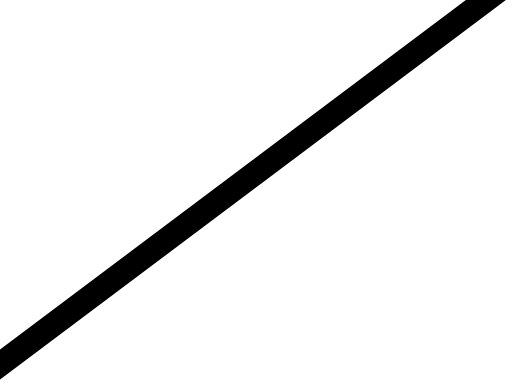
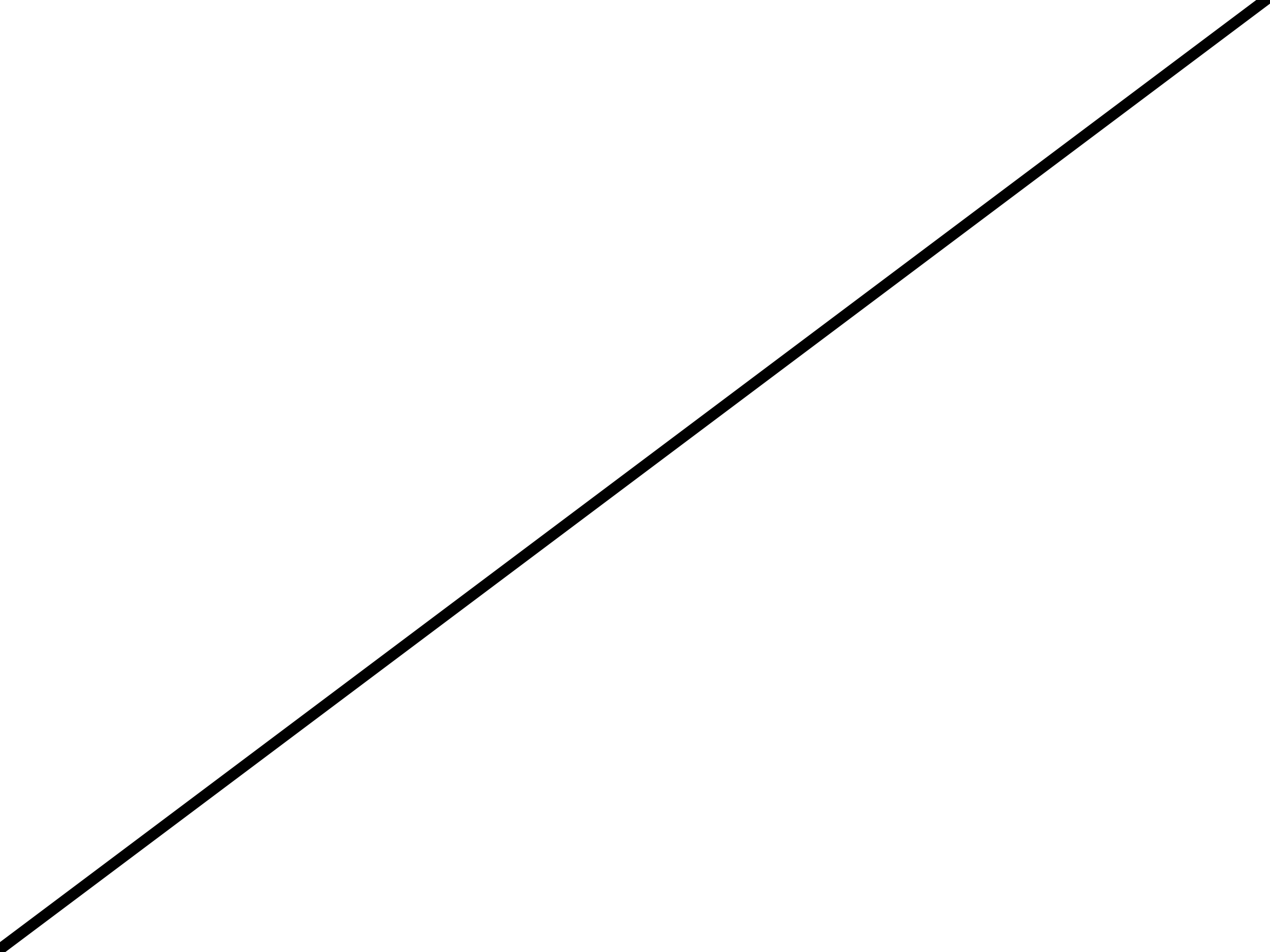


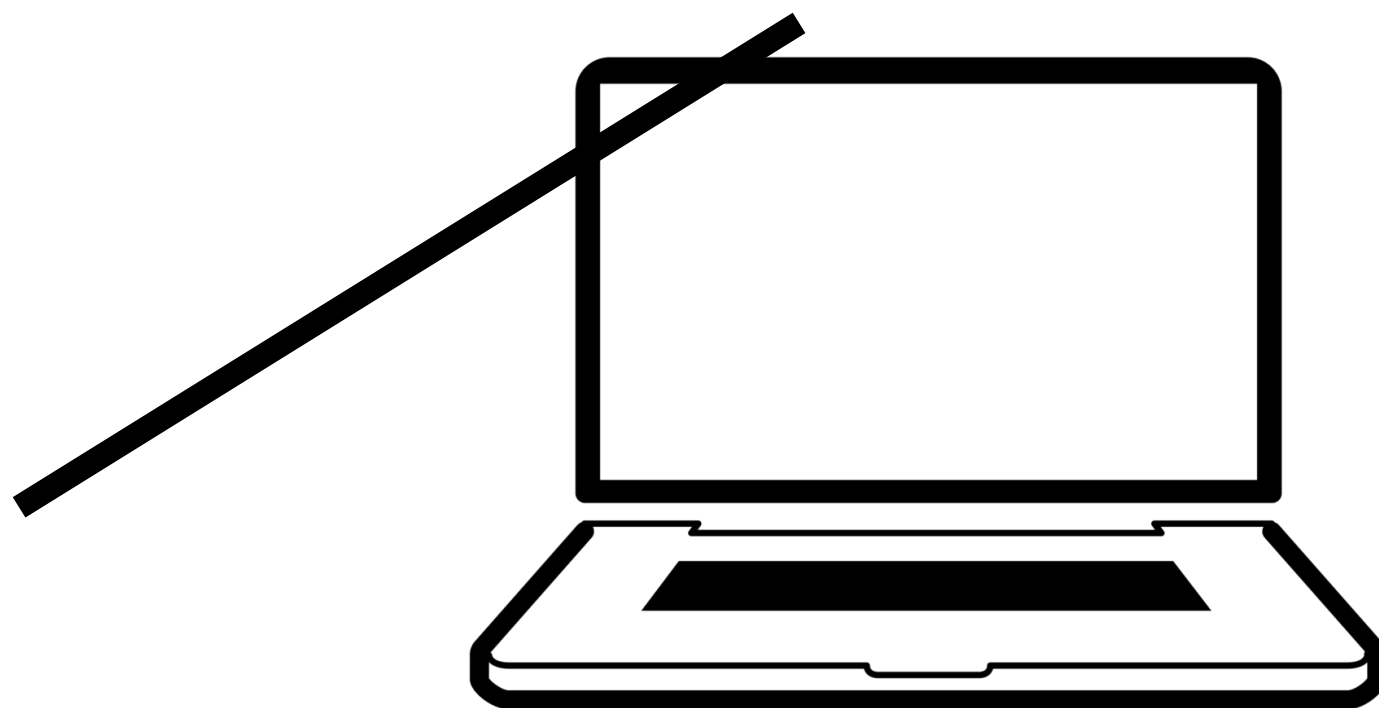
Weiss, Simoncelli, Adelson

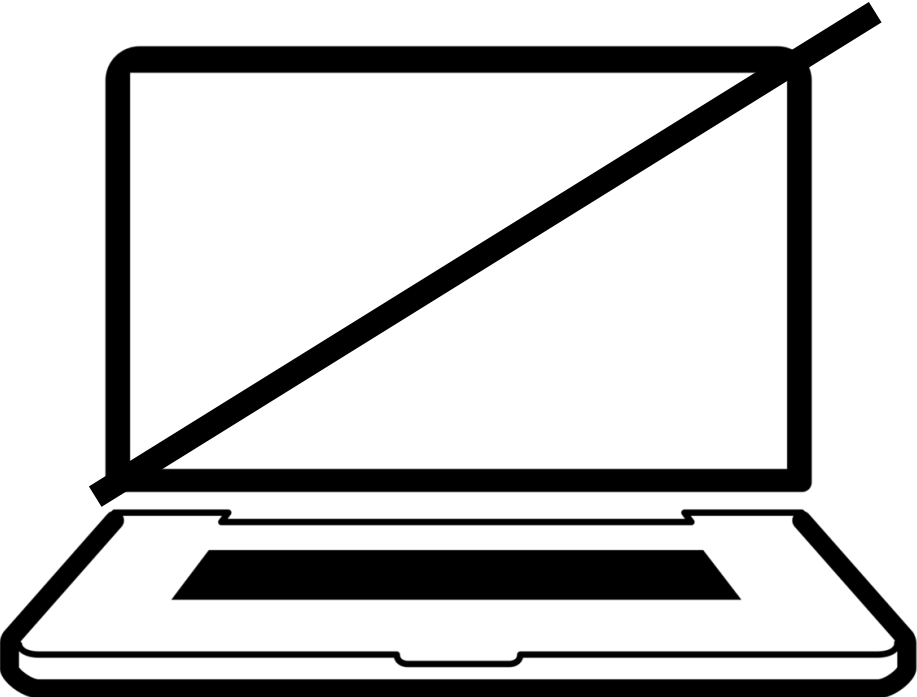
# Motion illusions as optimal percepts

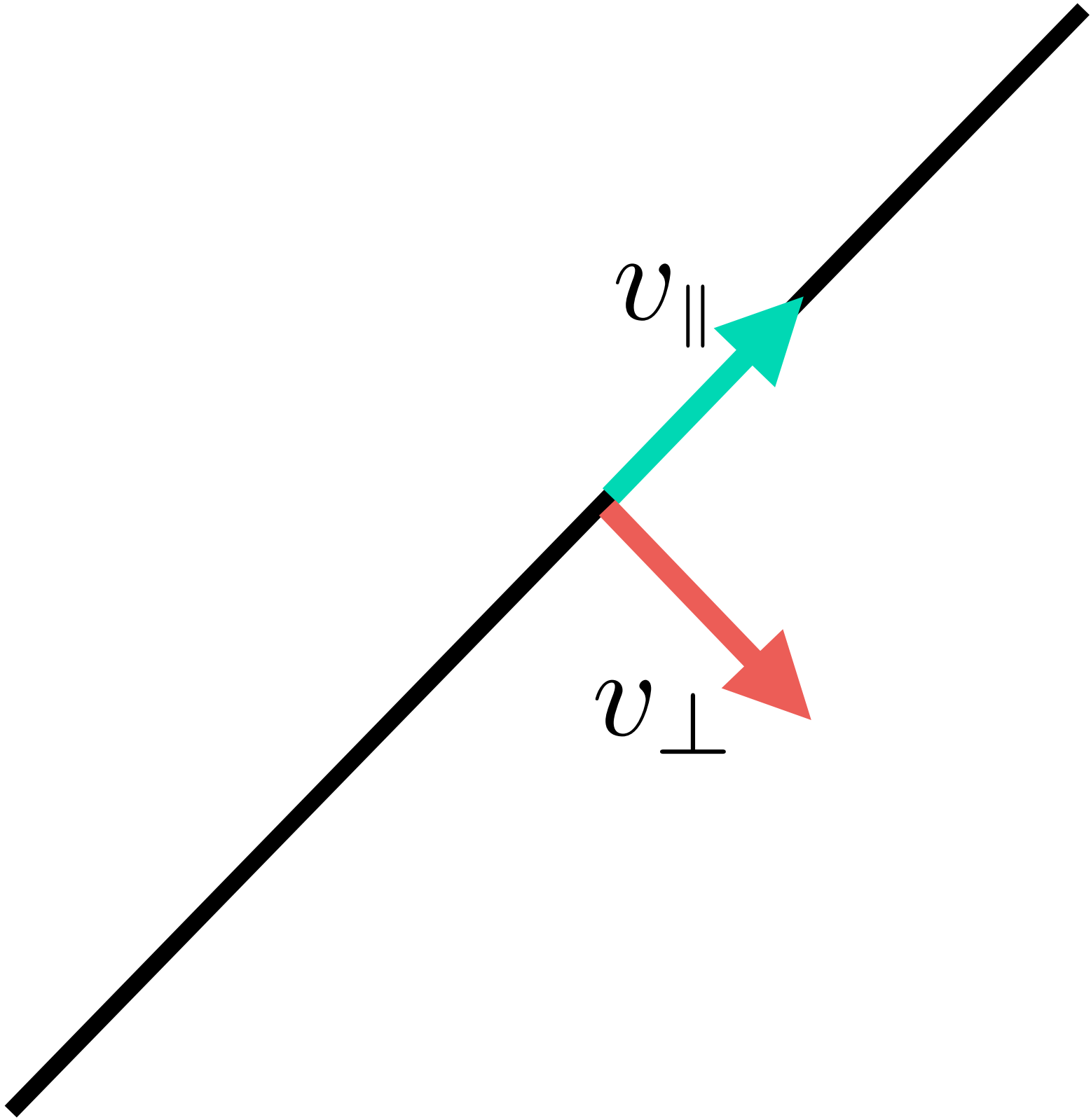
aperture problem

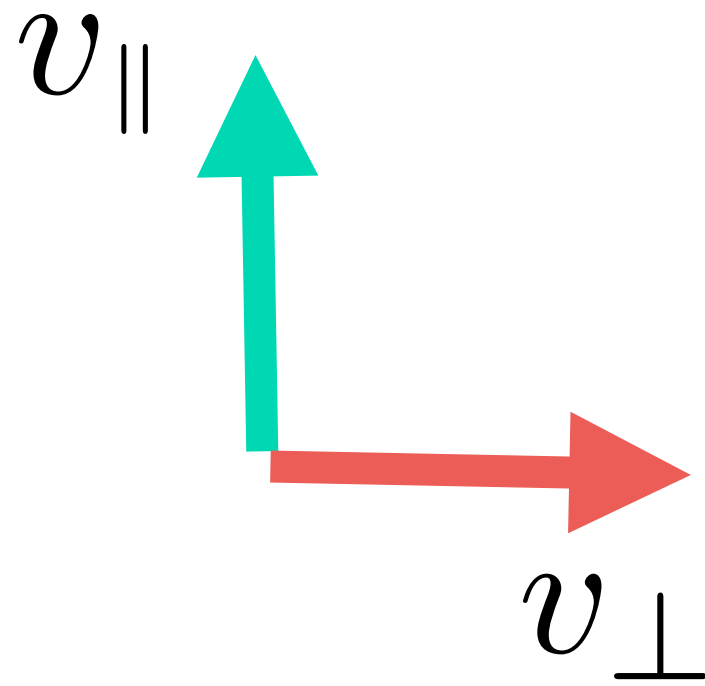








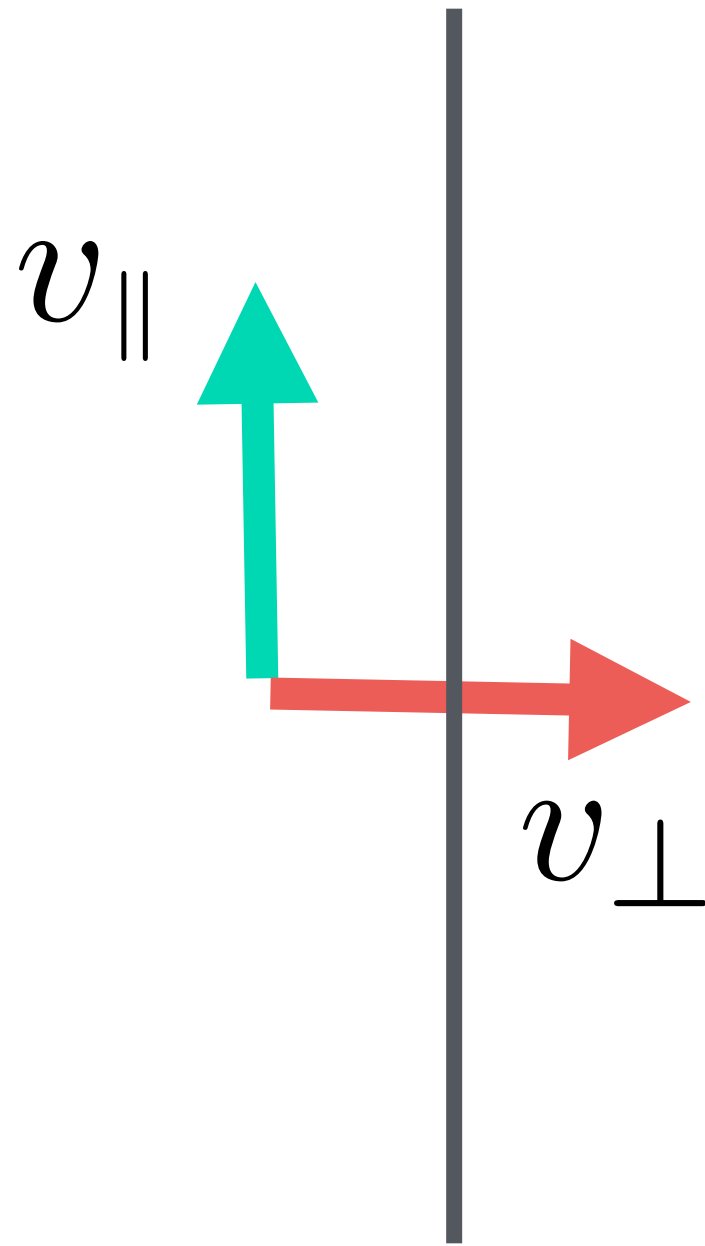




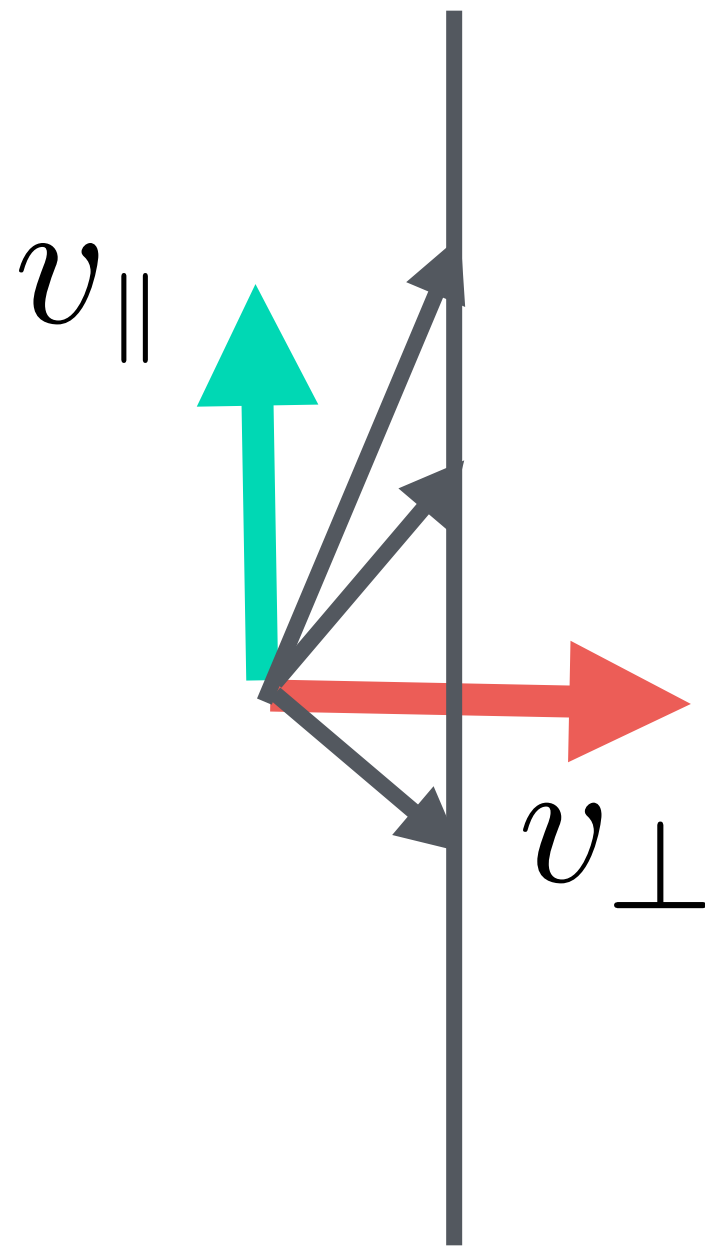
**?**

movement directions consistent  
with observation





movement directions consistent  
with observation



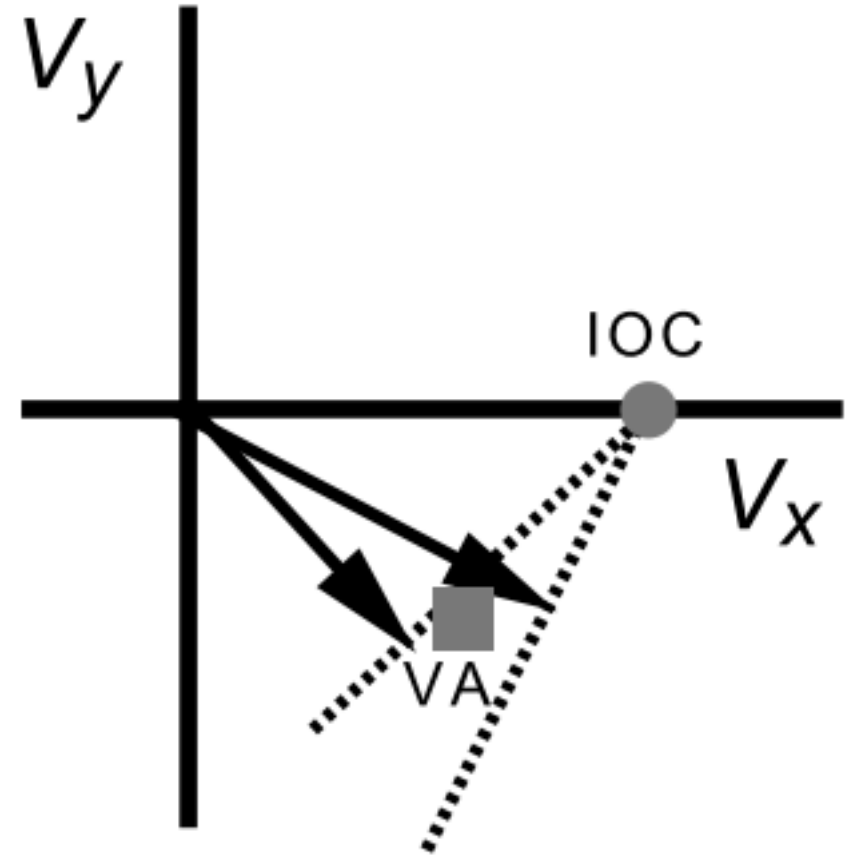
movement directions consistent  
with observation



plaid stimulus

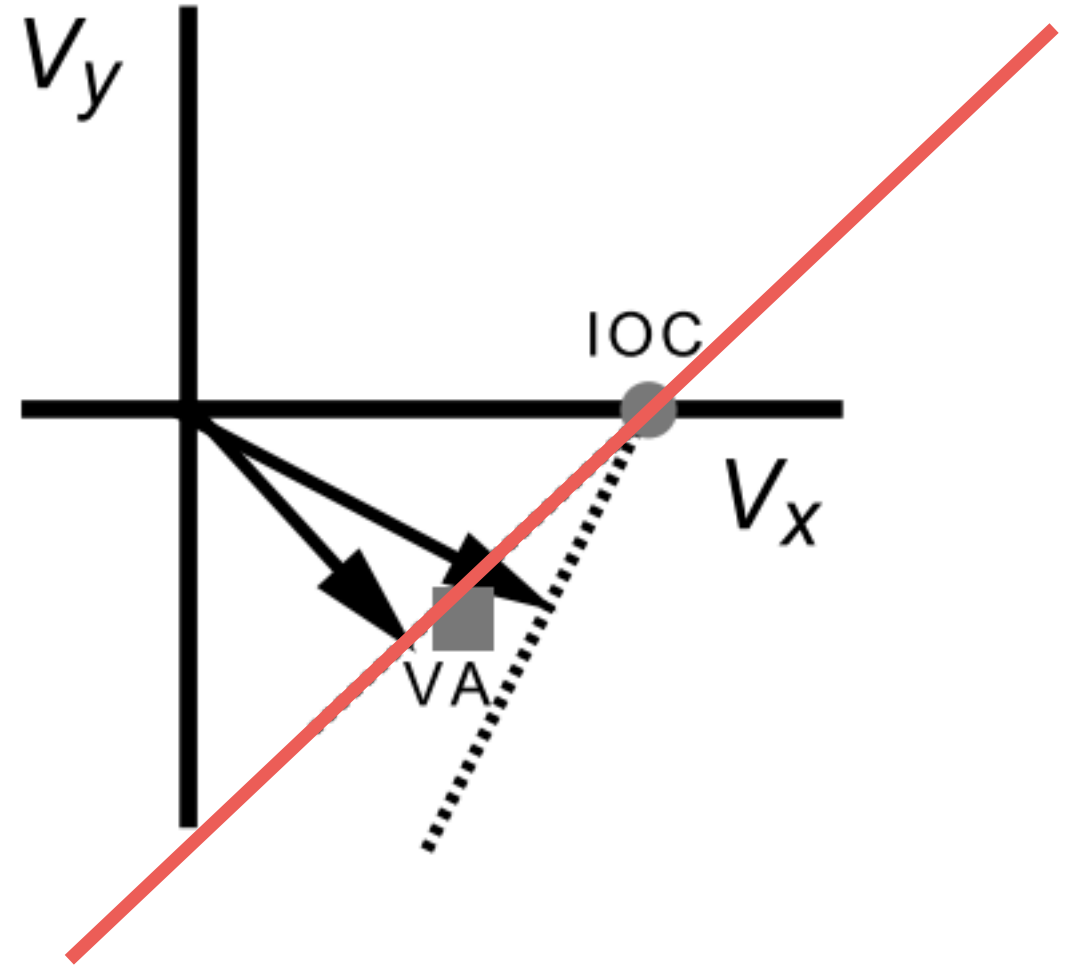


plaid stimulus



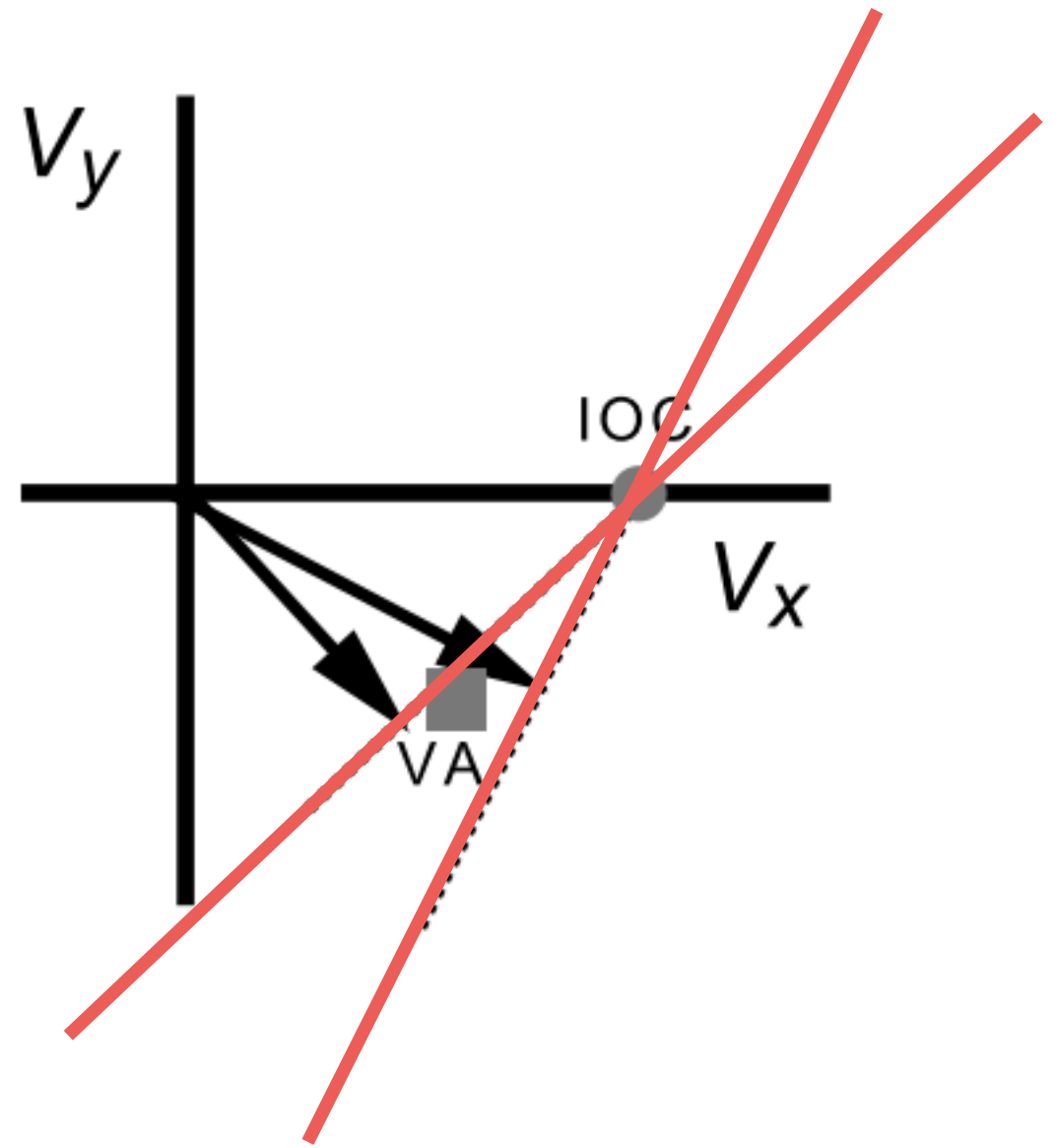


plaid stimulus



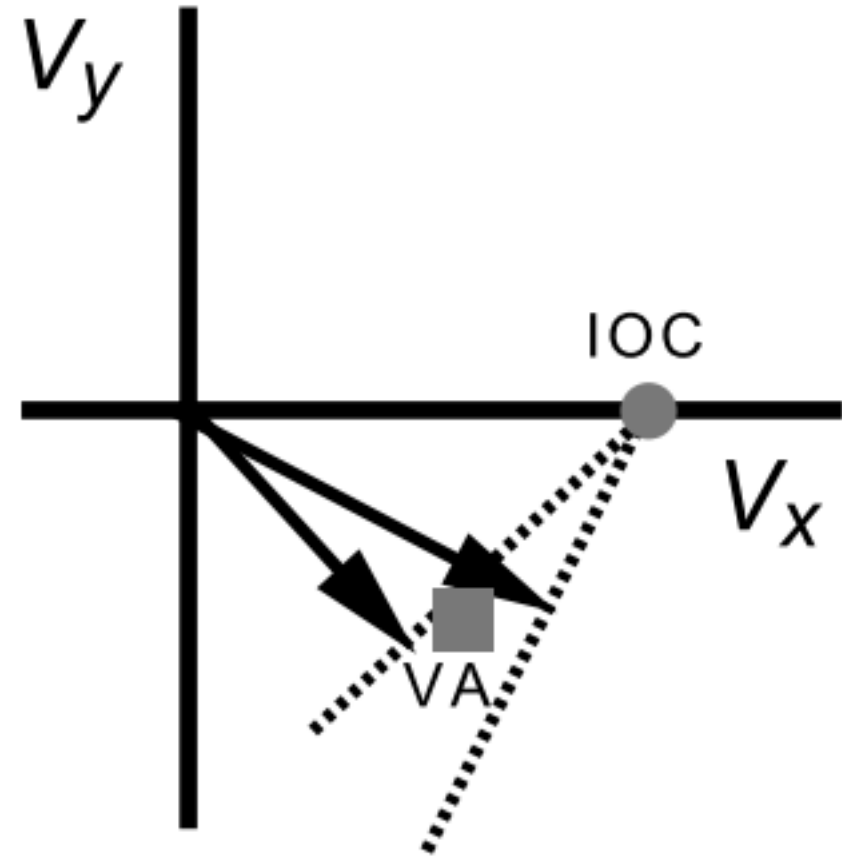


plaid stimulus





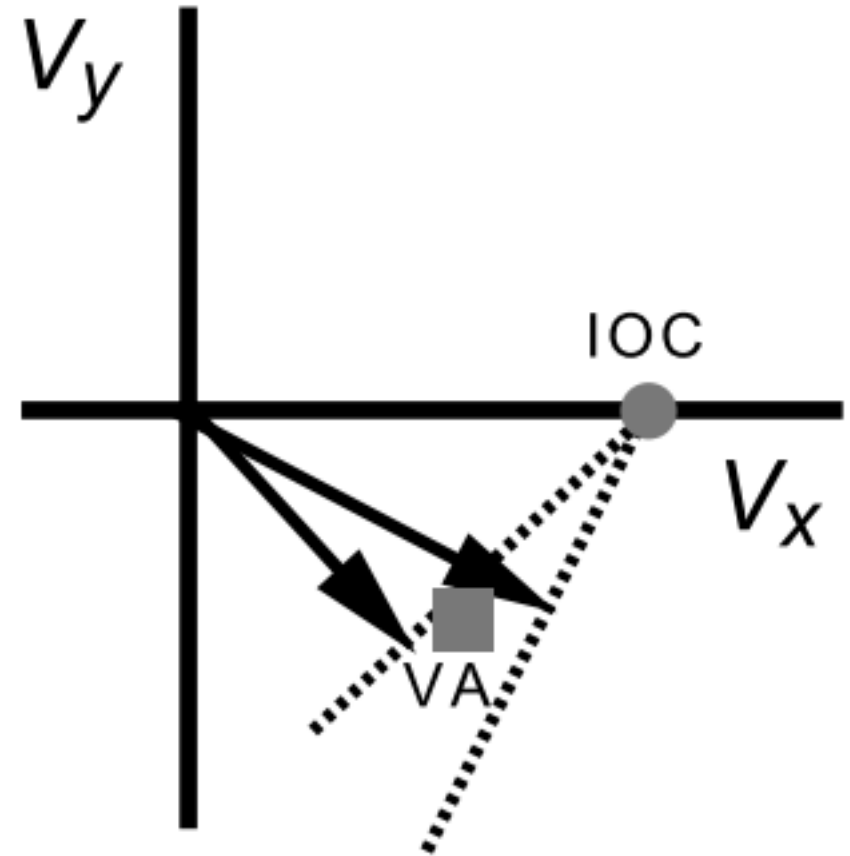
plaid stimulus



**intersection of constraints**



plaid stimulus



**intersection of constraints**

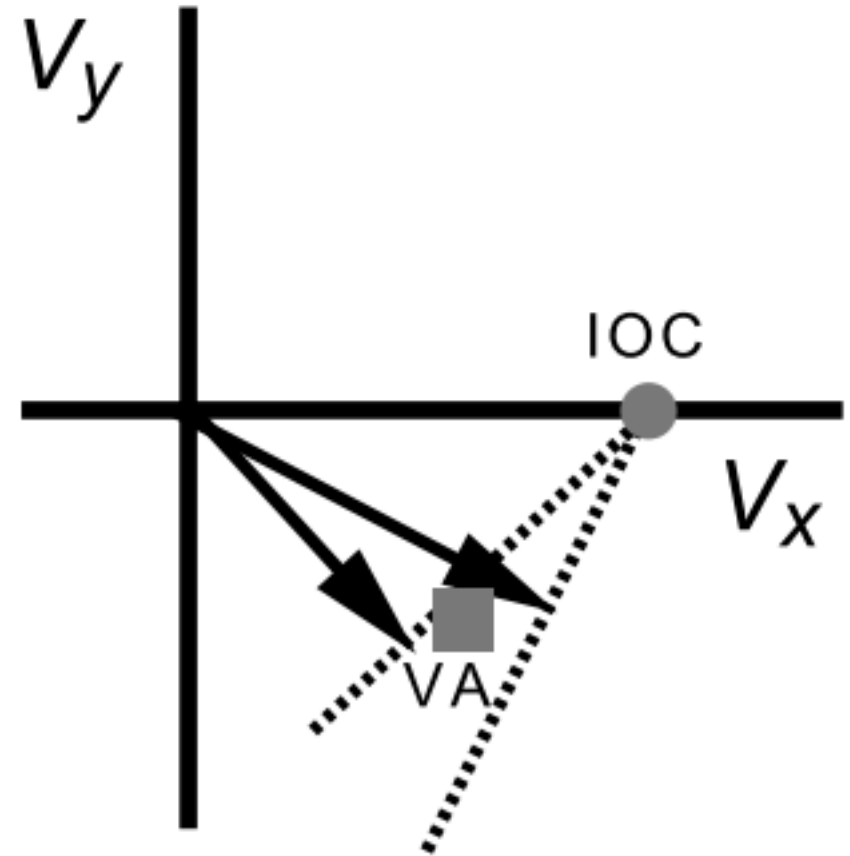
**vector average**

$$\frac{\mathbf{v}_{\perp}^{(1)} + \mathbf{v}_{\perp}^{(2)}}{2}$$





plaid stimulus



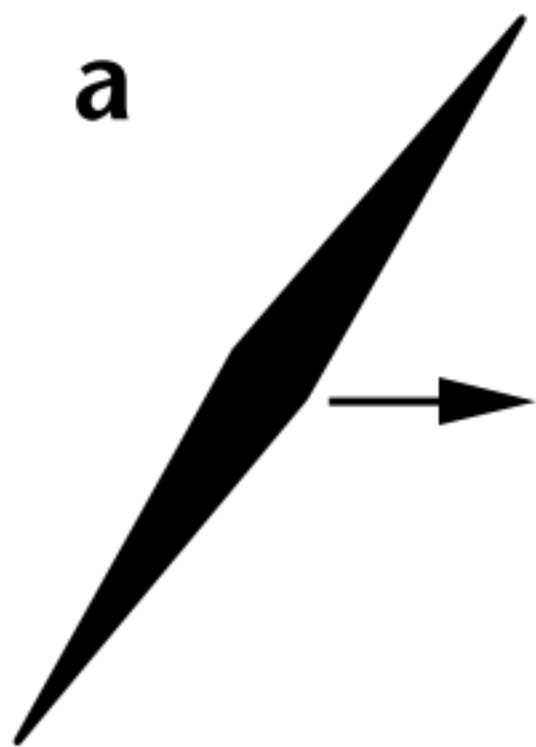
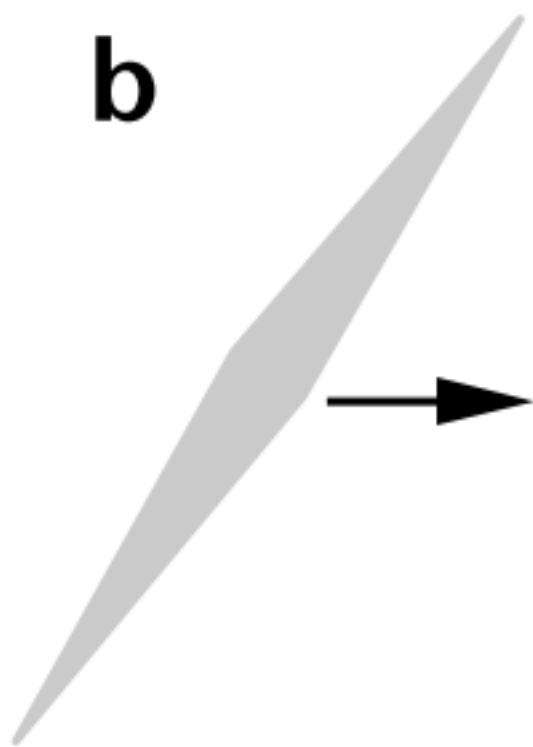
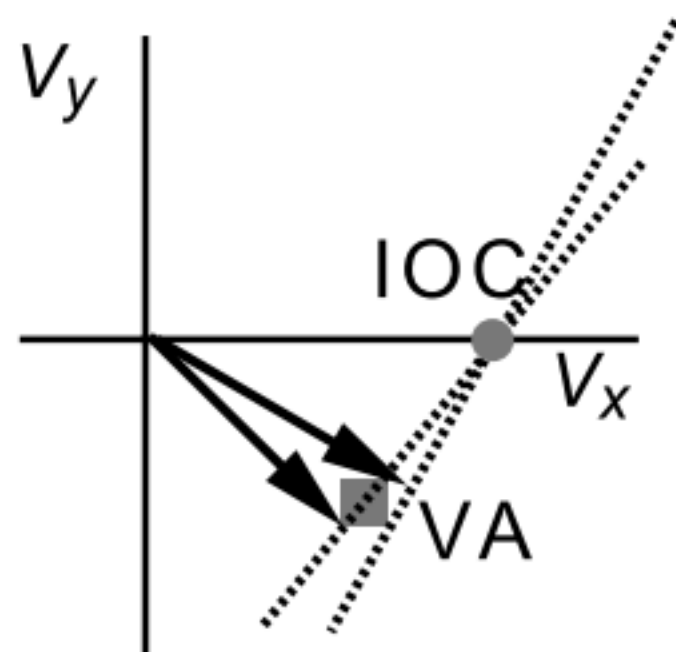
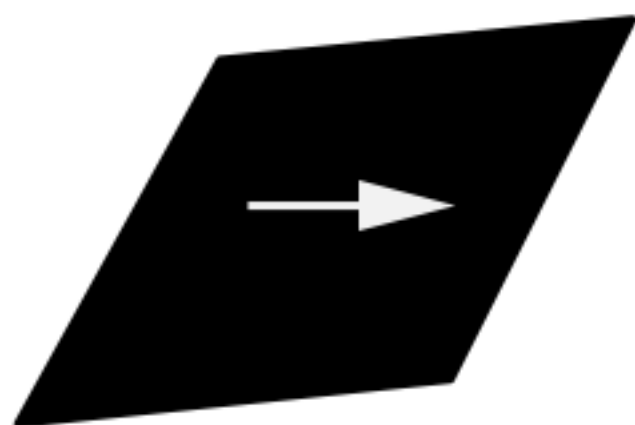
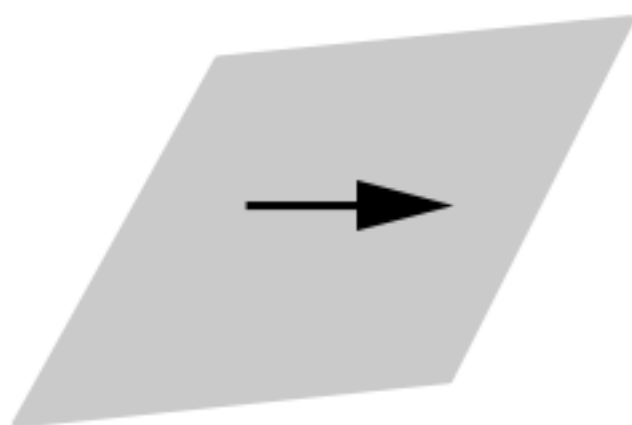
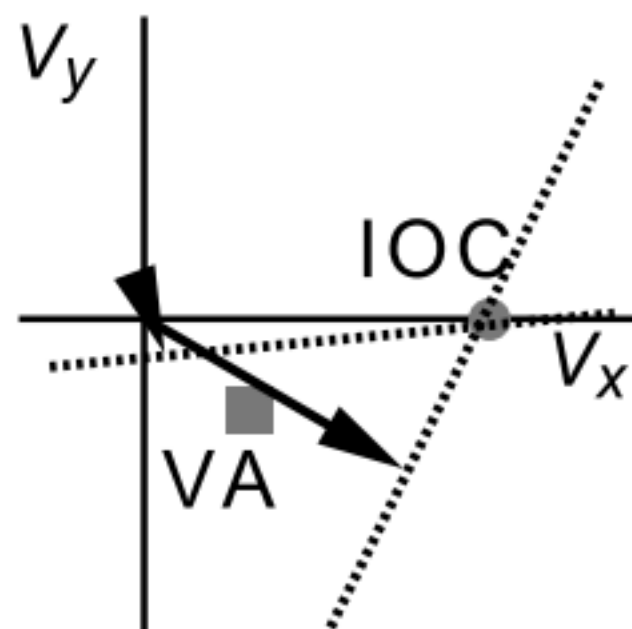
**intersection of constraints**

**vector average**

$$\frac{\mathbf{v}_{\perp}^{(1)} + \mathbf{v}_{\perp}^{(2)}}{2}$$

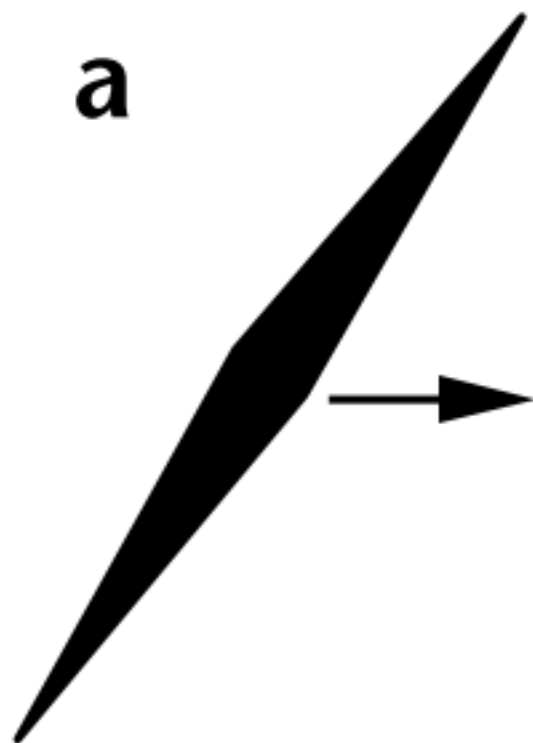
**feature tracking**

<http://www.cs.huji.ac.il/~yweiss/Rhombus>

**a****b****c****d****e****f**

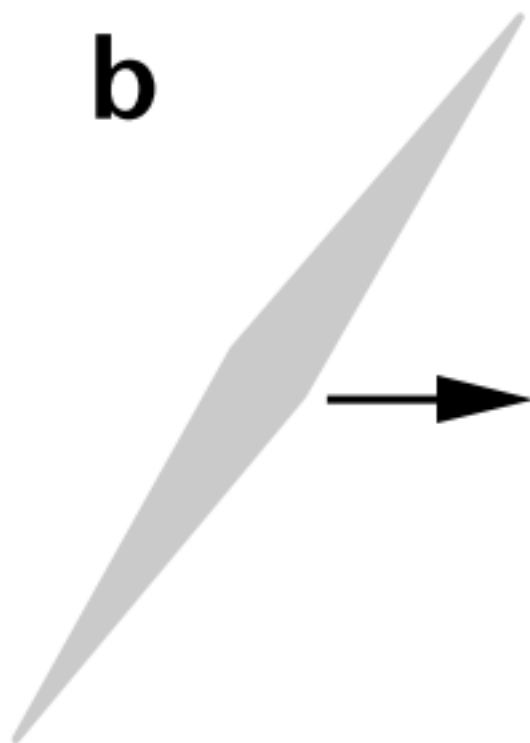
**IOC**

**a**

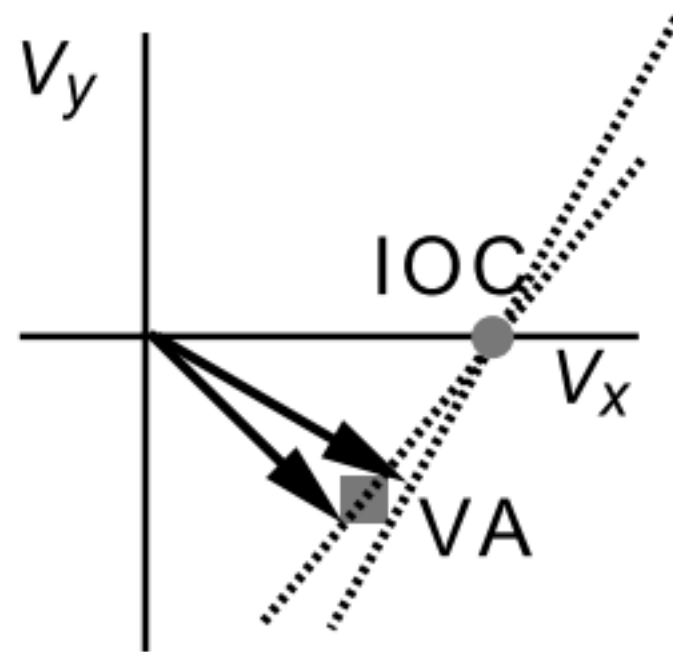


**VA**

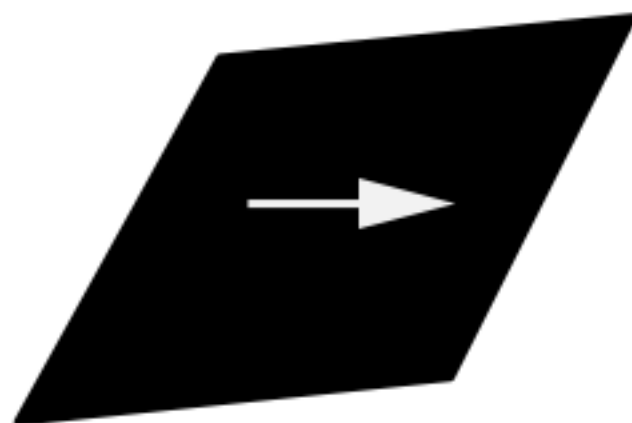
**b**



**c**

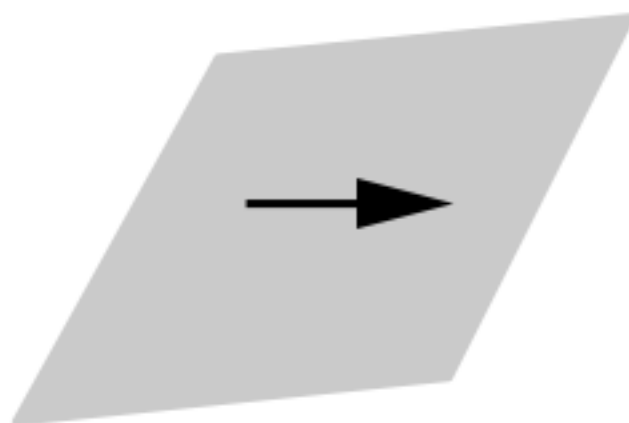


**d**



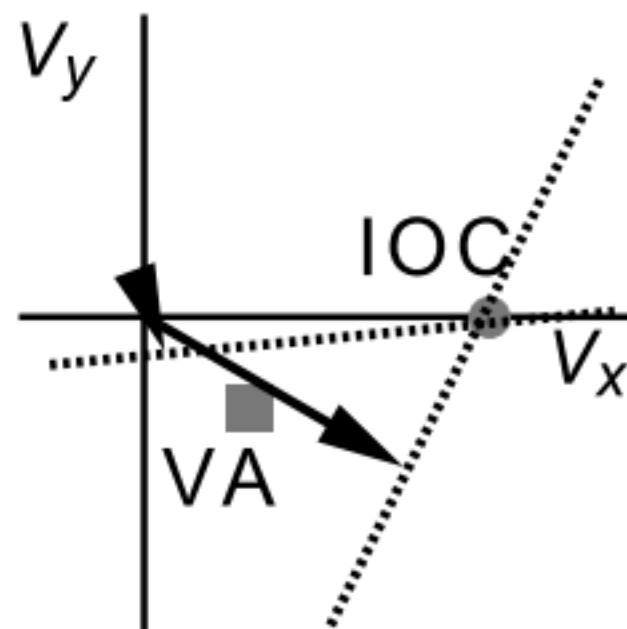
**IOC**

**e**



**IOC**

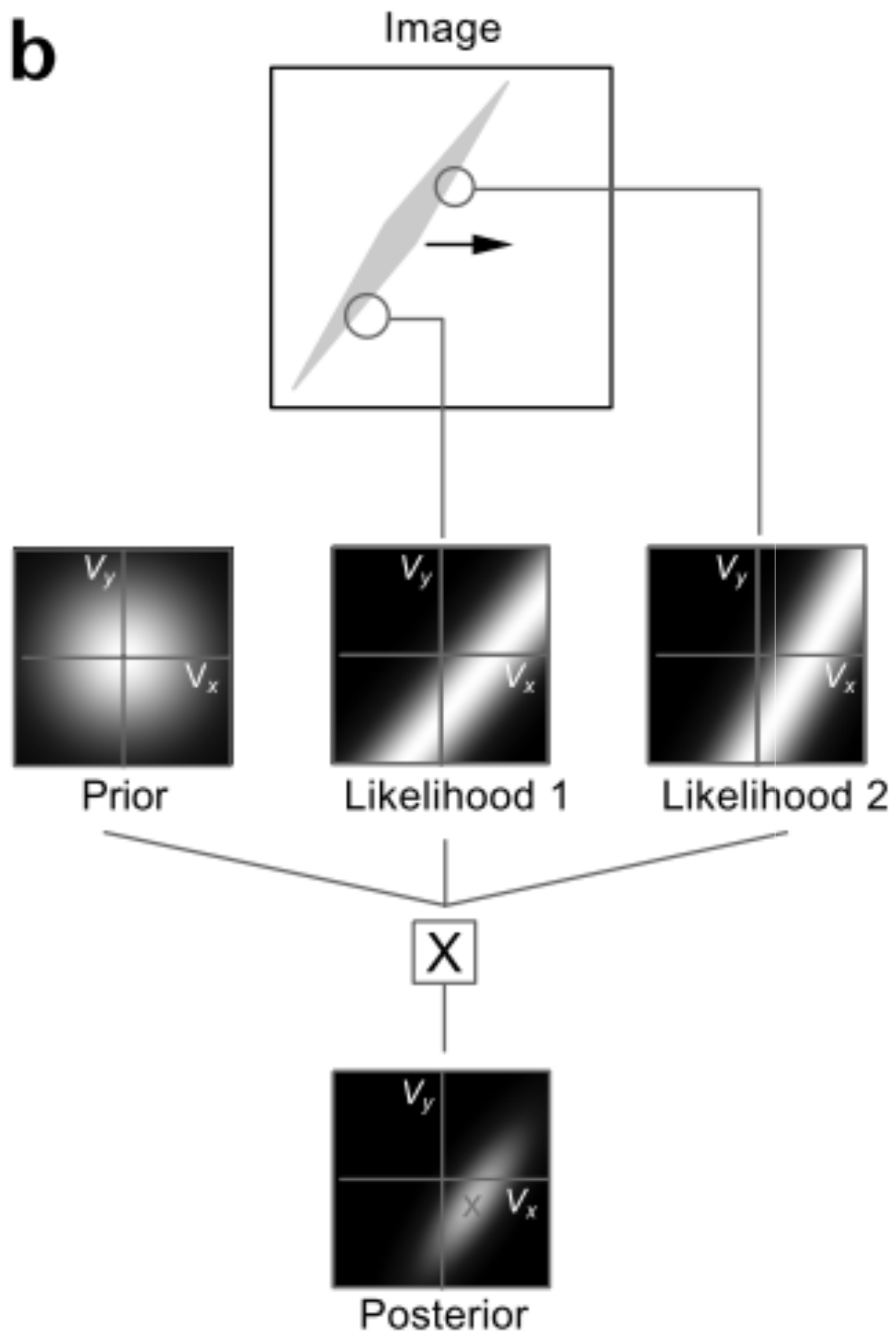
**f**

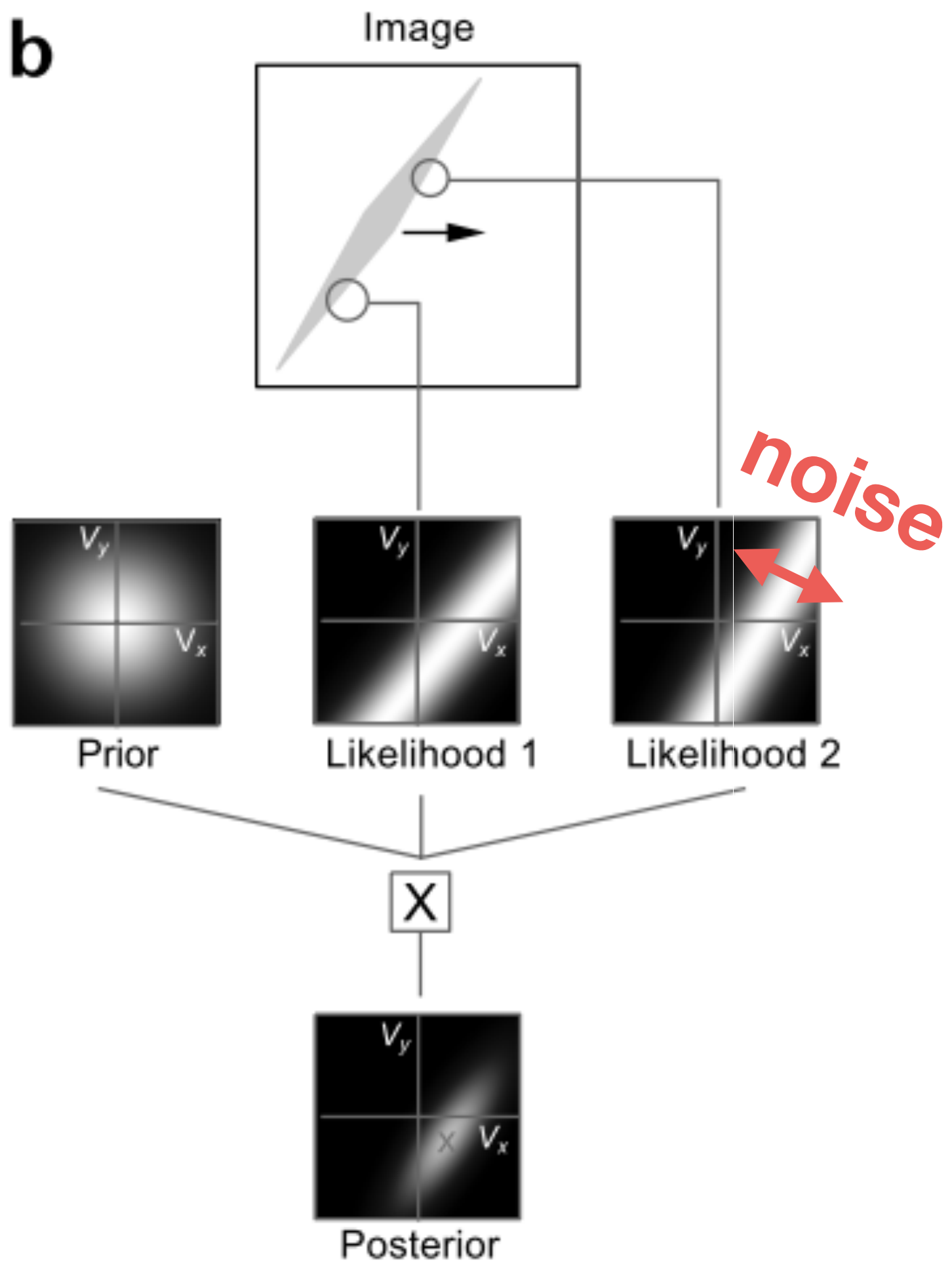


ideal observer model

# assumptions

- intensity conservation
- noisy measurements
- slow velocities prior

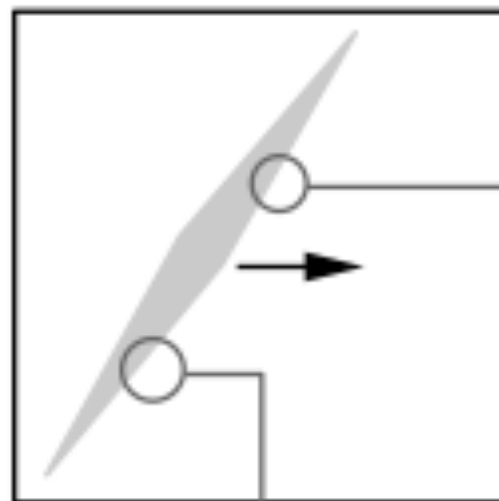
**b**

**b**

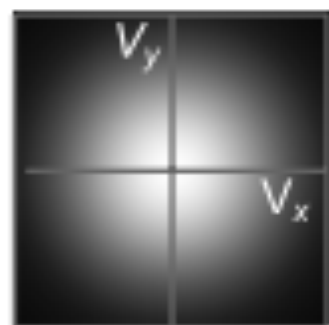


**b**

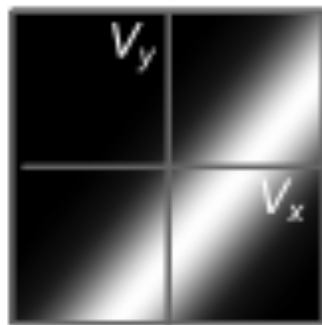
Image



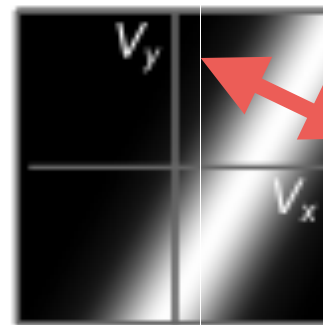
**slow  
speed  
prior**



Prior



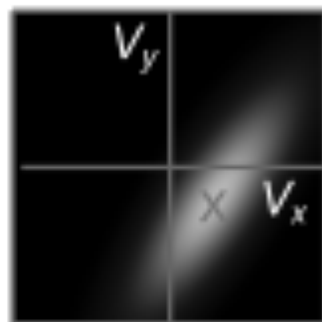
Likelihood 1



**noise**

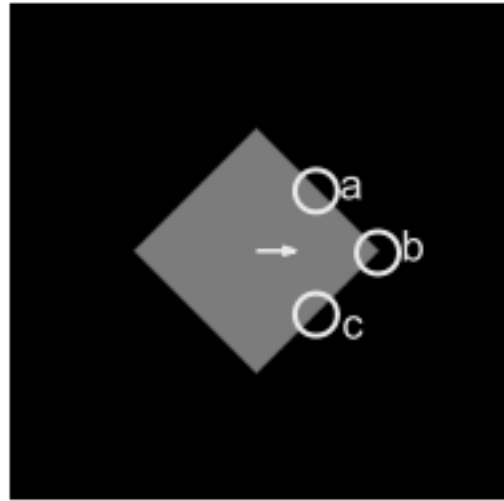
Likelihood 2

X

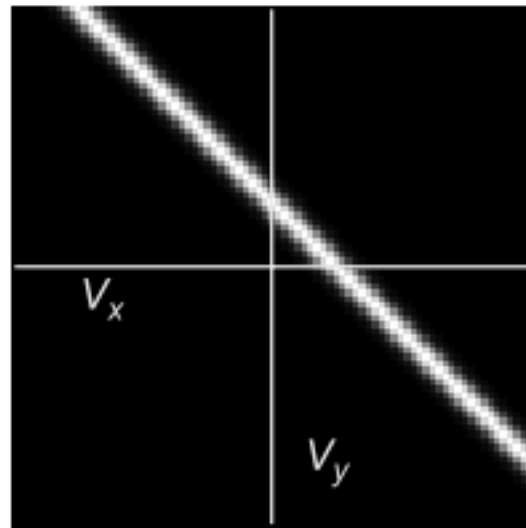


Posterior

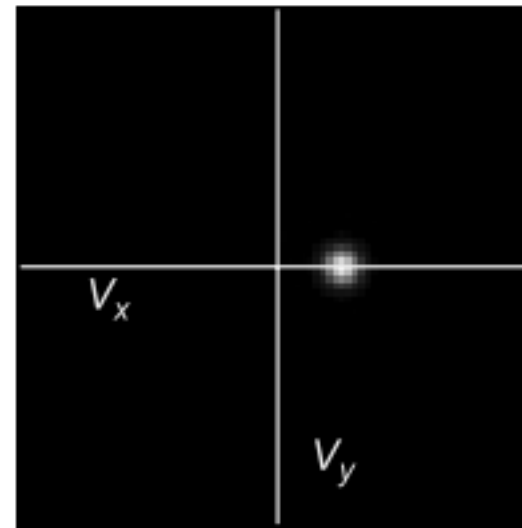
Stimulus



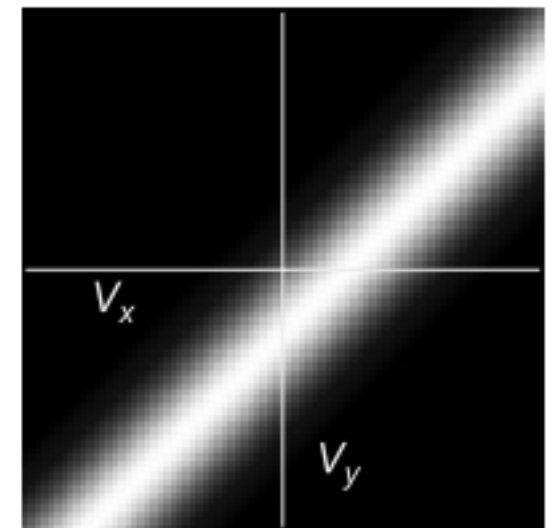
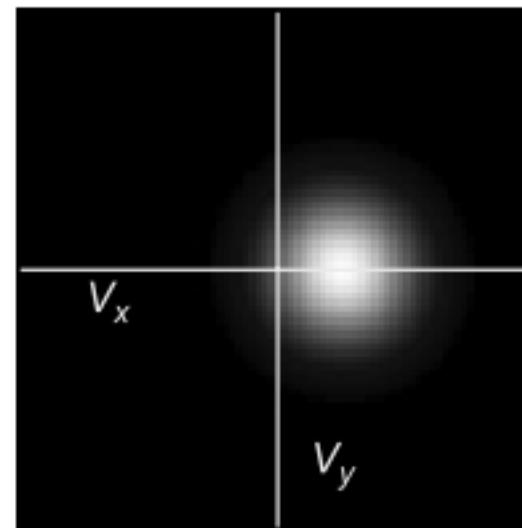
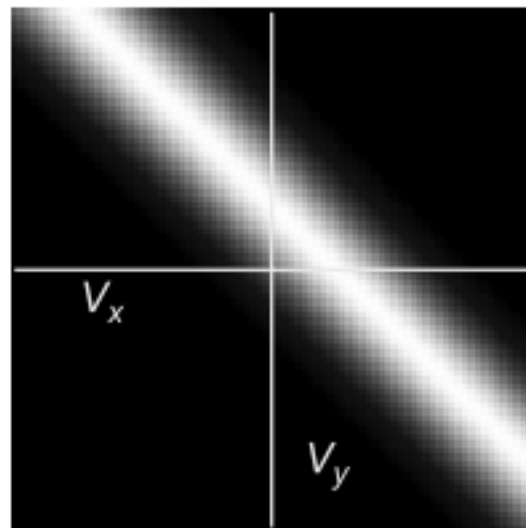
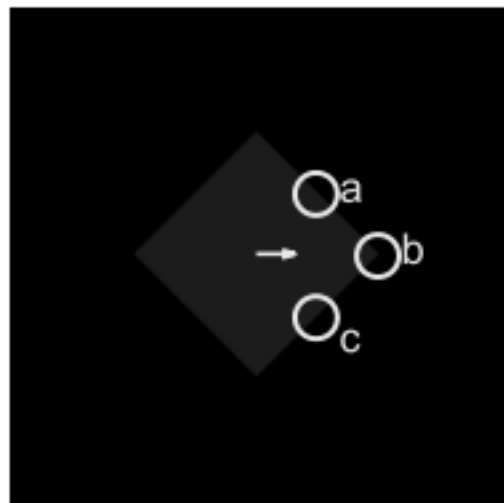
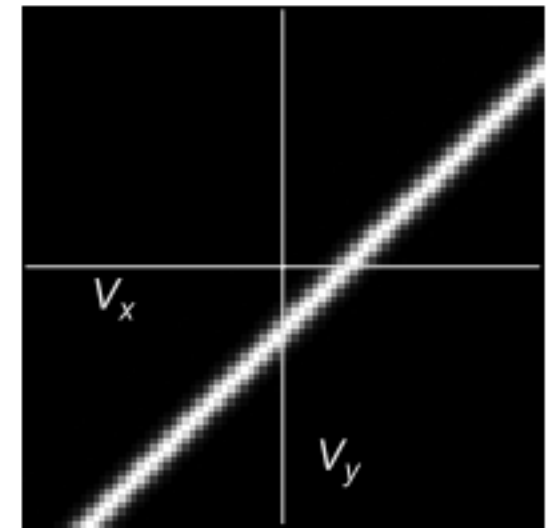
Likelihood  
at location a

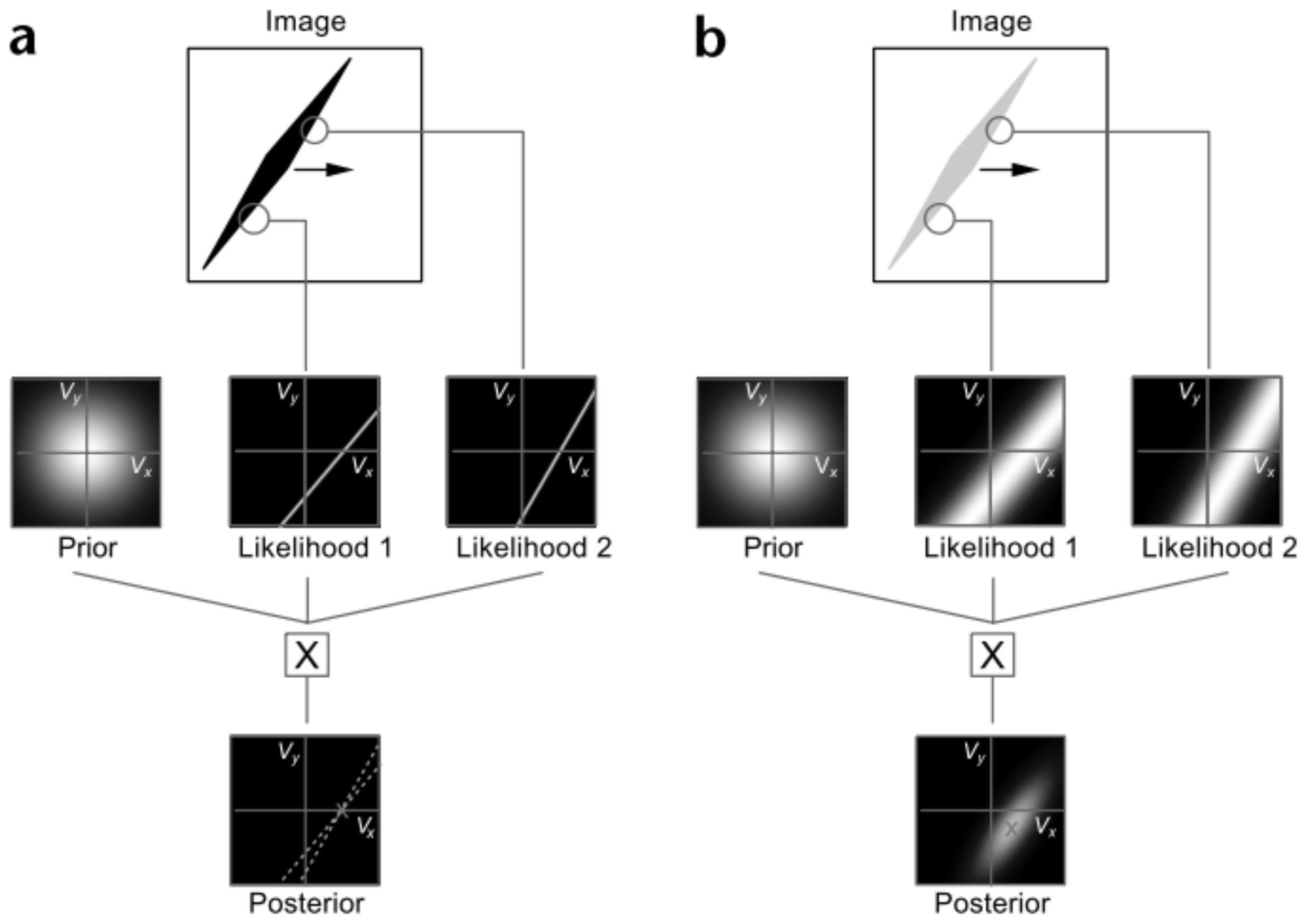


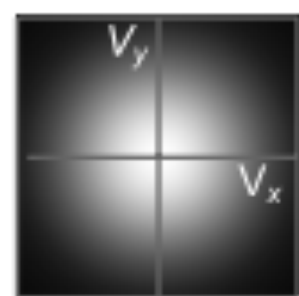
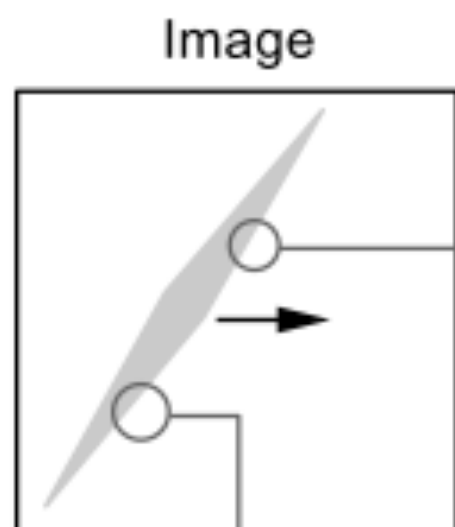
Likelihood  
at location b



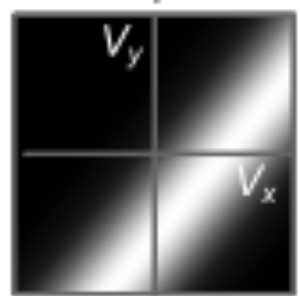
Likelihood  
at location c



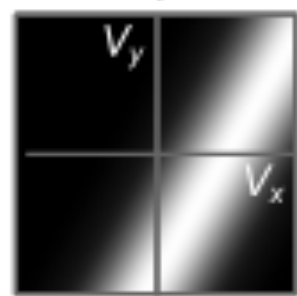


**b**

Prior

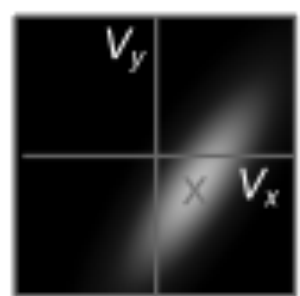


Likelihood 1

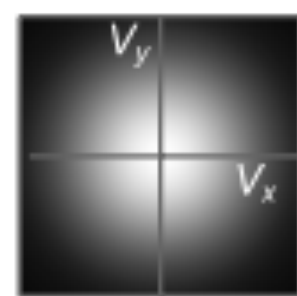
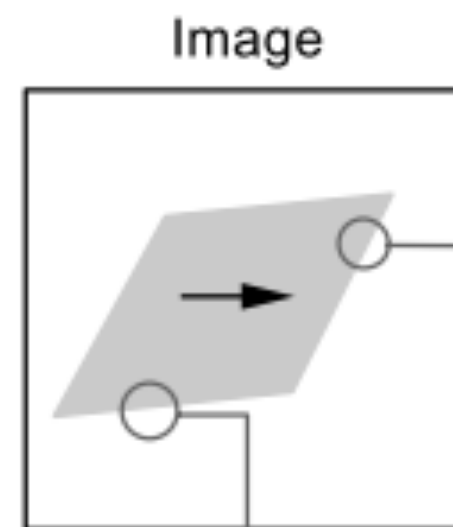


Likelihood 2

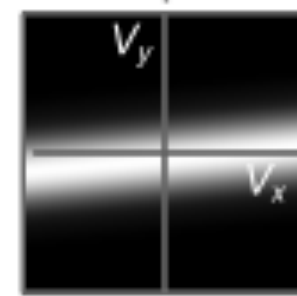
X



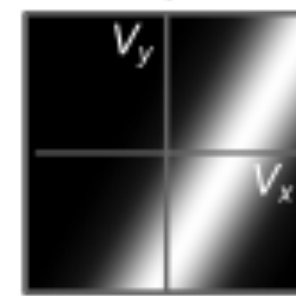
Posterior

**c**

Prior

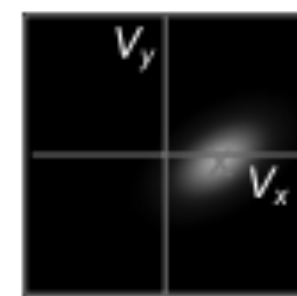


Likelihood 1



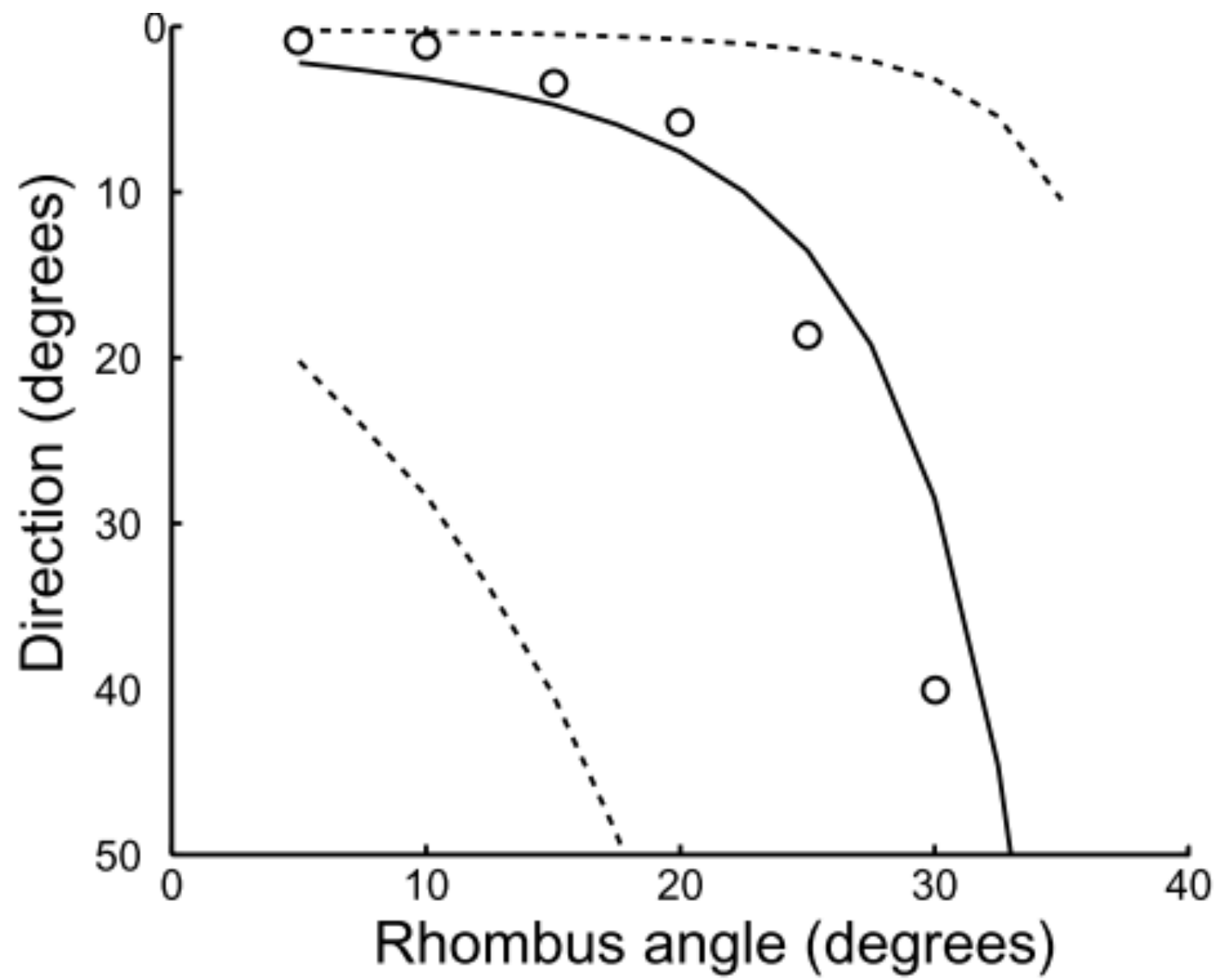
Likelihood 2

X

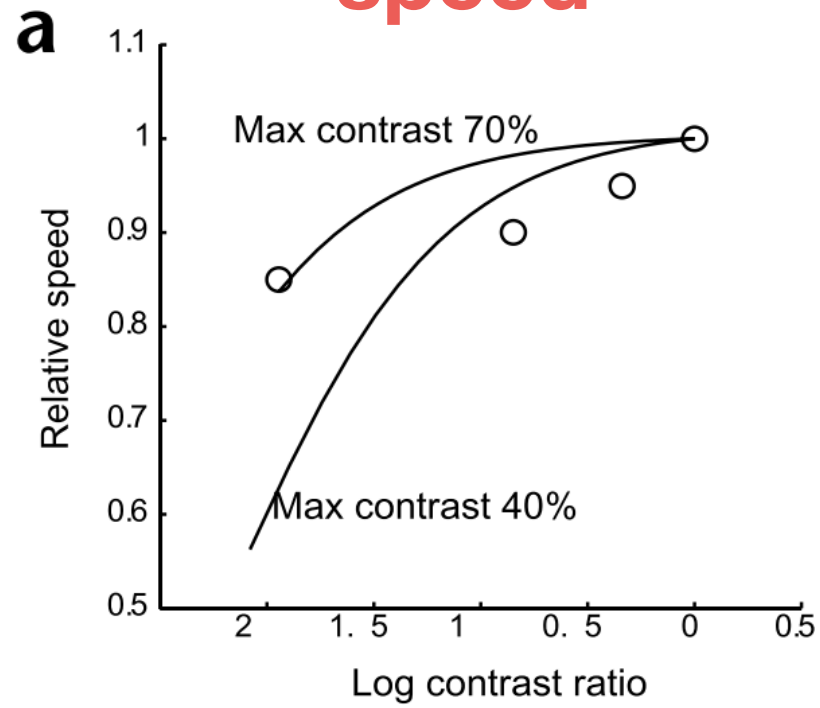


Posterior

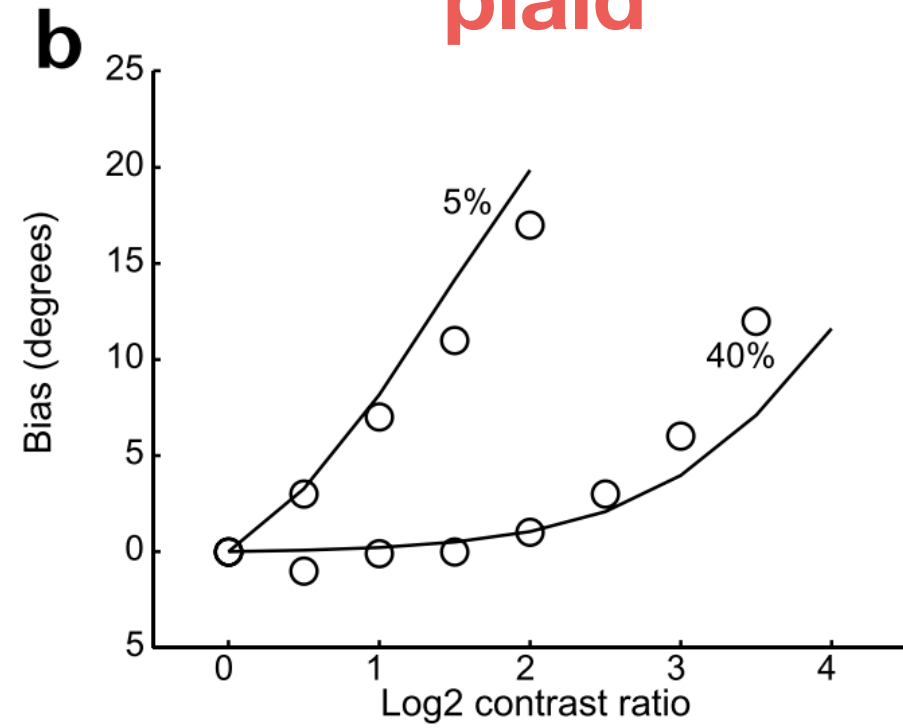
hood 2



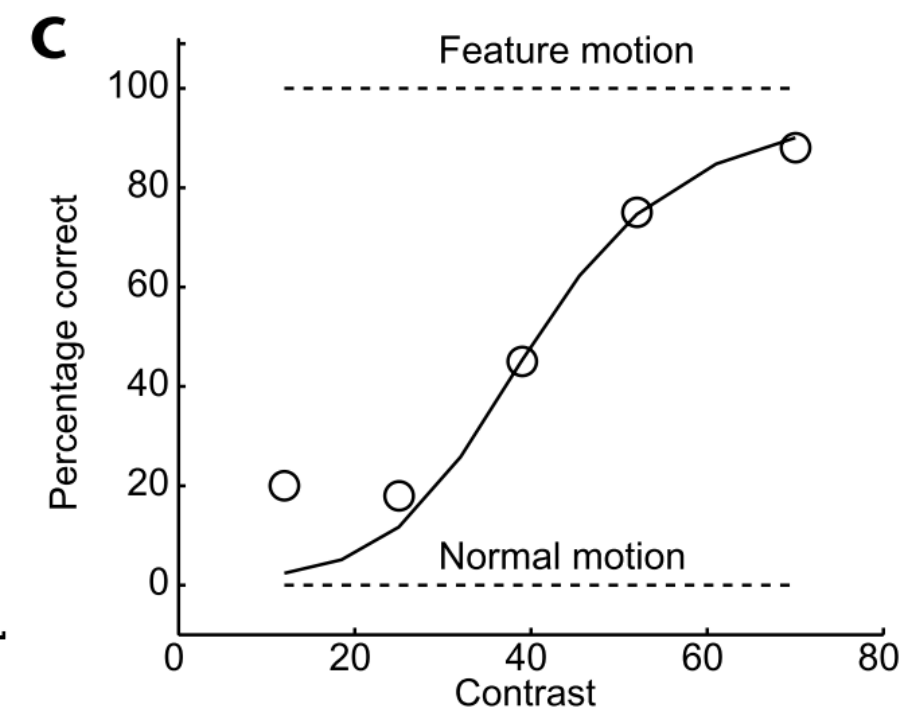
# grating speed

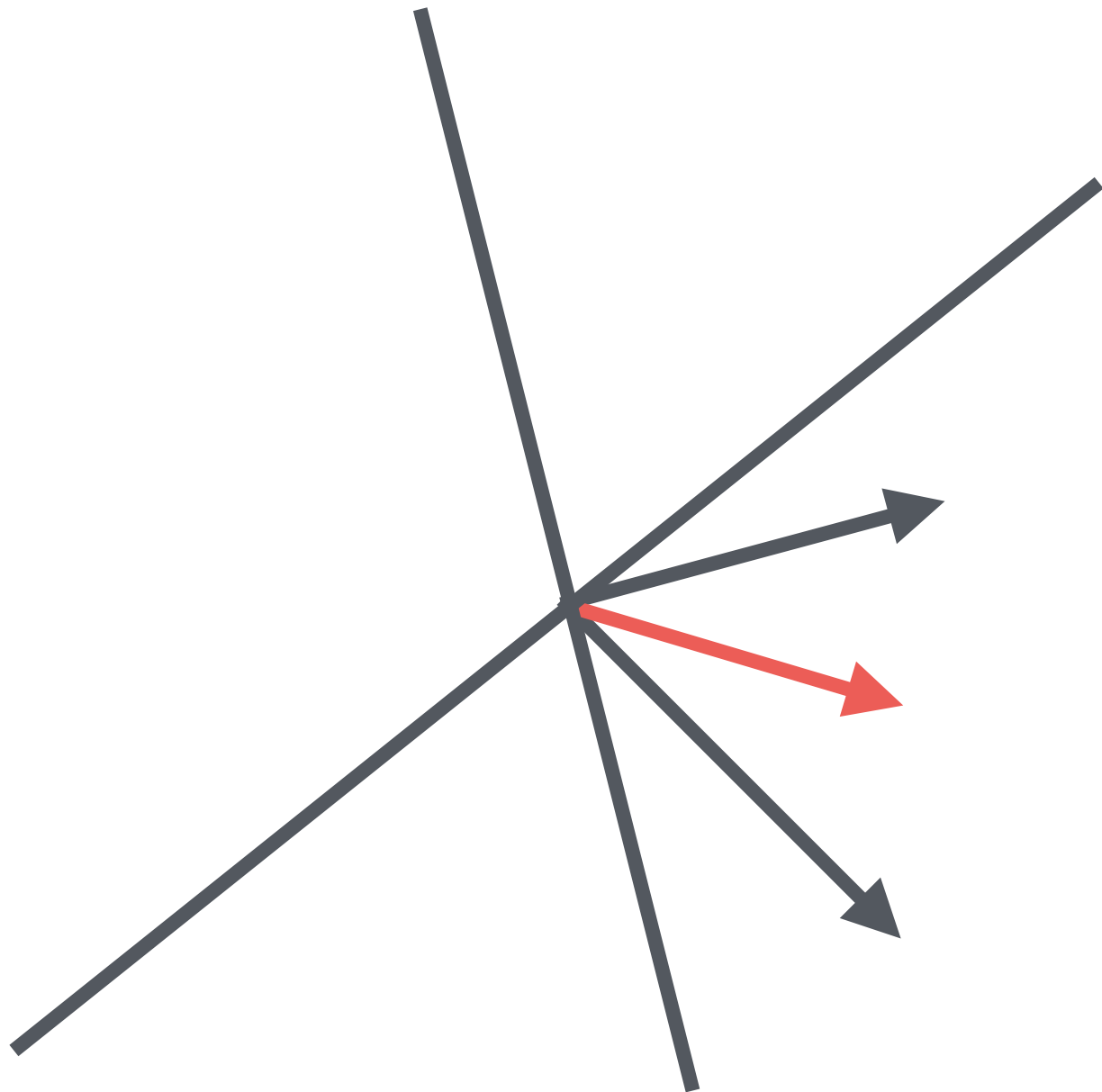


# contrast of plaid

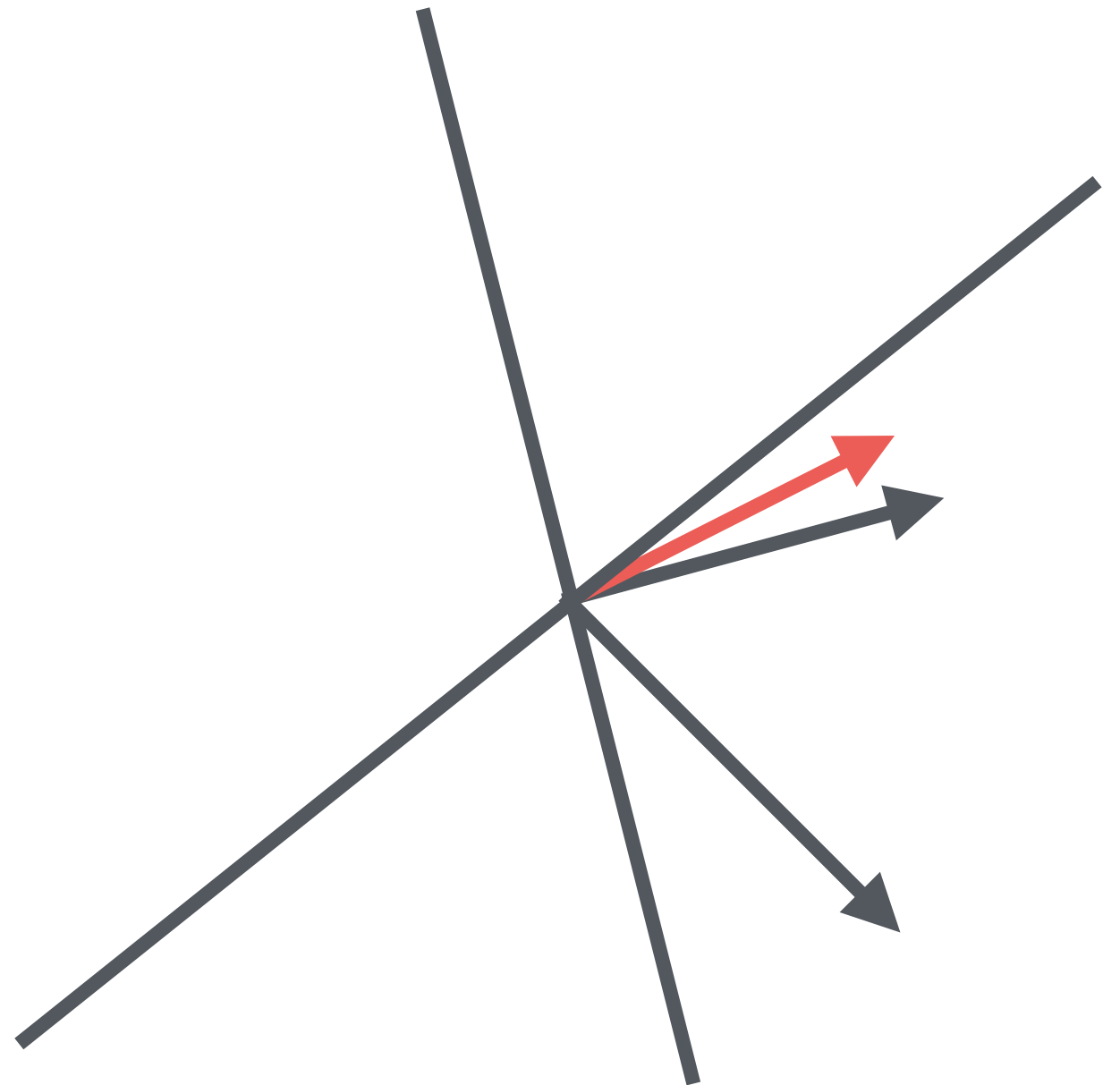


# line



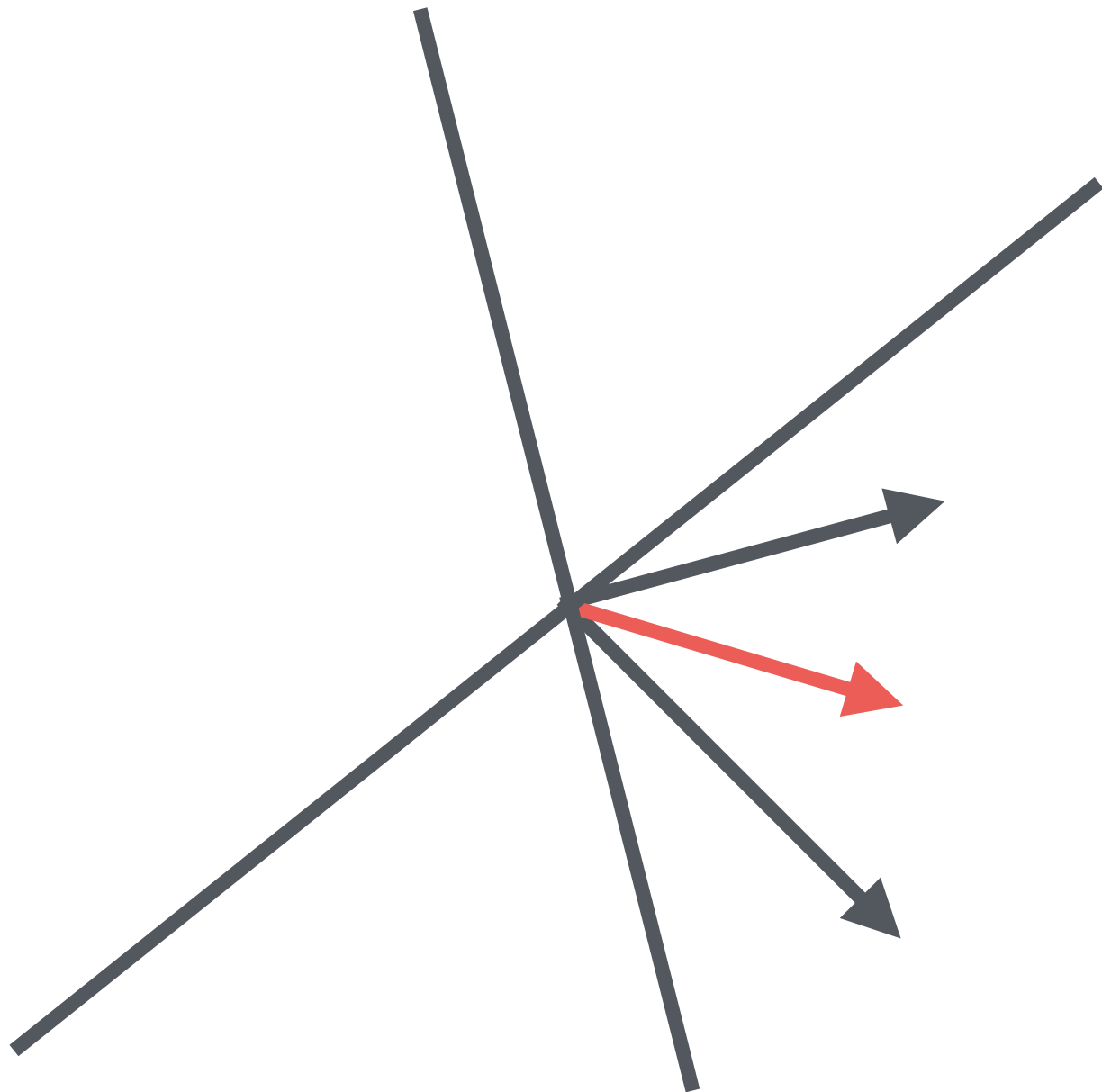


**type I**

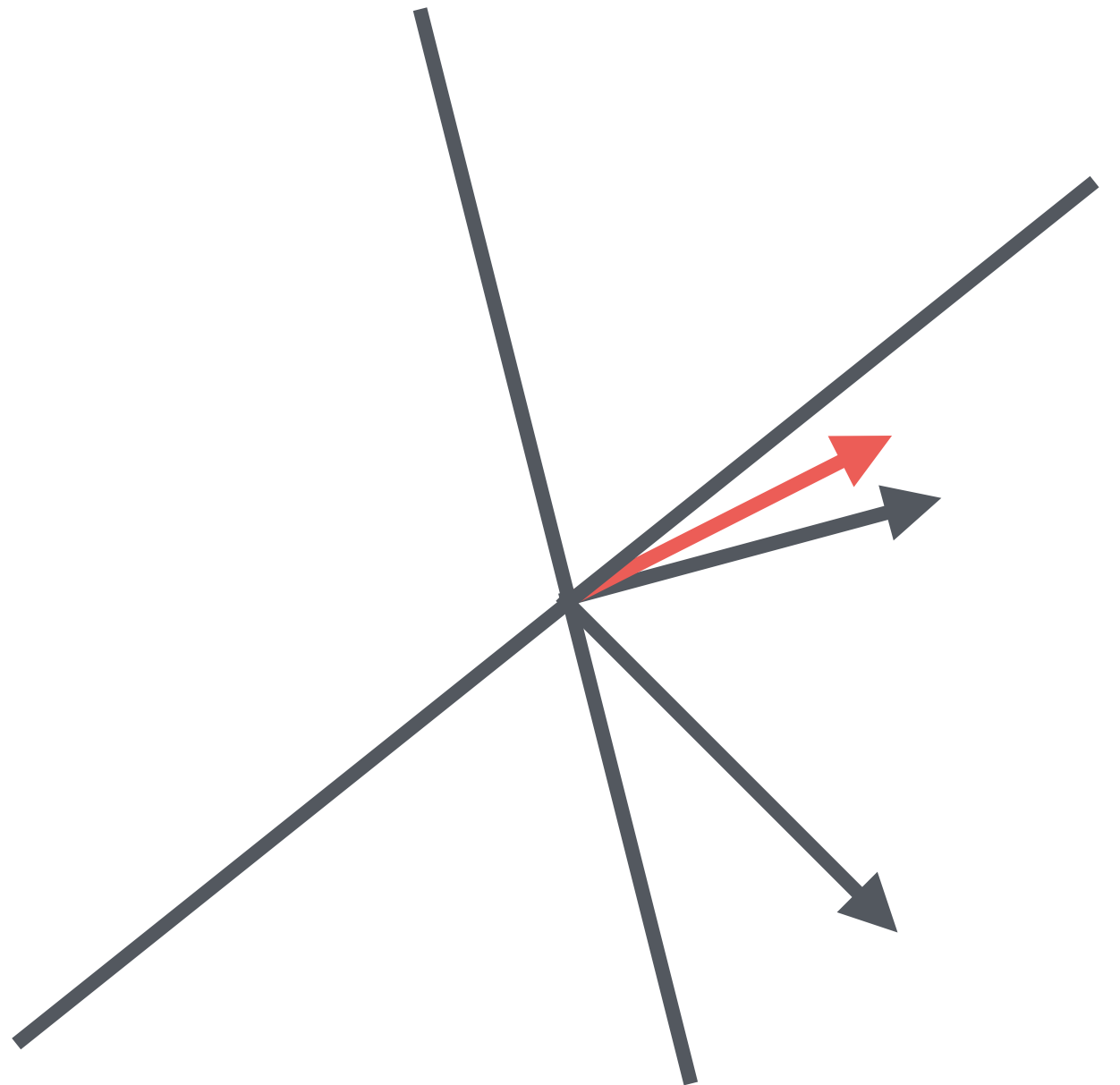


**type II**

plaids



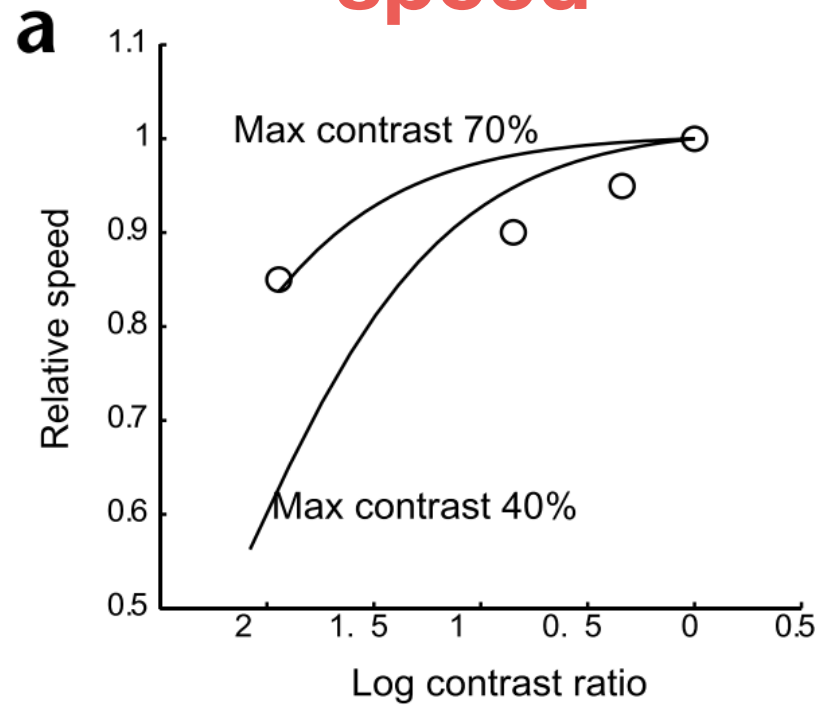
**type I**  
veridical



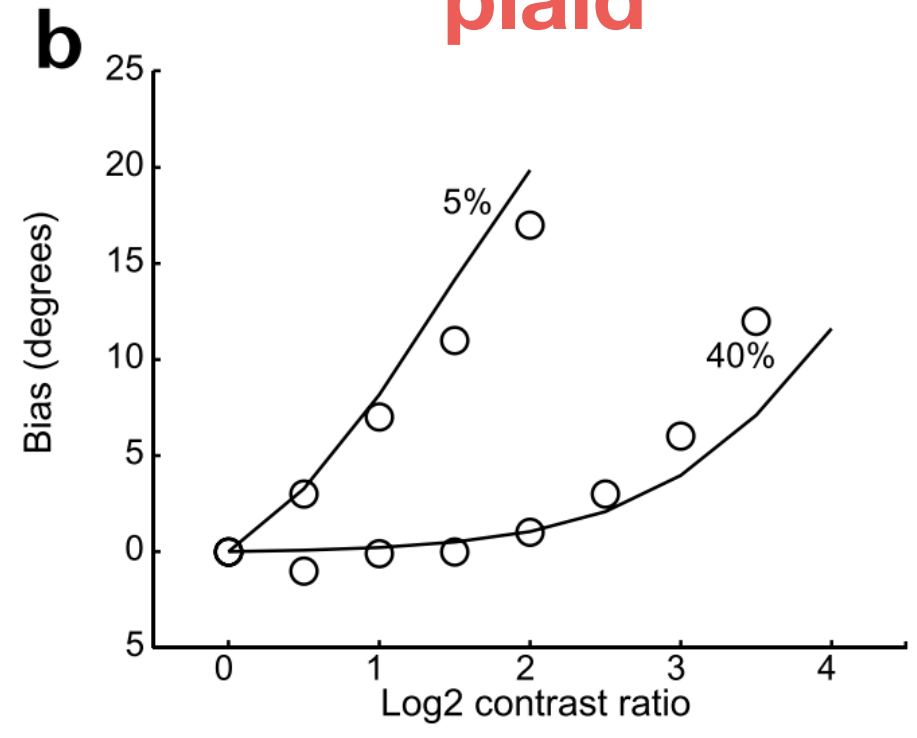
**type II**  
VA at low contrast



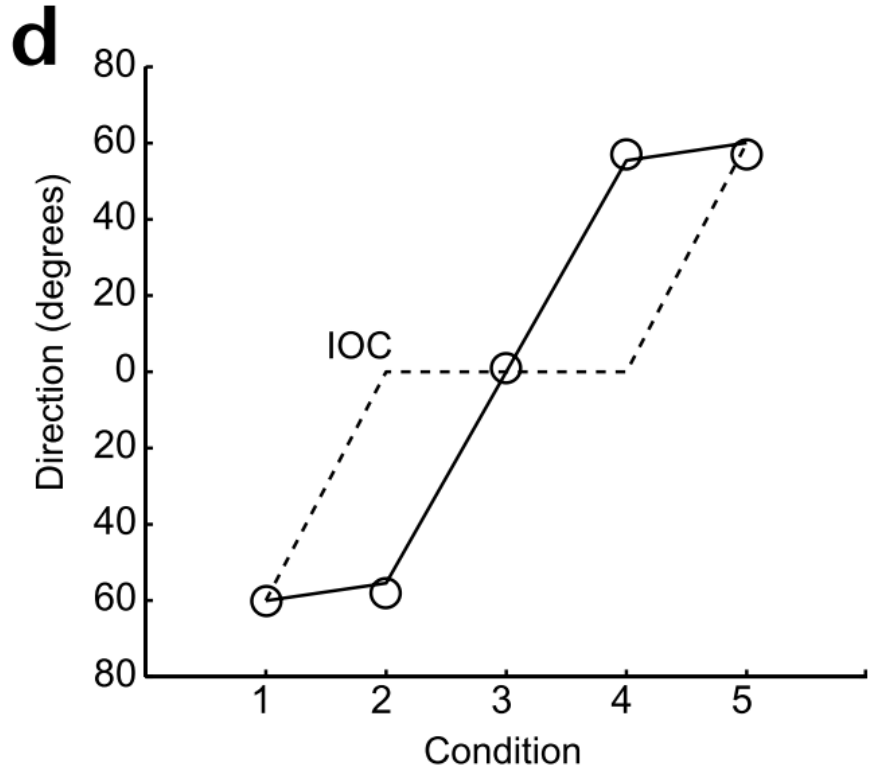
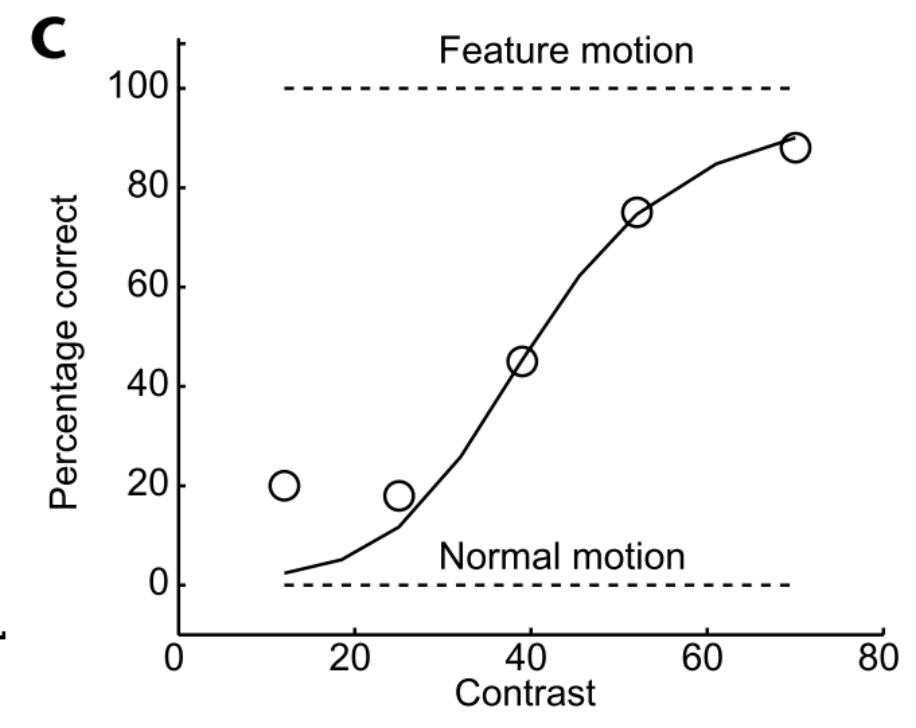
# grating speed



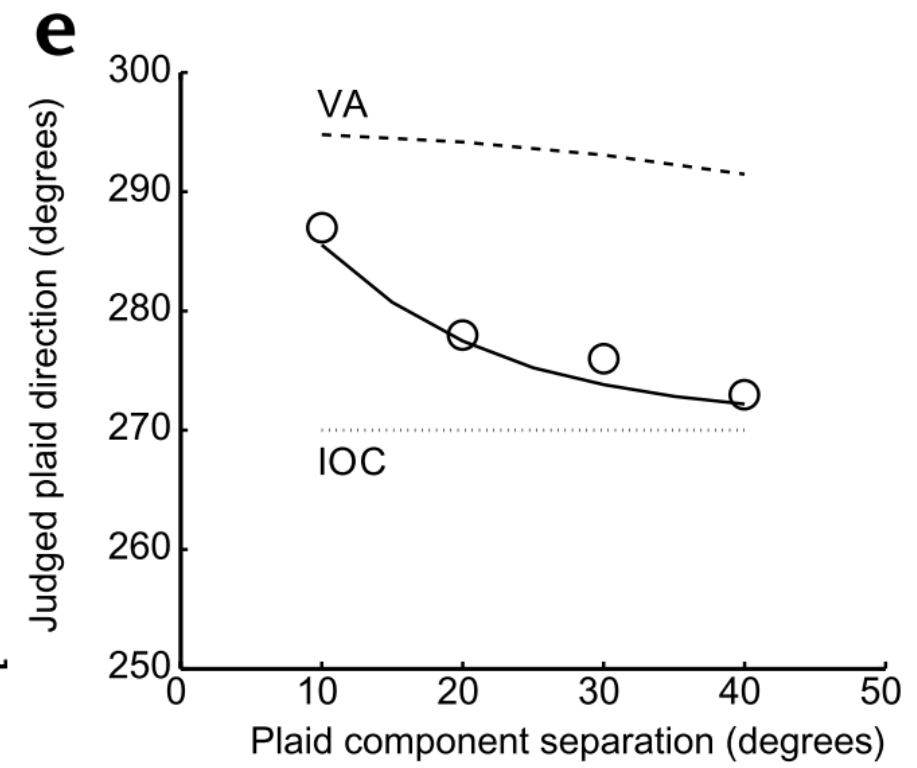
# contrast of plaid



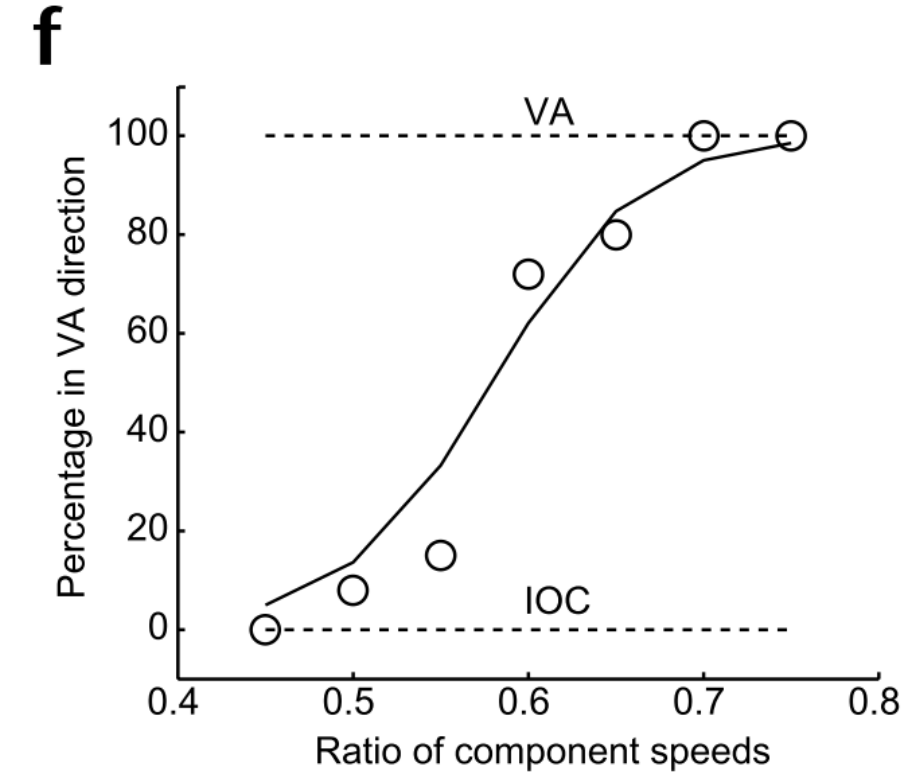
# line



# type I vs II plaid



# rel. orientation of type II plaid



# speed of type II plaid

Laptop by Olivier Guin from The Noun Project