J9

Suboptimal movements under risk due to experimentally imposed anisotropic endpoint variance

1033

Hadley Tassinari[1], Todd E. Hudson[1,2] and Michael S. Landy[1,2]

[1]Department of Psychology & [2]Center for Neural Science, New York University

Introduction

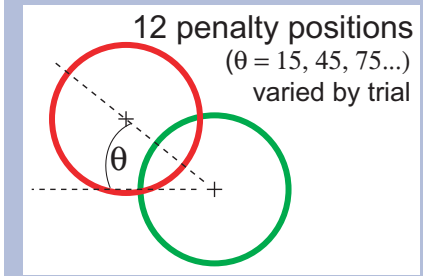
In a rapid pointing task under risk, do subjects account for:

- increased movement variance?
- anisotropic variance?

Method

Subjects reached to a screen as follows:

- 450 ms movement time limit
- Hitting within a green target circle earned 1 point
- Hitting within a red penalty circle cost 0, 2, or 5 points (by block)
- Subjects were paid $.02 per point

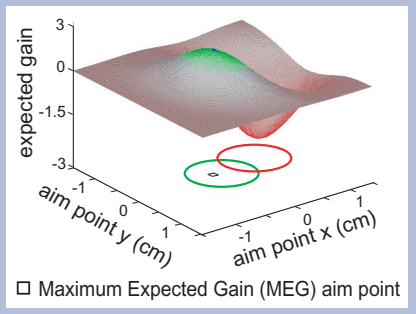


2 Conditions:

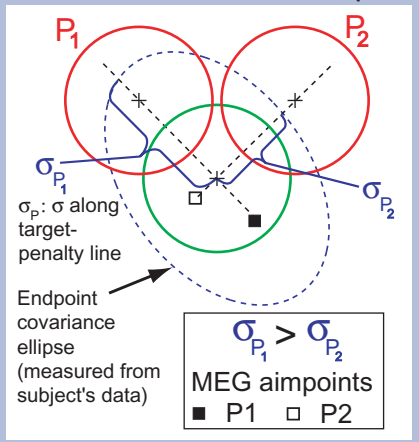
- vibration of triceps surae
- unvibrated

Ideal behavior

Aim point gain landscape:



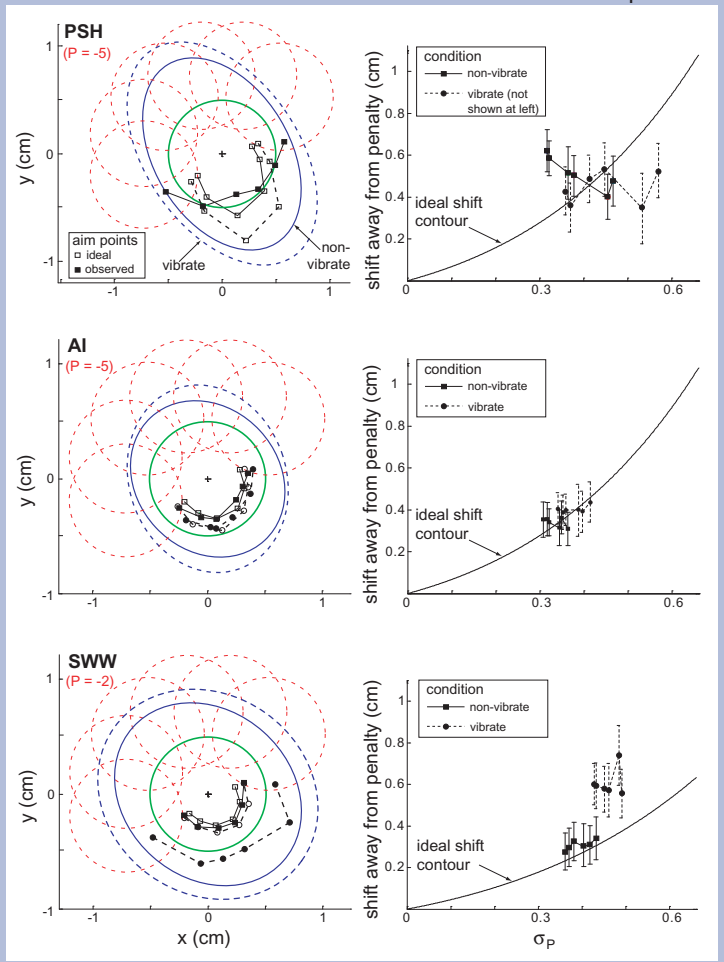
Subjects' endpoint distributions are anisotropic:



The ideal shift away from P1 should be greater than that away from P2.

Results (3 examples)

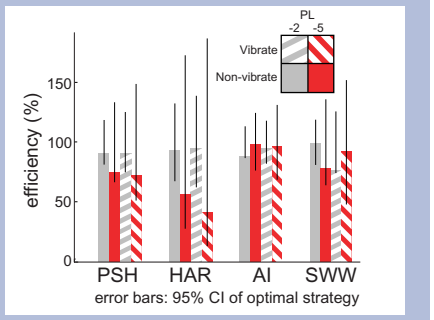
Average aim points | Shift (function of σ_P)



Efficiency

Simulated experiments were conducted as follows:

- endpoints chosen from 2-d Gaussian with covariance as measured from subjects' data, centered on subjects' aimpoints
- scores calculated for each set of simulated endpoints
- simulations repeated, yielding a distribution of predicted scores for each subject in each condition
- observed scores matched predictions
- simulations repeated, using ideal aim points, to predict the range of optimal performance for each subject:



Conclusions

Most subjects shifted further with increased variance.

Subjects did not adjust ideally for anisotropy in endpoint variance.

NIH EY08266