

# LC Activated SMS

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## Security Motivation System + LC

Ventral Anterior and Ventral Lateral Thalamus

→ Projection region, amplifying motor commands

Supplementary Motor Area / Premotor Area / Motor Cortex

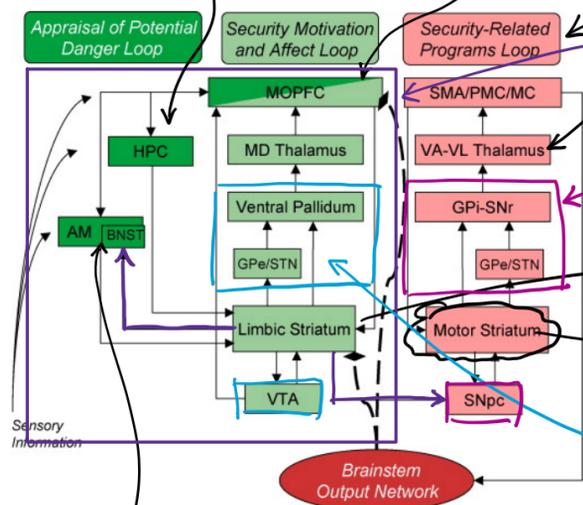
→ Basal Ganglia output to Voluntary motor behaviors

→ Intrinsic driven actions (SMA)

→ OCD may come from over activated SMA

Medial/Lateral PFC: evaluation of Threat / Association / Action selection

Hippocampus (HPC): Contextual memory processing / Integrate past experiences



Generalized Basal Ganglia Thalamo Cortical Circuit

- Feedback to prolonged sustain activation

Caudal reinforcing path → Motor Loop

Basal Ganglia + Substantia Nigra pars Compens (dopamine source) → Reinforcing

Limbic Striatum projecting to BNST  
→ Anxiety Potentiated Limbic response

Motor/Dorsal Striatum

- Mapping from security motivation (Input from Limbic Striatum) to action (output to motor circuit)

- Key site for habitual behavior, may be a starting point of OCD

Rostral reinforcing path → Association Cortex

Basal Ganglia + Ventral Tegmental Area

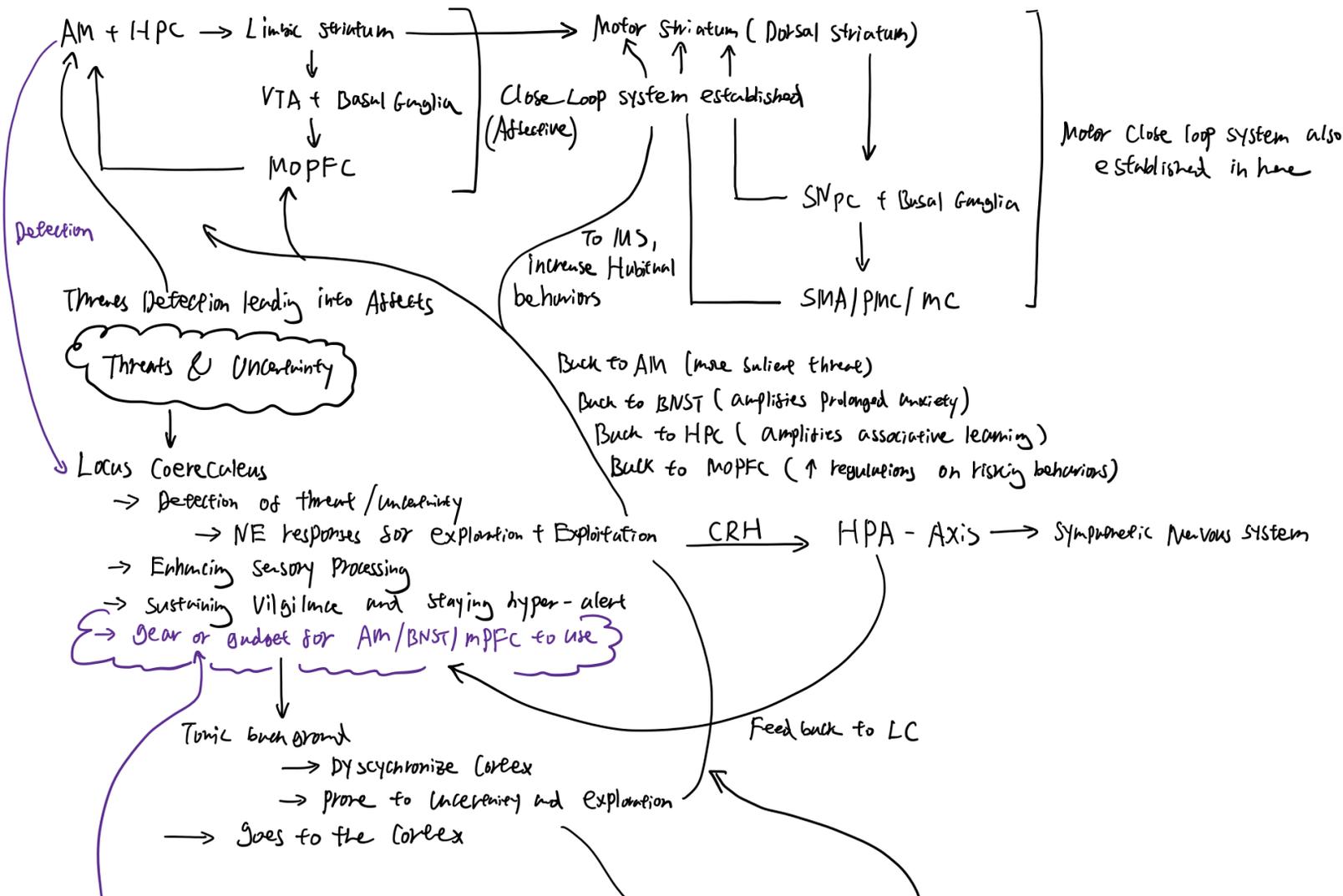
→ Reinforcement region + Parallel Processing

Hyperactivity of reinforcing may cause OCD

Amygdala and BNST interprets threat related cues/emotions

→ Damage to Amygdala or Ventral Medial PFC reduces ability to detect threats

→ Fear based quick learning



We should make this system as a gadget to use

It should be a one that can give self-attention to increase any part of the Control + Reinforcing loop

For Basal Ganglia/VTA/SNpc  
→ Required dopaminergic inputs/output

→ Hypothesis: If we activate the LC-NE system in the way like how it would do so under anxious condition, we can trigger habituation circuit activation even with unpresence of the distal stimulus

Neural activation is what leads to sensation, not proximal stimulus