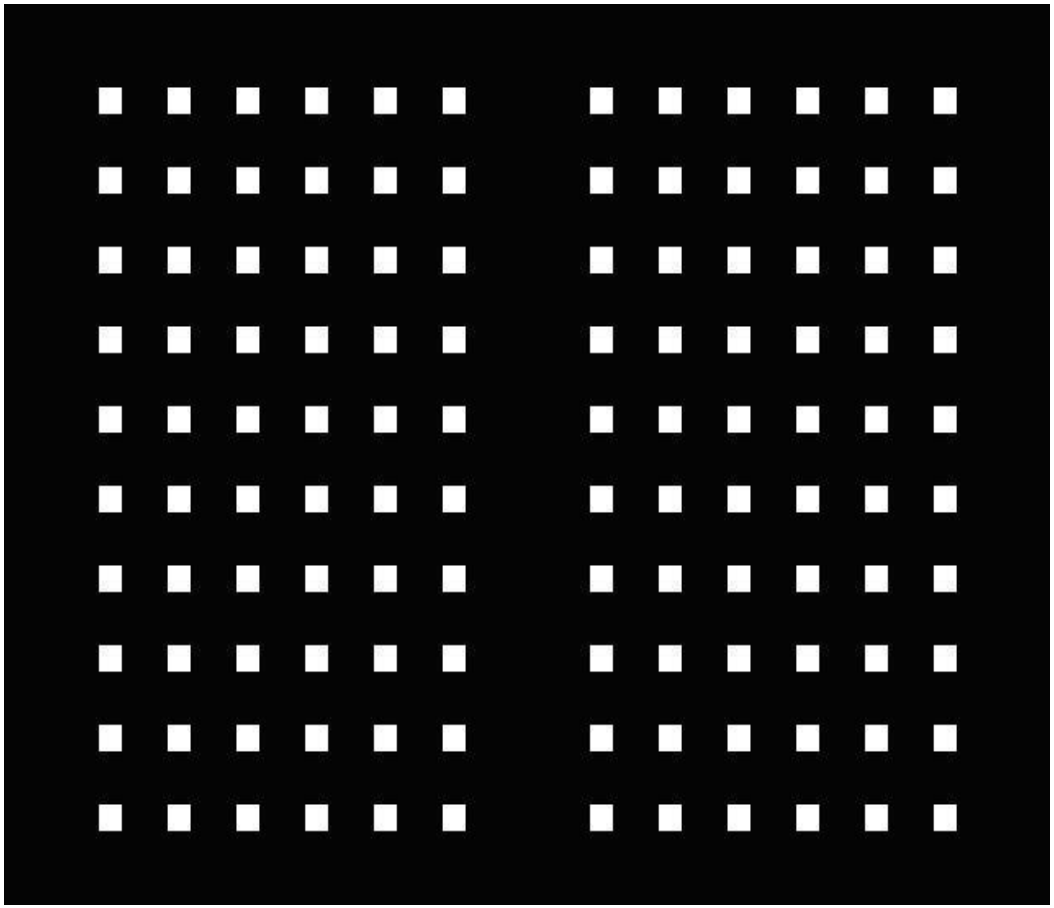
Why Another Psychophysical Test for Glaucoma ?

- Objectives of investigating PAVS:
  - to provide tests maximizing sensitivity to M_y magno-fibres & to parvo-fibres
  - to determine whether PAVS can discriminate between normals, hypertensives, & glaucomatous Pxs
  - to determine whether PAVS (using 2-AFC reaction times) has practicality (e.g. consistency)

PAVS Targets: Orientation Task

- Px required to press switch to indicate whether target (N) is on L or RHS.
- Uses paradigm of Flitcroft et al. (1996)

Flicker & Oscillatory Targets



1 target flickers or oscillates vertically among stationary distractors

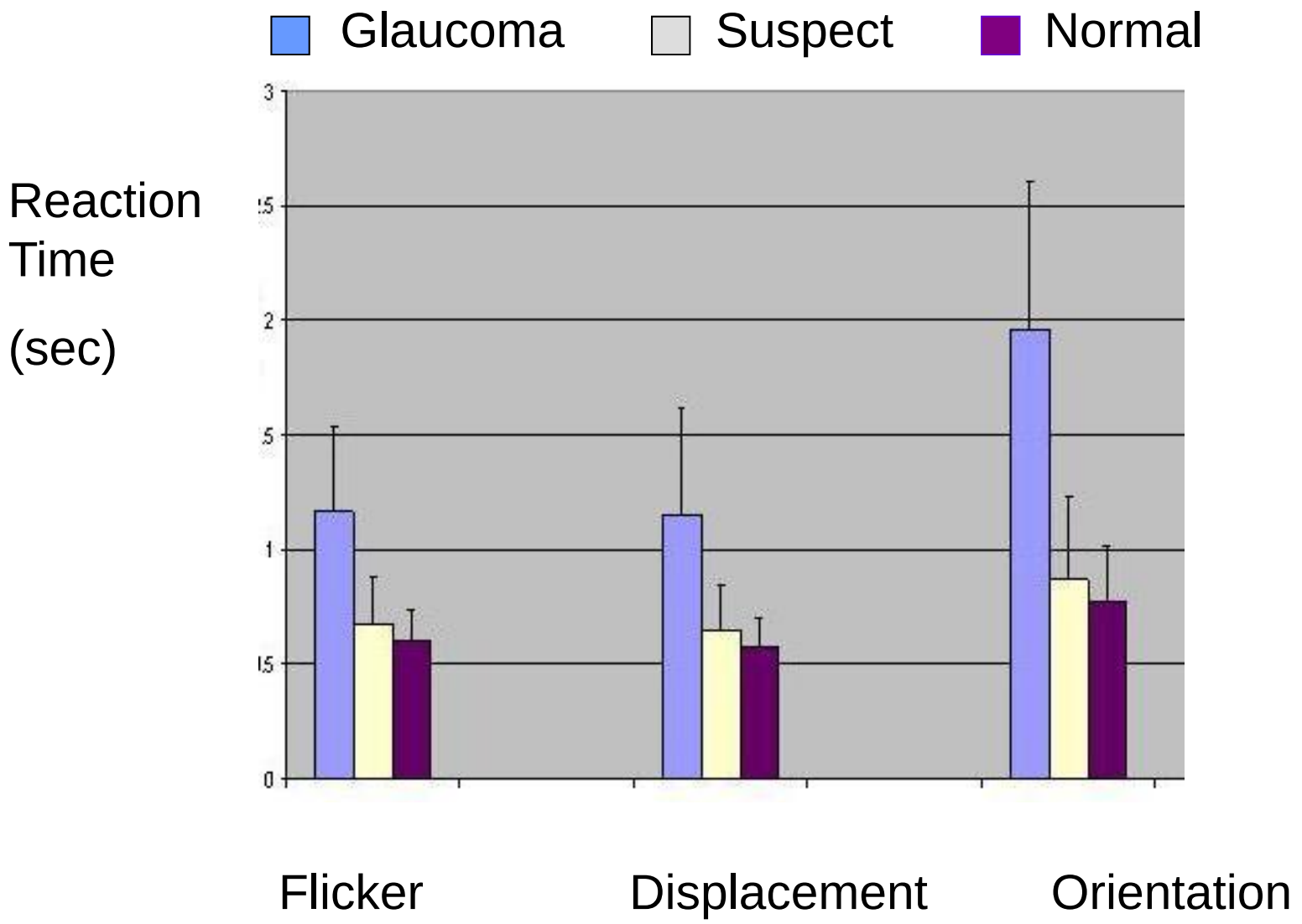
Target & Distractor Parameters

Include:

- # distractors
- Oscillation frequency
- Displacement frequency

[All 3 PAVS tests are 2-alternative forced-choice]

Glaucoma	Glaucoma Susp.	Normal
Characteristic ONH/RNFL damage	Suspicious ONH/RNFL structure	Normal ONH & RNFL structure. C:D < 0.7
Characteristic, repeatable, VF loss (Abnormal GHT &/or corrected PSD < 5%, &/or cluster criteria defect	No repeatable characteristic VF loss	Normal VF sensitivity
Classified based on IOP & gonio-scopy findings		Normal IOP & anterior chamber angle


Glaucoma
Suspect
Normal
Reaction Time
(sec)
3
2
1
0
Flicker
Displacement
Orientation

[41 Px's per category]	Flicker	Displacement	Orientation
Glaucoma Vs Suspect	T = 7.43 P < 0.001	T = 6.25 P < 0.001	T = 9.34 P < 0.001
Glaucoma Vs Normal	T = 9.16 P < 0.001	T = 7.54 P < 0.001	T = 10.96 P < 0.001
Suspect Vs Normal	T = 1.76 P = 0.083	T = 2.18 P = 0.032	T = 1.39 P = 0.168

Potential Problems with RTs

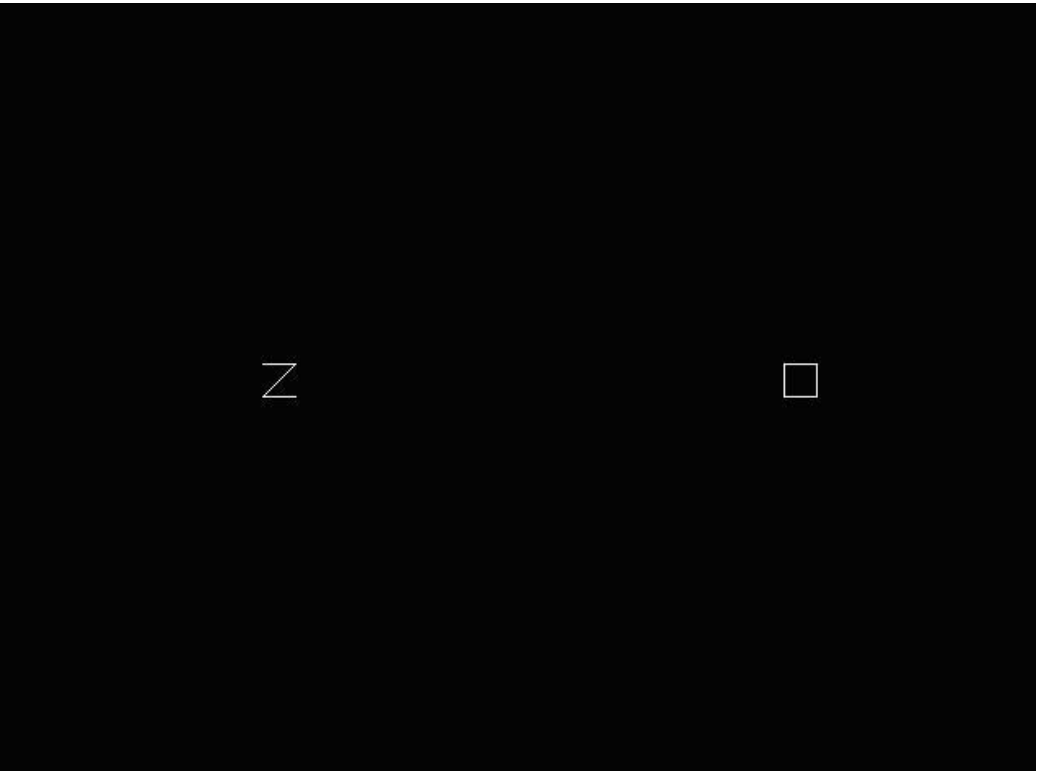
Choice RTs (CRTs) are:

- sensory status dependent

But also potentially influenced by

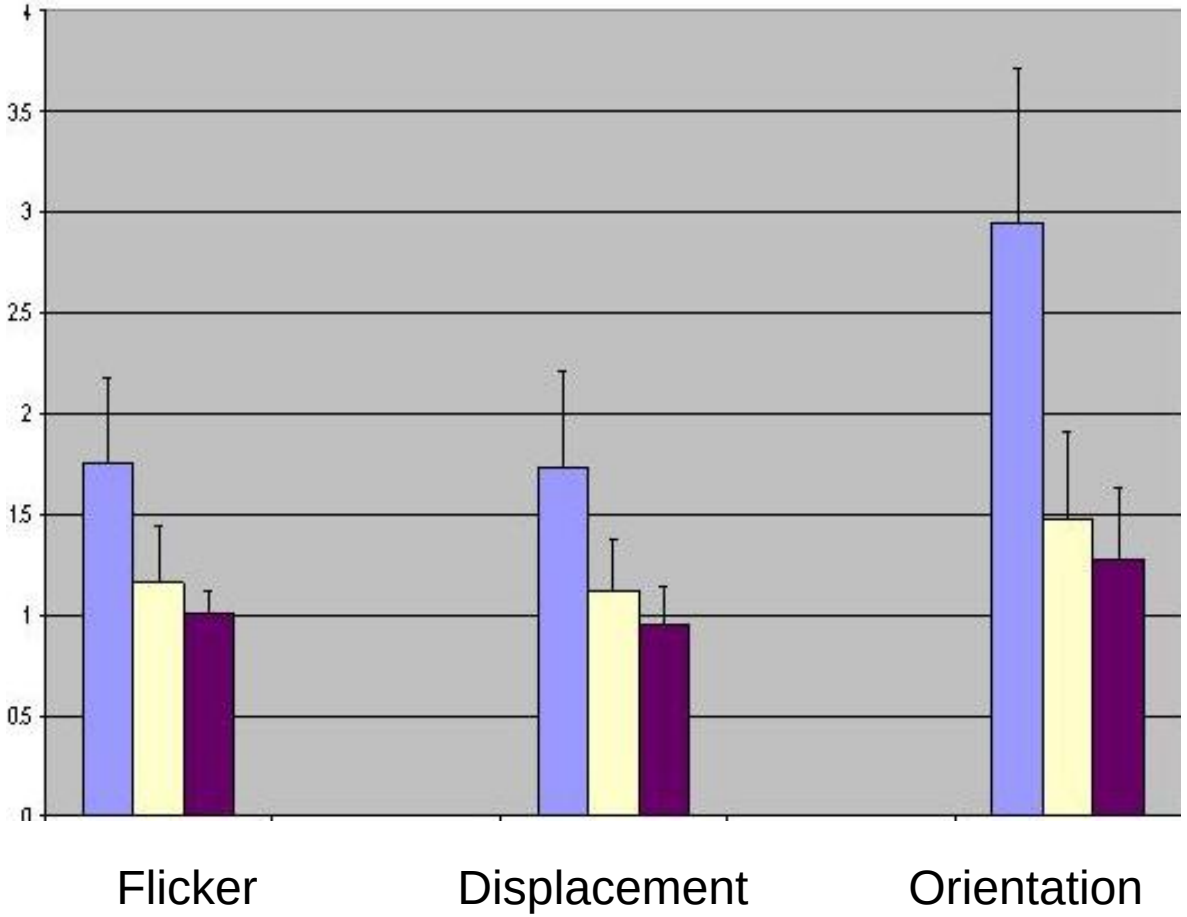
- motor status
- cortical factors – e.g. decision time
- age

Perceptual Search Index



- CRT paradigm: find square & press L or R button (only 1 distractor)
- PSI = PAVS RT / CRT
- PAVS RTs should not increase significantly above the CRT regardless of the number of distractors

PSI Results



PSI: Glaucoma Suspects vs Normals

Flicker PAVS/CRT	Displacement PAVS/CRT	Orientation PAVS/CRT
T = 3.19 P = 0.002	T = 3.59 P = 0.001	T = 2.60 P = 0.012

- PSI discriminates for all 3 PAVS tests, even between normals & glaucoma suspects.

Conclusions

- All 3 PAVS tests discriminate between glaucoma & suspect Px's.
- Displacement PAVS discriminates between suspects & normals.
- Using CRT to generate PSI improves discriminability by reducing motor & decision time factors
- Test is rapid & Px-friendly (does not use thresholds)
- Only requires PC & software

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