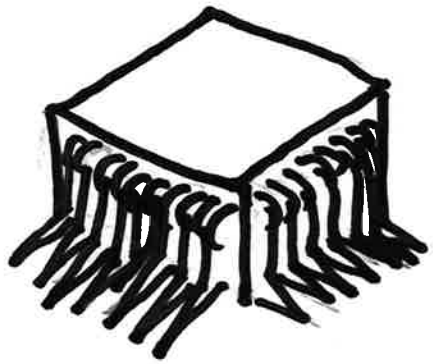
HUMAN ENGINEERING

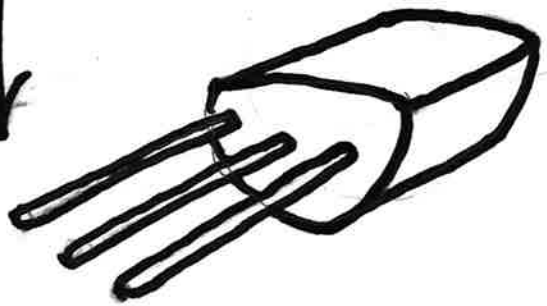
NATURAL SYSTEM

coarse grained

$\mathbb{E}[\cdot]$

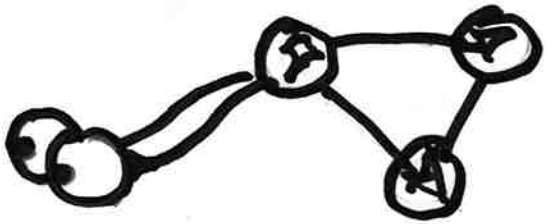
$\mathrm{Var}[\cdot]$

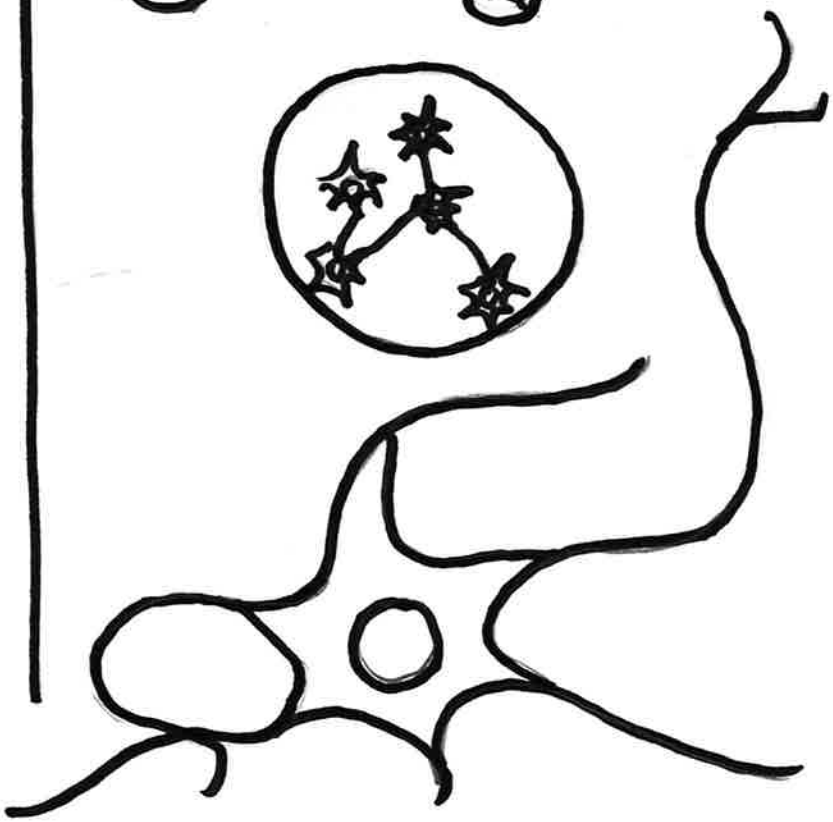


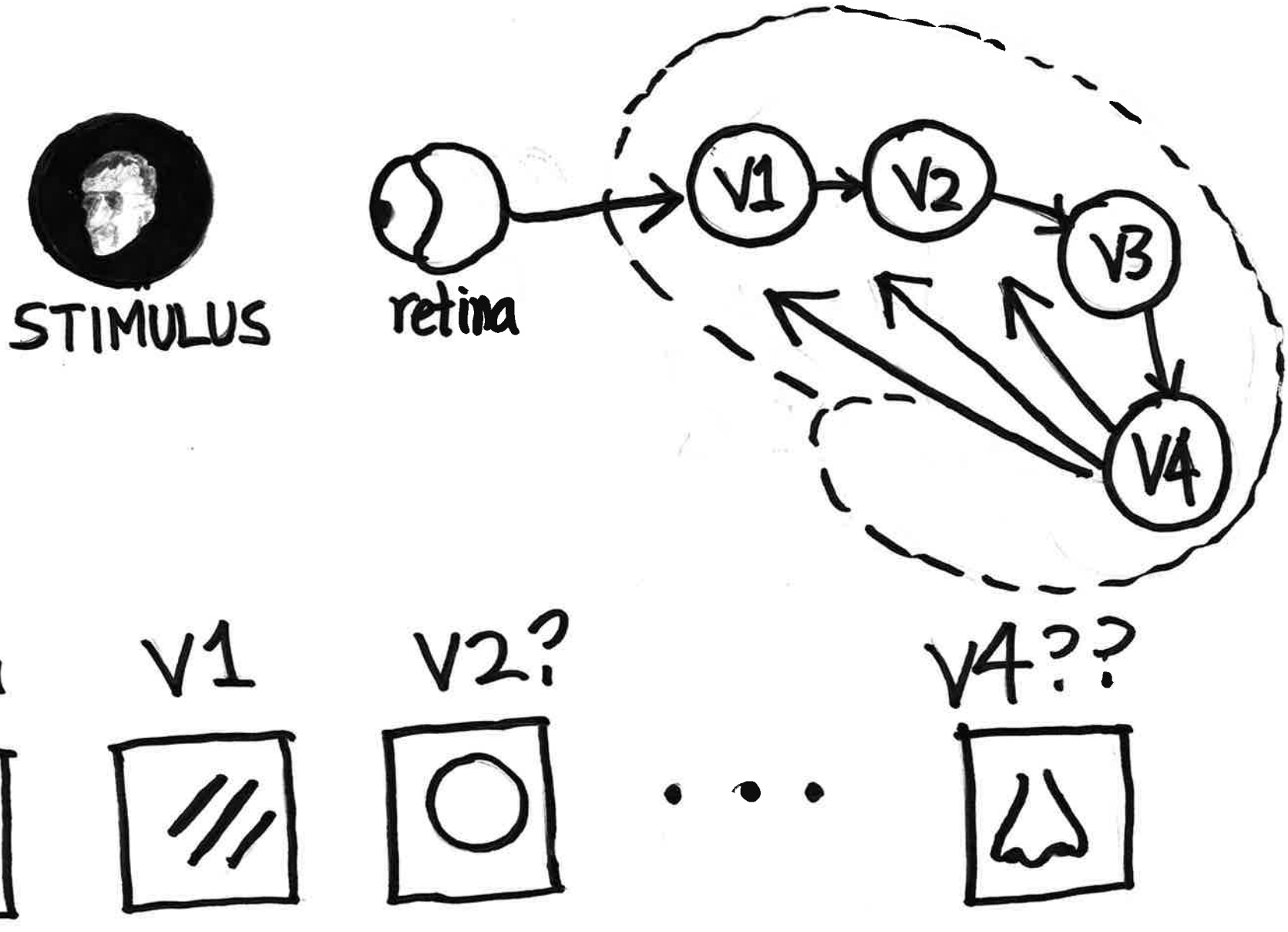


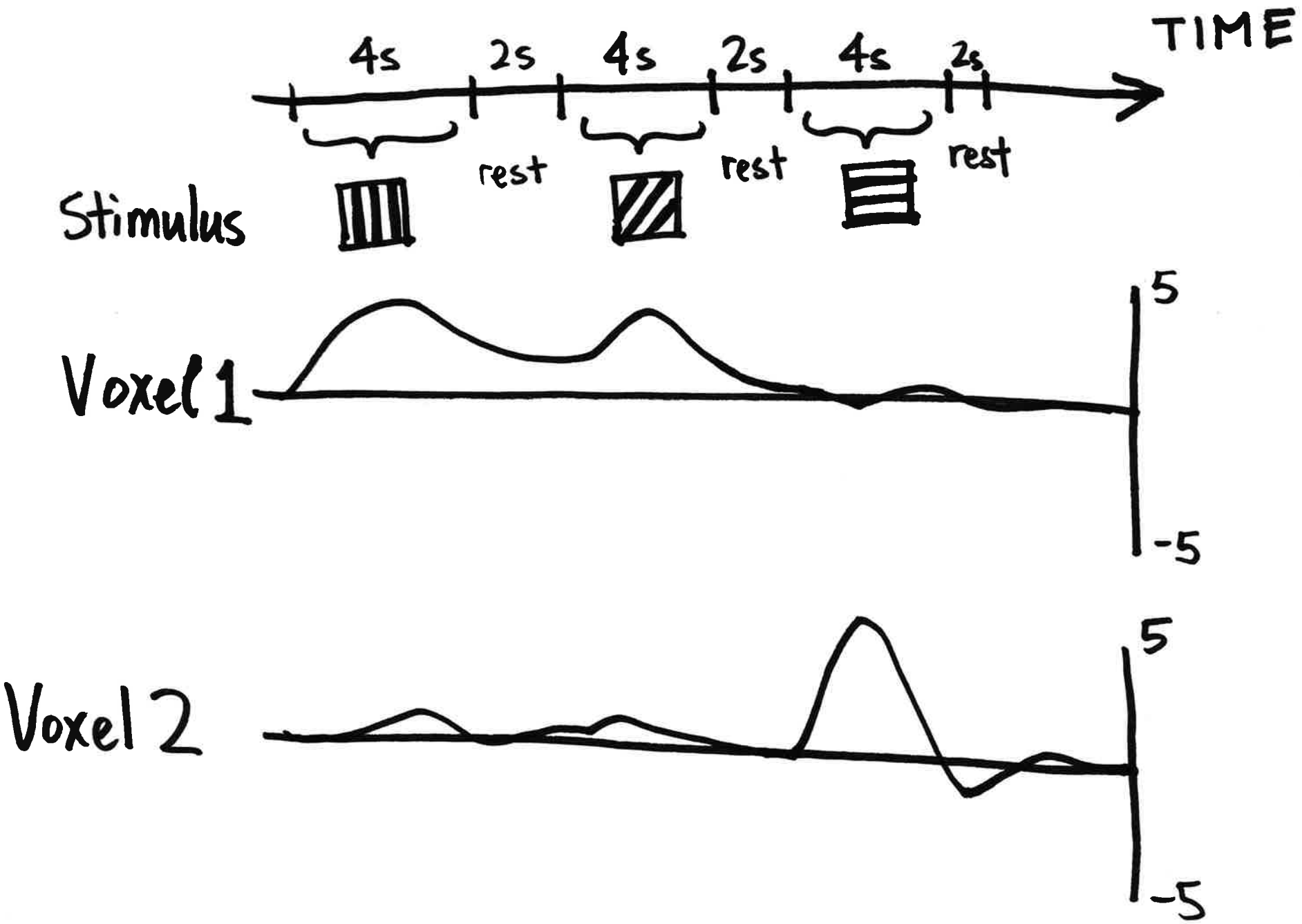
fine grained

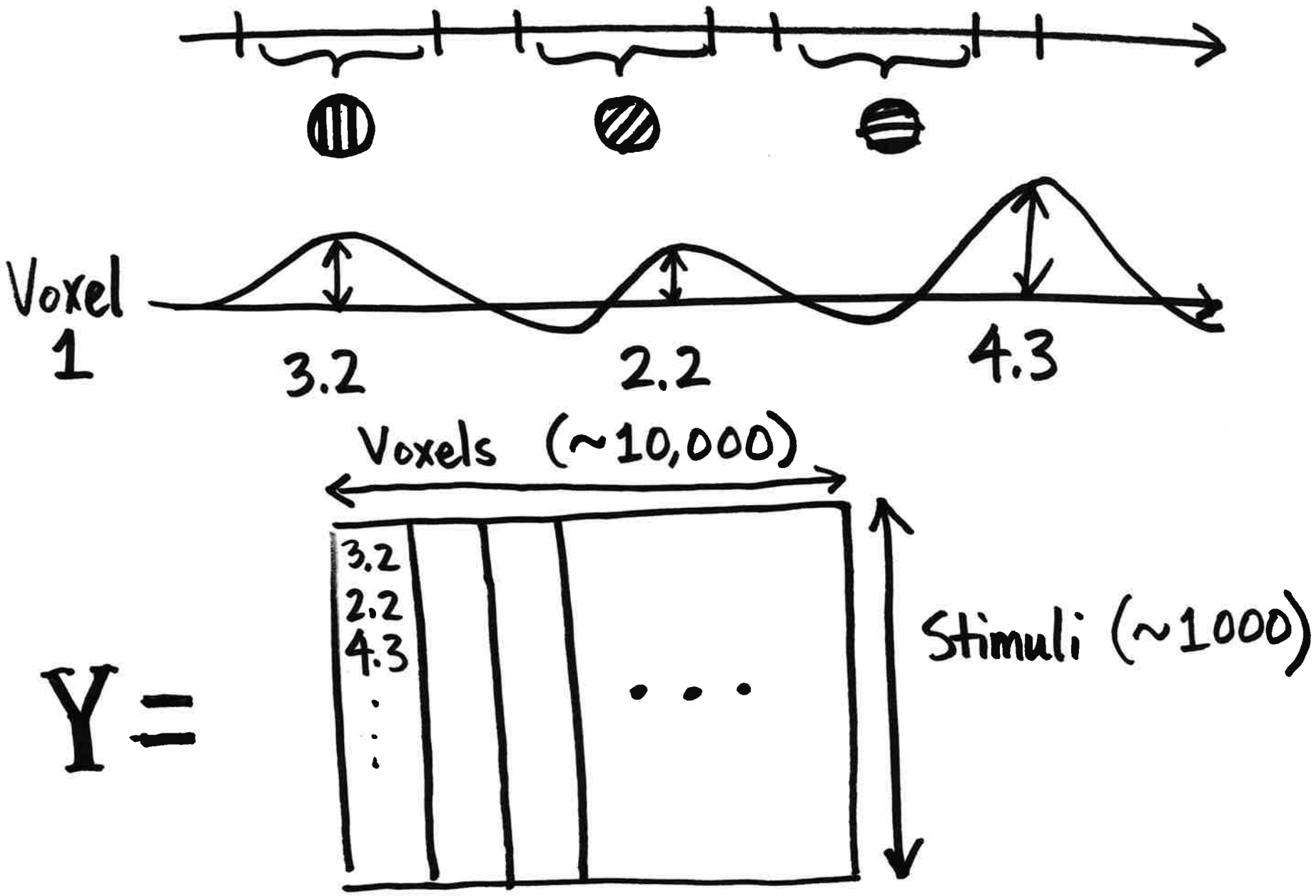
$\frac{dx}{dt} = f(x)$

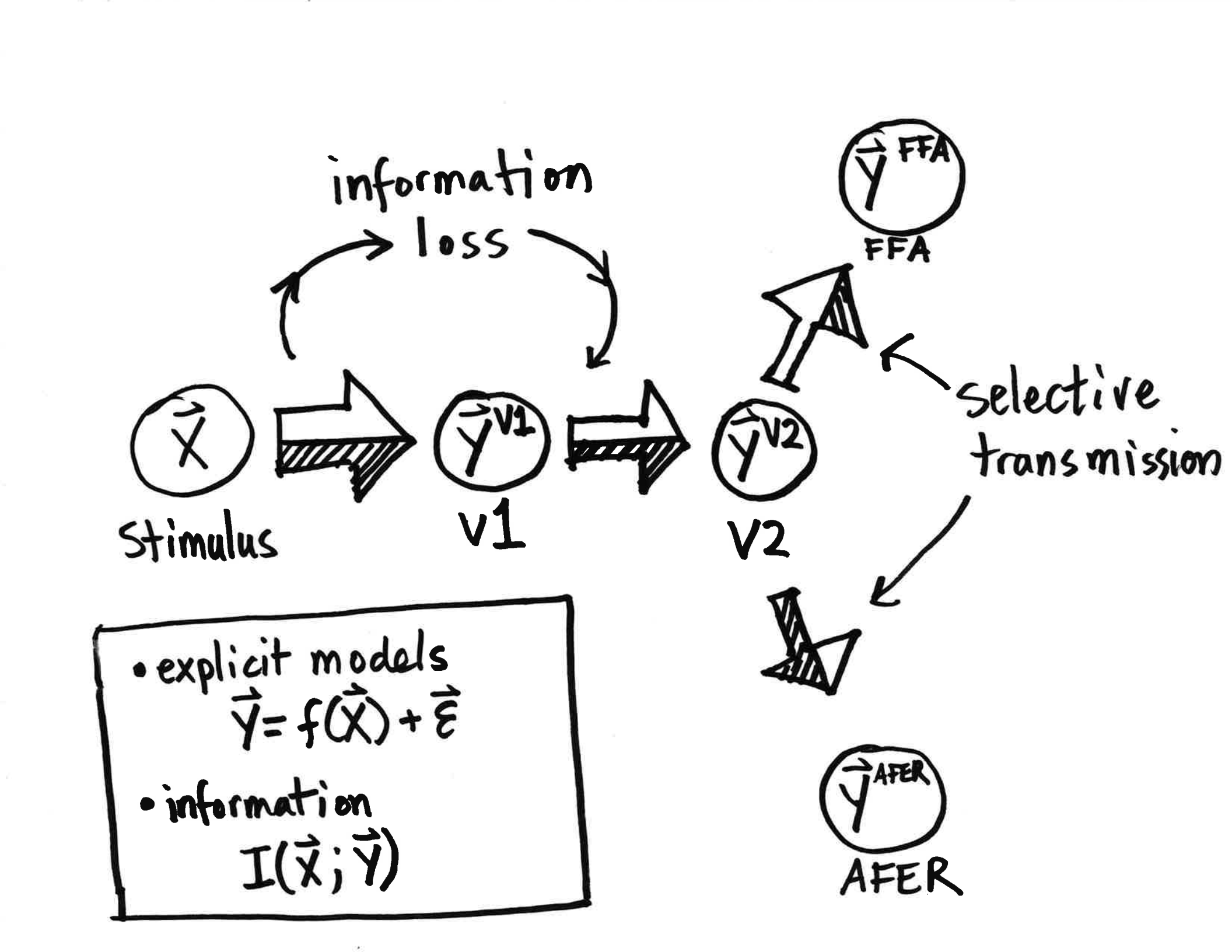




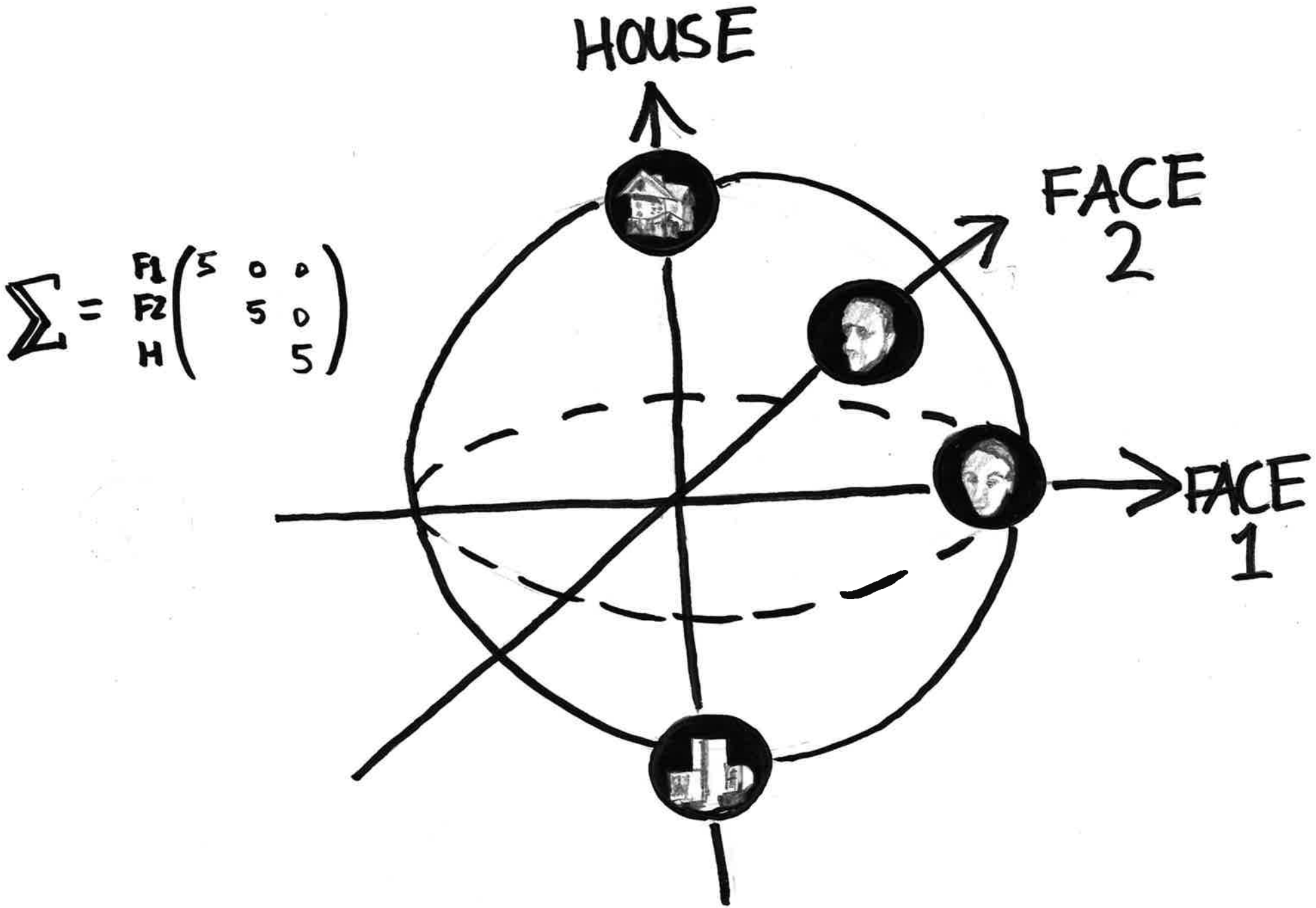

STIMULUS
retina
V1
V2
V3
V4
Retina
V1
V2?
V4??

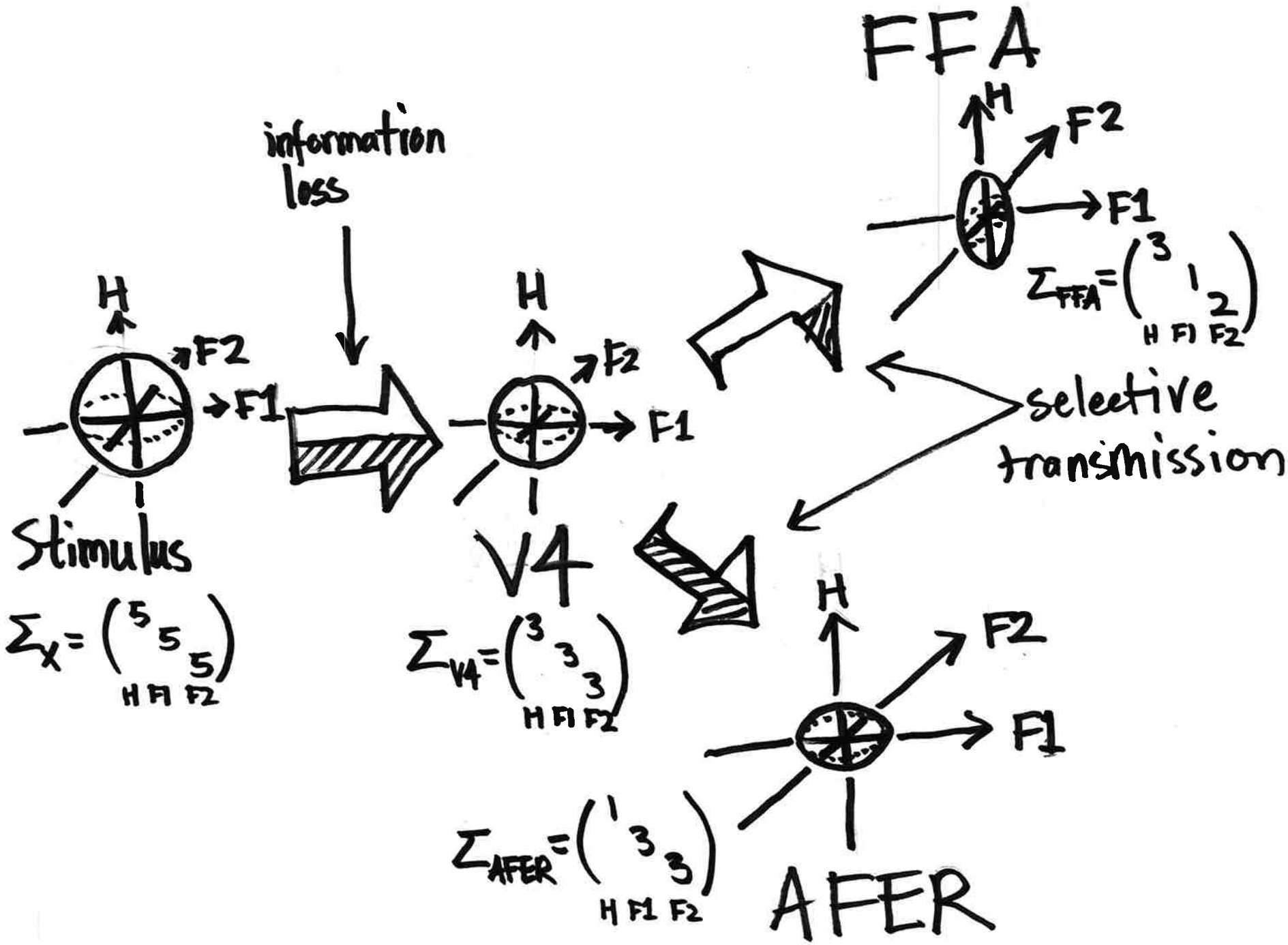

TIME
4s
2s
4s
2s
4s
2s
rest
rest
rest
Stimulus
Voxel 1
5
-5
Voxel 2
5
-5


Voxel
1
3.2
2.2
4.3
Voxels (~10,000)
Y =
3.2
2.2
4.3
Stimuli (~1000)


information
loss
$\vec{Y}^{FFA}$
FFA
$\vec{X}$
Stimulus
$\vec{Y}^{V1}$
V1
$\vec{Y}^{V2}$
V2
selective
transmission
$\vec{Y}^{AFER}$
AFER
• explicit models
$\vec{Y} = f(\vec{X}) + \vec{\varepsilon}$
• information
$I(\vec{X}; \vec{Y})$

classification
information
distance metric
Part I of talk
Part II of talk


HOUSE
FACE 2
FACE 1
$\sum = \begin{matrix} F1 \\ F2 \\ H \end{matrix} \begin{pmatrix} 5 & 0 & 0 \\ & 5 & 0 \\ & & 5 \end{pmatrix}$


FFA
H
F2
F1
information loss
H
F2
F1
$\Sigma_{FFA} = \begin{pmatrix} 3 & & \\ & 1 & \\ & & 2 \end{pmatrix}$
H F1 F2
selective transmission
H
F2
F1
Stimulus
$\Sigma_X = \begin{pmatrix} 5 & & \\ & 5 & \\ & & 5 \end{pmatrix}$
H F1 F2
V4
$\Sigma_{V4} = \begin{pmatrix} 3 & & \\ & 3 & \\ & & 3 \end{pmatrix}$
H F1 F2
H
F2
F1
$\Sigma_{AFER} = \begin{pmatrix} 1 & & \\ & 3 & \\ & & 3 \end{pmatrix}$
H F1 F2
AFER