

# **Neurophysiology and Clinical Applications: from Gellhorn to Edelman**

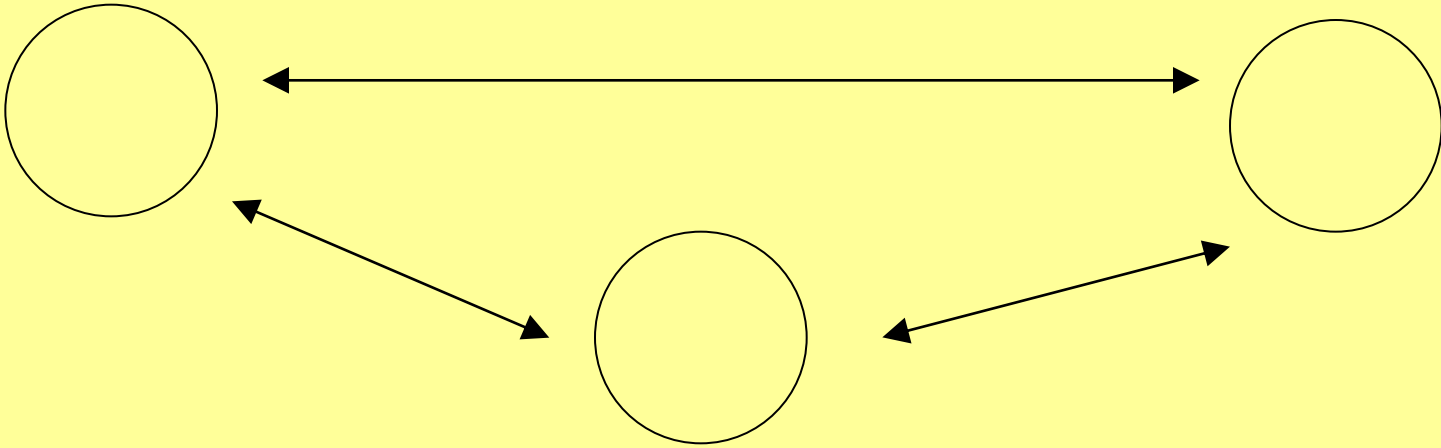
Jerome Liss, M.D.

# The Brain: Cortical Conscious Experiences and Subcortical Non-Conscious Process

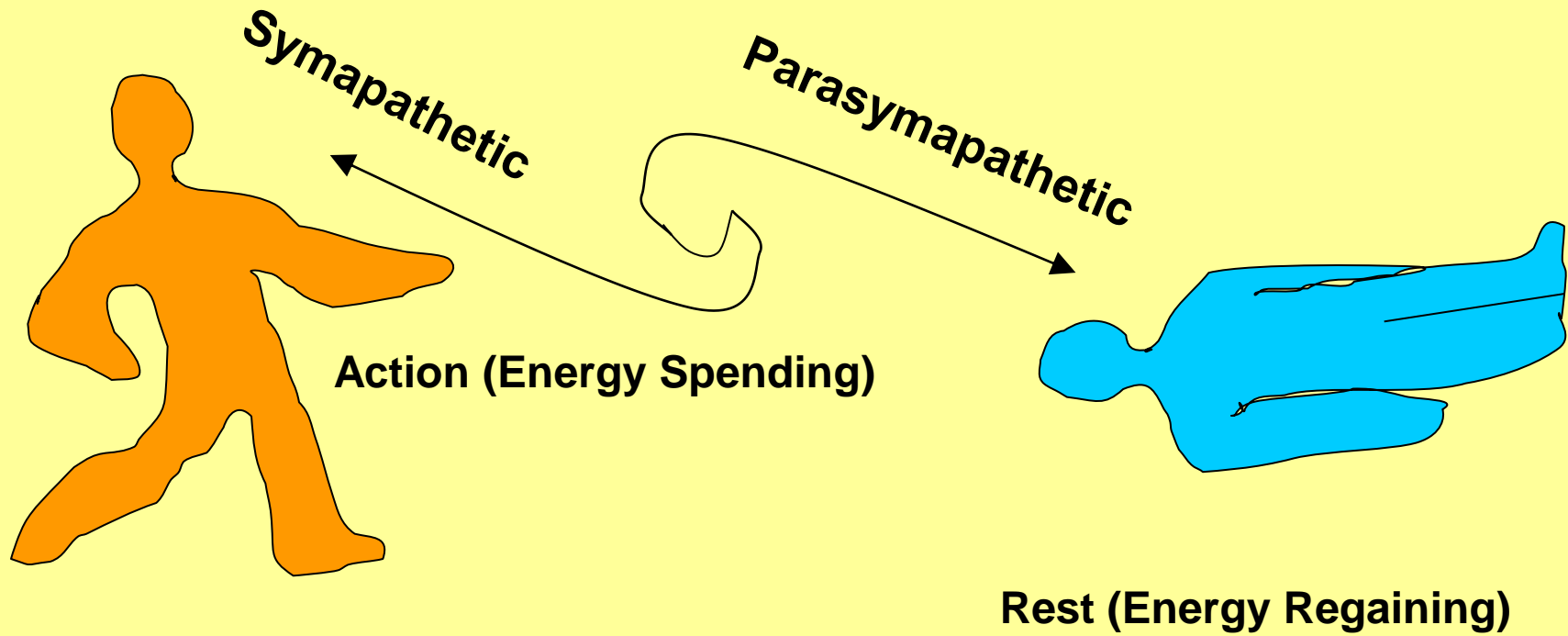
**CORTEX → Conscious Experience**

**Interaction**

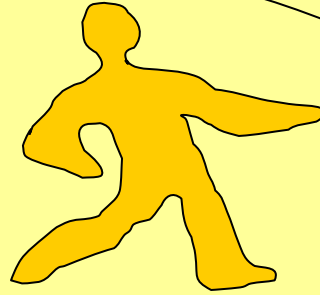
**SUBCORTEX → Non-Conscious Process**



# The Energy Curve



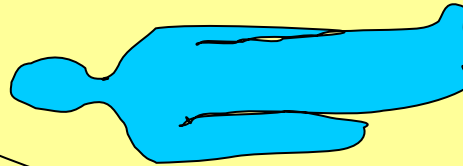
# “Sympathetic” Anger and “Parasympathetic” Vulnerability



**RAGE  
ANGER  
PROTEST  
FRUSTRATION**

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**JUMPING JOY**



**HURT  
SADNESS  
SHAKING FEAR  
SHAME**

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**MELTING JOY**

# Sympathetic-Parasympathetic Pathways Throughout the Whole Brain

**“Sympathetic and Parasympathetic”**

**Frontal lobe (Right hemisphere)**

**Limbic System**

**Hypothalamus**

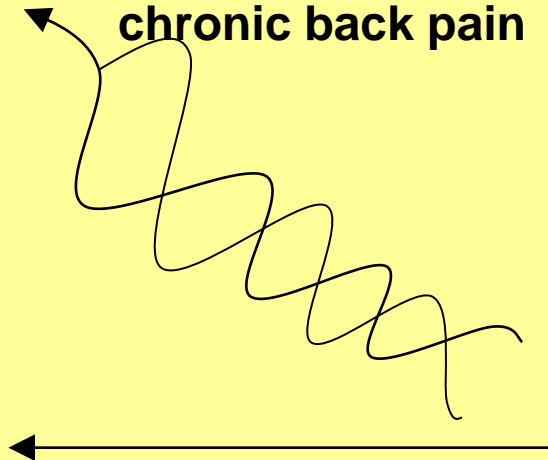
**Tegmentum**

**Brain Stem**

# **AUTONOMIC NERVOUS SYSTEM “KNOTS” AND RESULTING SYMPTOMS:**

## **SYMPATHETIC DOMINANT SYMPTOMS**

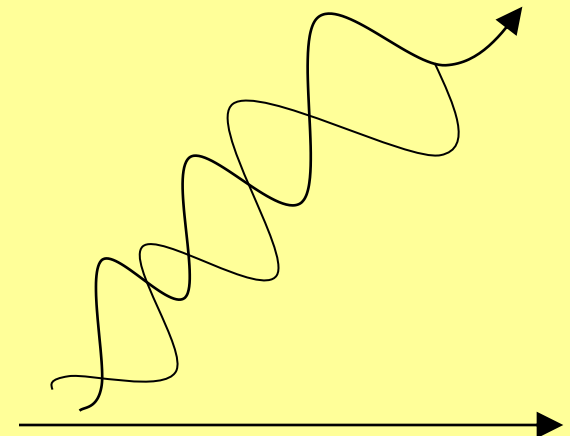
**agitated movements  
hypertension  
vulnerability to  
infection and tumors  
headaches  
chronic back pain**



**SYMPATHETIC**

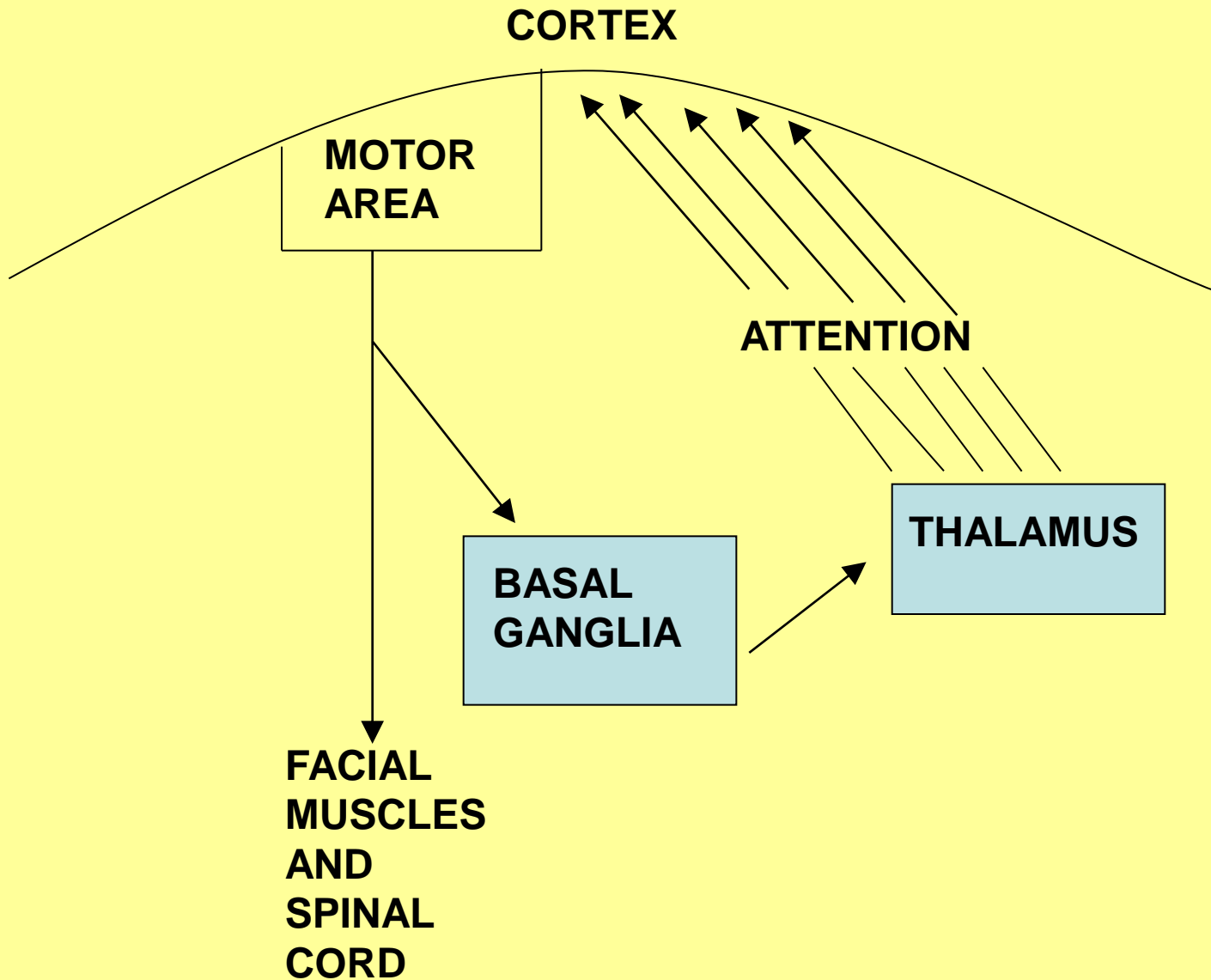
## **PARASYMPATHETIC DOMINANT SYMPTOMS**

**chronic passivity and  
depression  
obesity  
apathy  
social isolation  
lowered self-esteem**

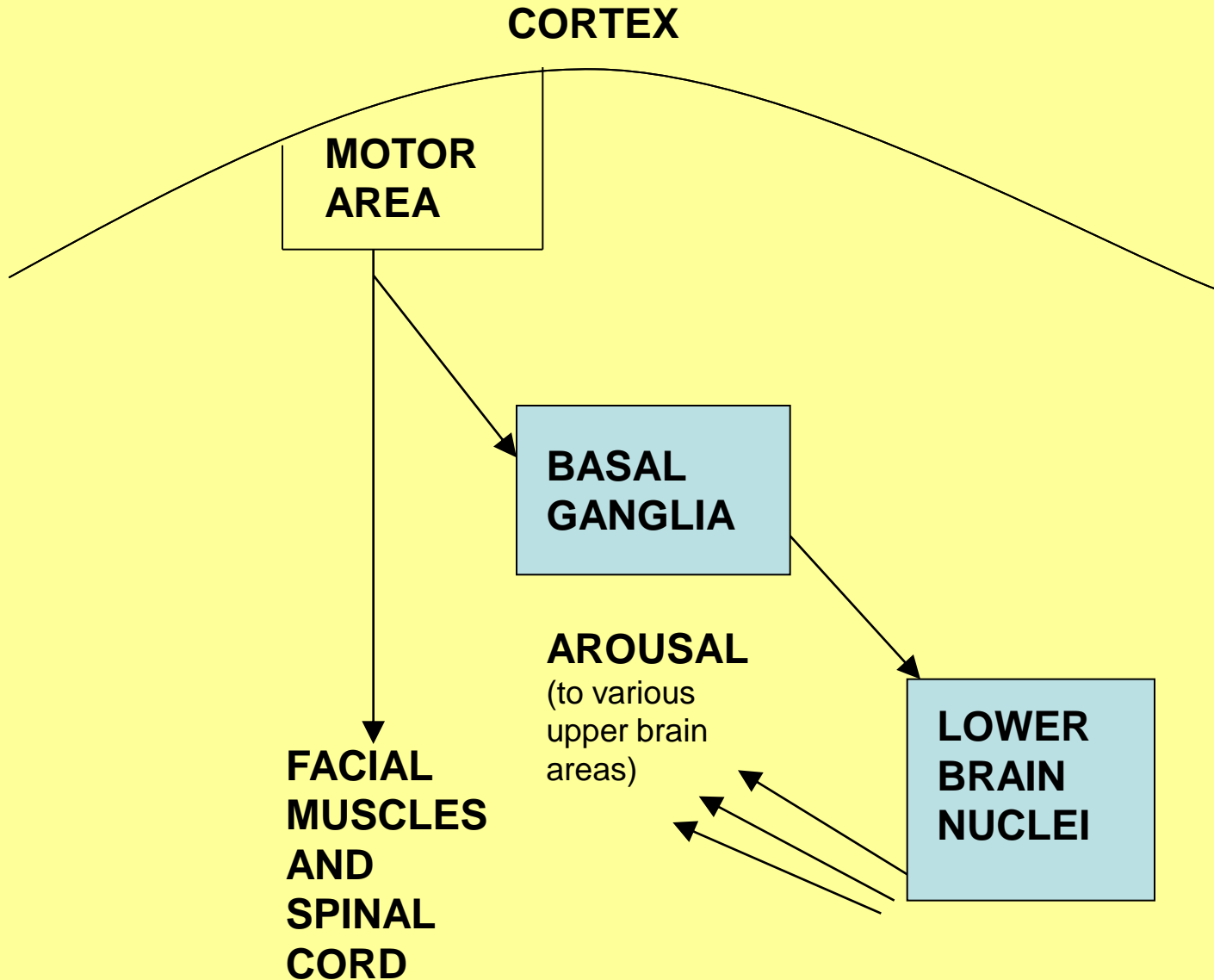


**PARASYMPATHETIC**

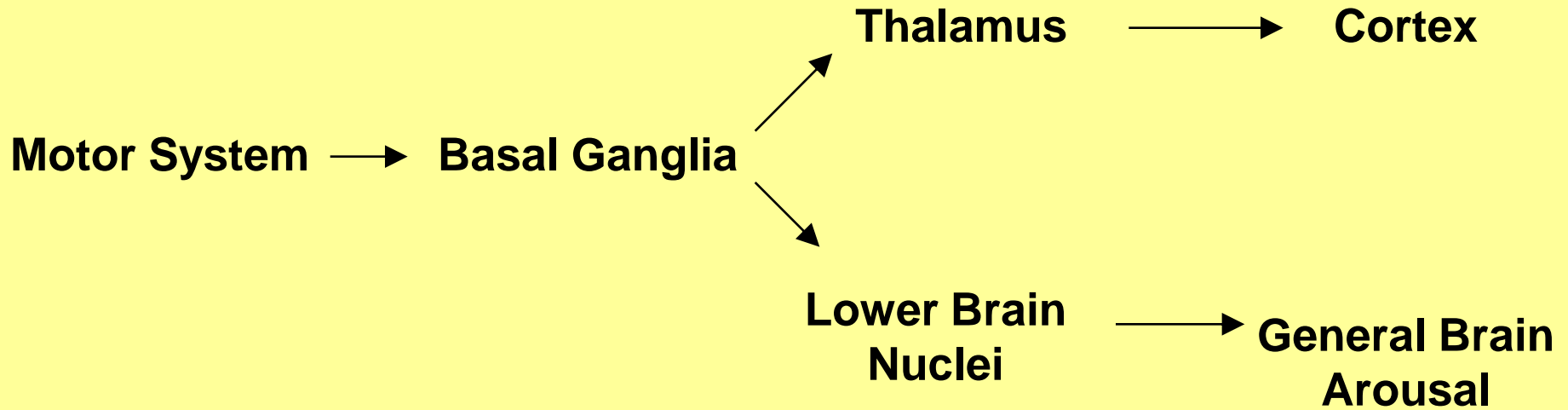
# Motor Neuron Pathways to Organize Our Attention



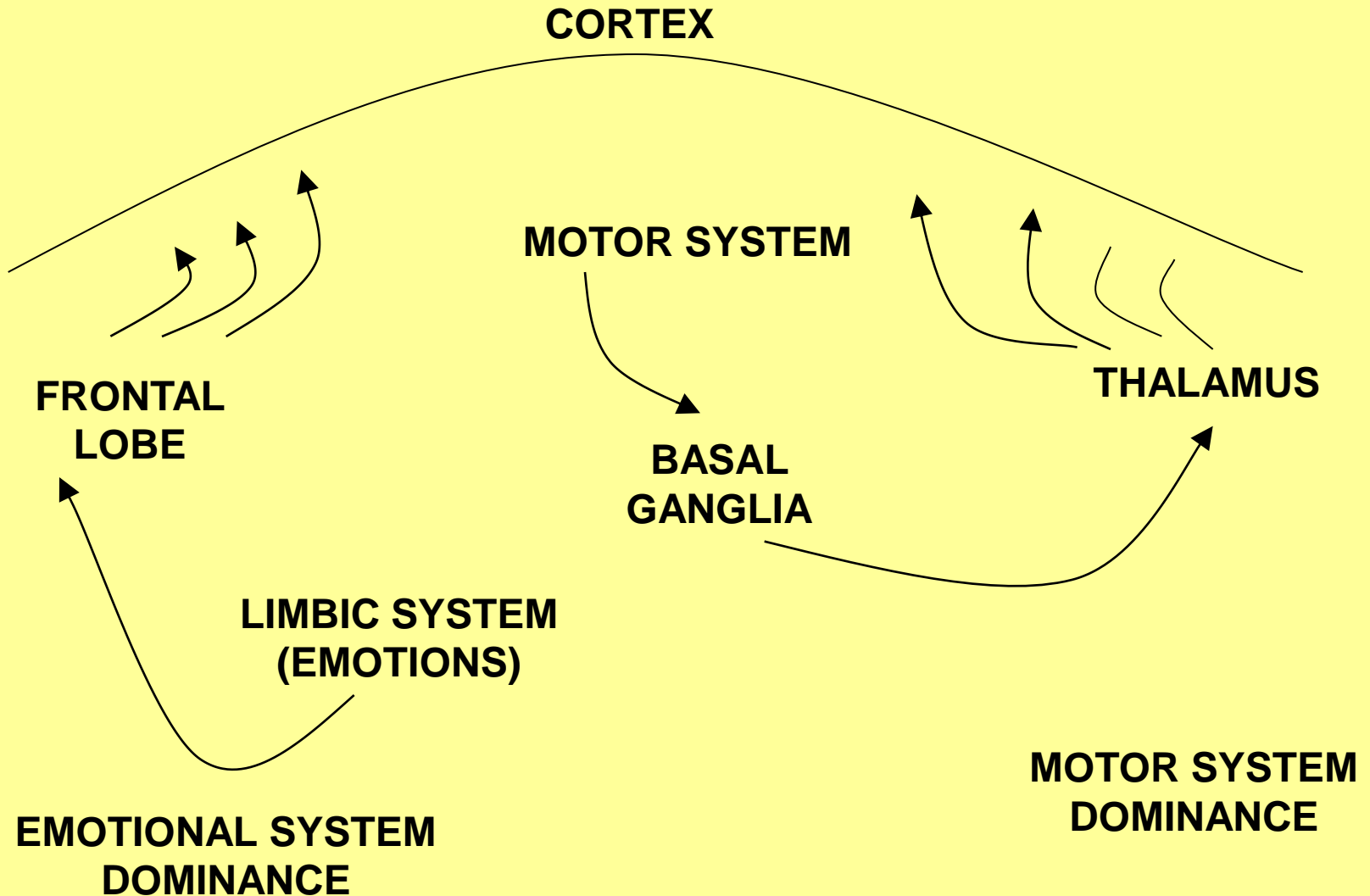
# The Activation of the Motor System Creates “Arousal”



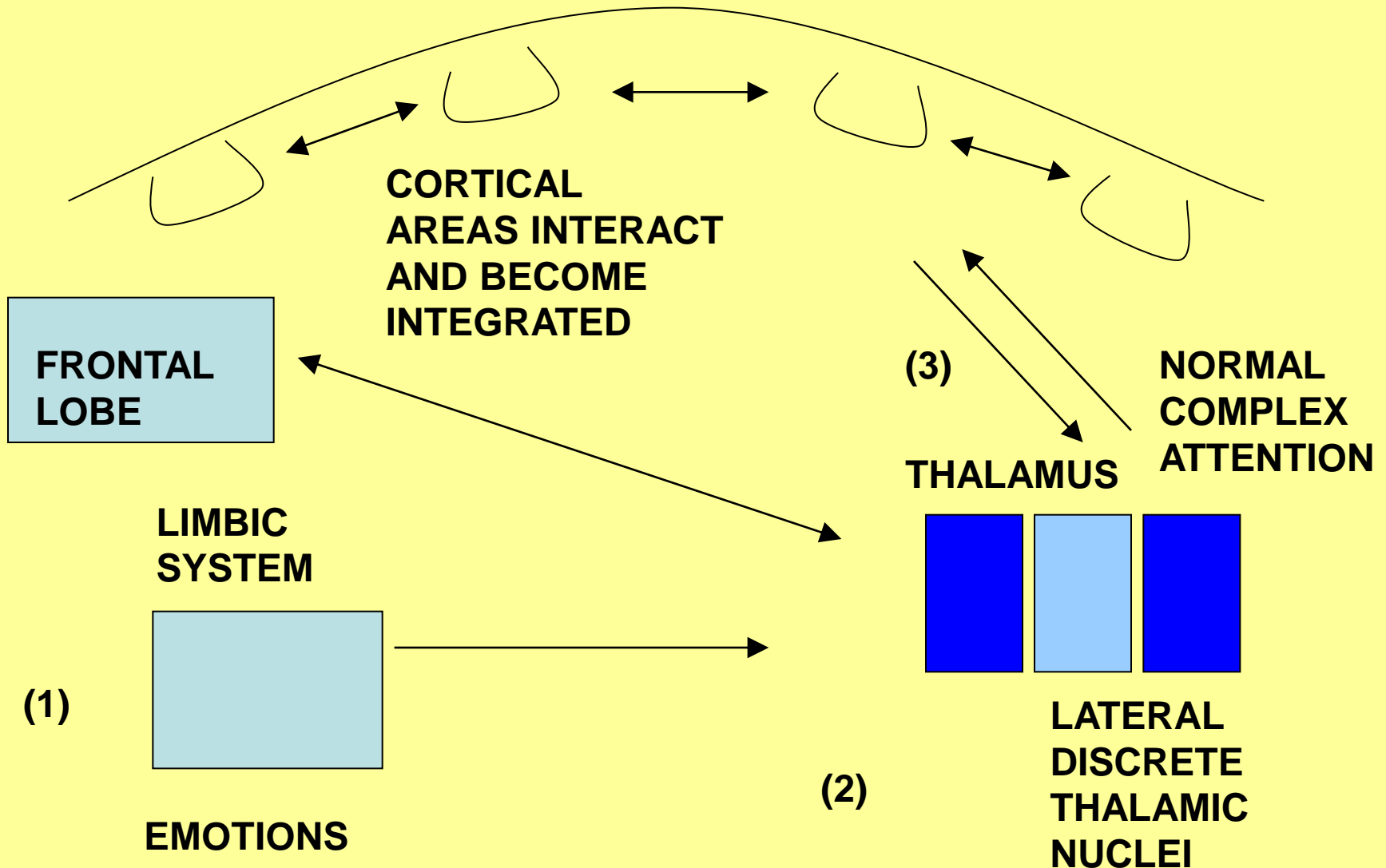
# Action Arouses the Brain and Organize Attention



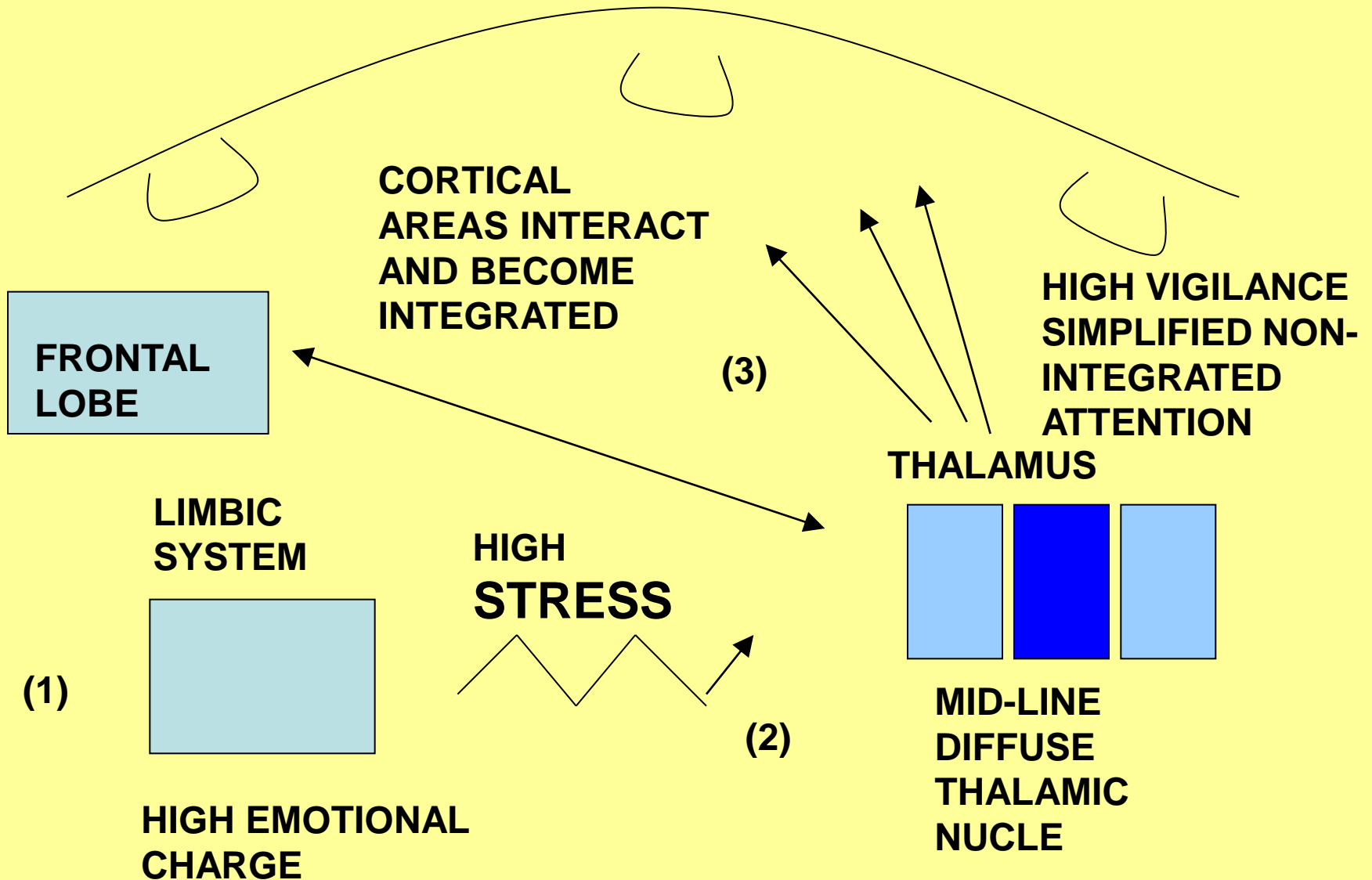
# Attention Overwhelmed by Emotion or “Contained” by Action



# LOW EMOTIONAL STRESS: COMPLEX ATTENTION CORTEX



# HIGH EMOTIONAL STRESS: SIMPLIFIED ATTENTION CORTEX



# From “Intentional Action” to “Habit”

CORTEX

MOTOR  
AREA

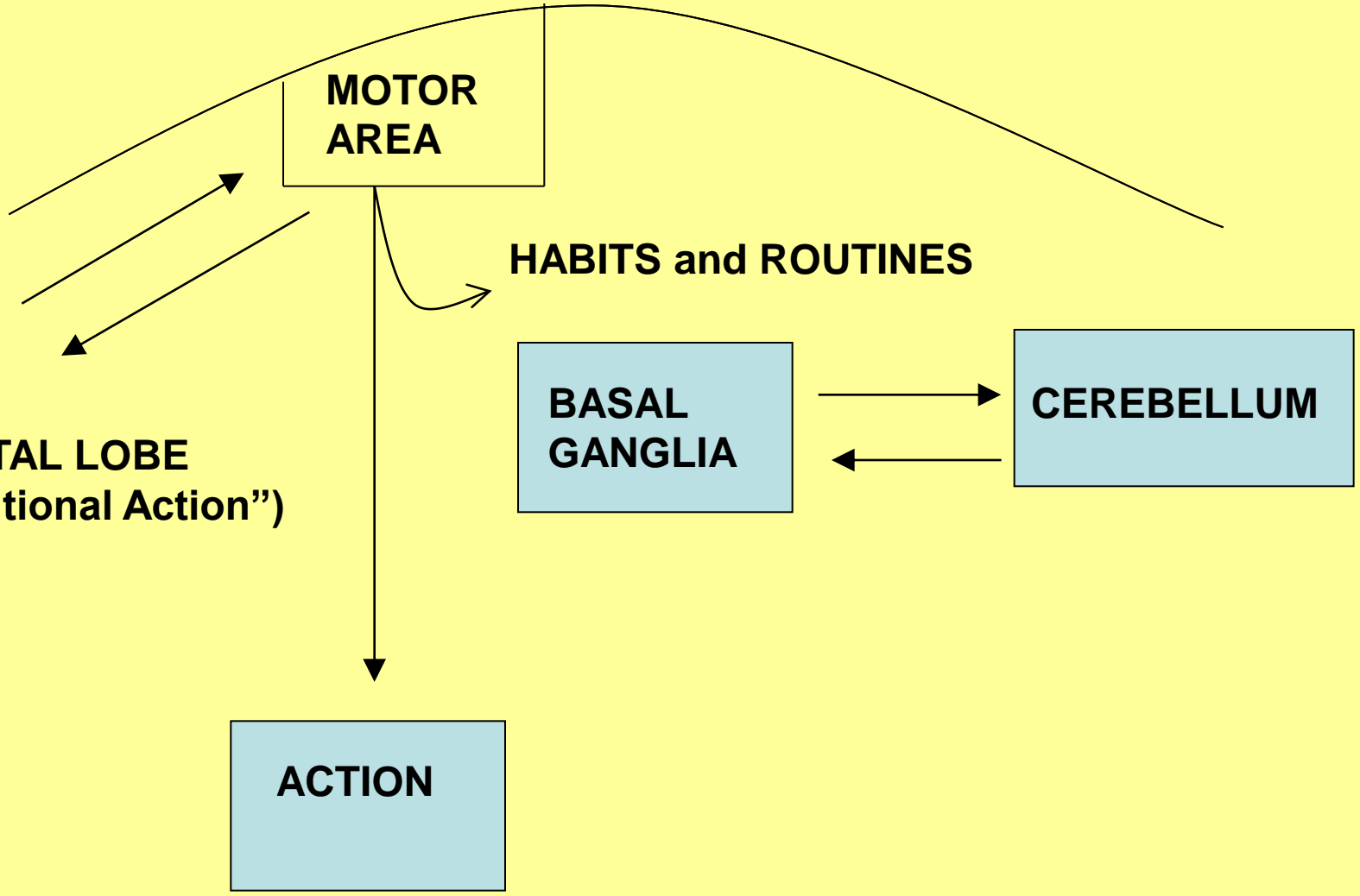
HABITS and ROUTINES

FRONTAL LOBE  
 (“Intentional Action”)

BASAL  
GANGLIA

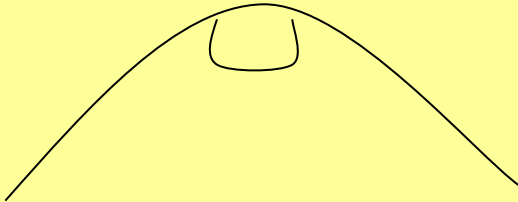
CEREBELLUM

ACTION

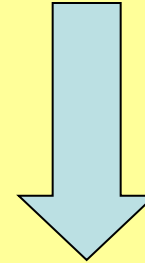


# TRAUMATIC EXPERIENCE

**BROCA'S AREA**

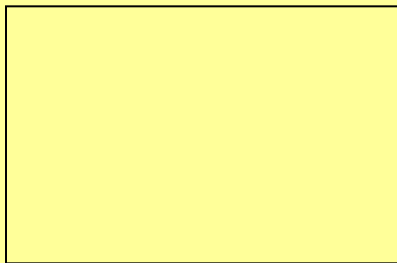


**(LANGUAGE)**

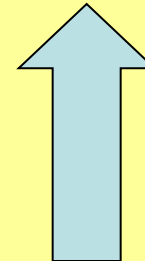


**DECREASED  
LANGUAGE**

**LIMBIC SYSTEM**



**(EMOTION)**



**INCREASED  
EMOTIONS**