



Parallels in Models of Biological and Behavioral Immune Systems:

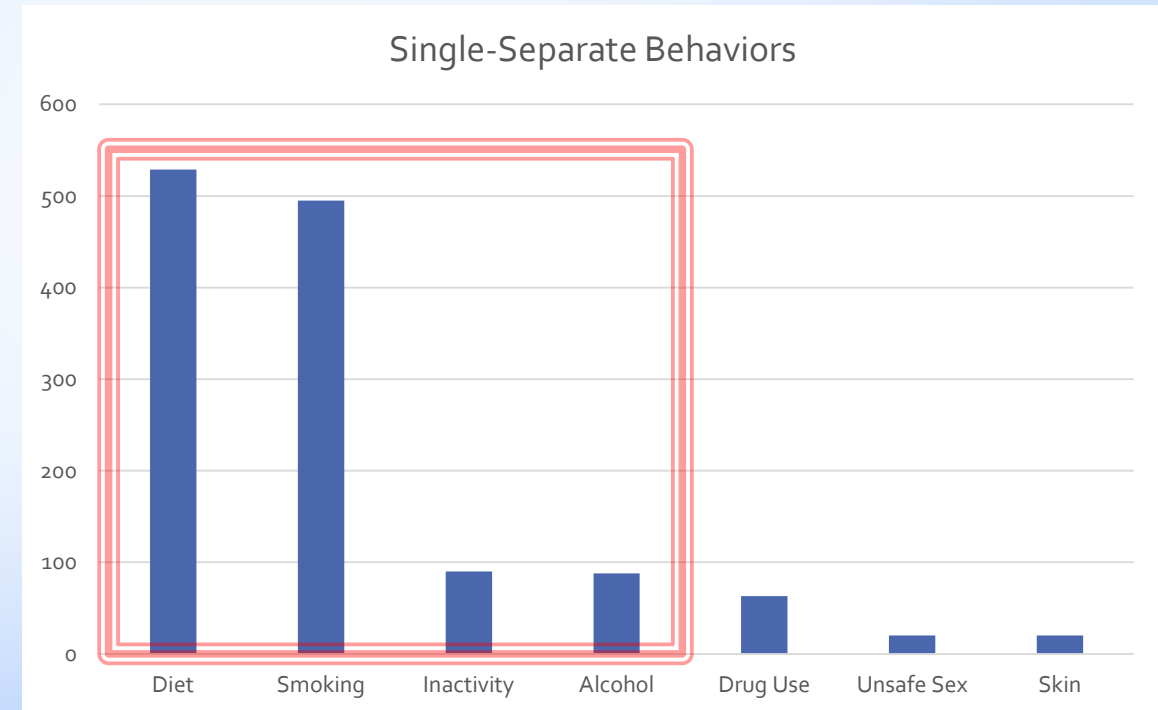
Introducing the Adaptive Behavioral Immune System (ABIS)

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The 'Big 4': a BIG population health problem

❖ Deaths per year due to behaviors_{2,9,15,26}:

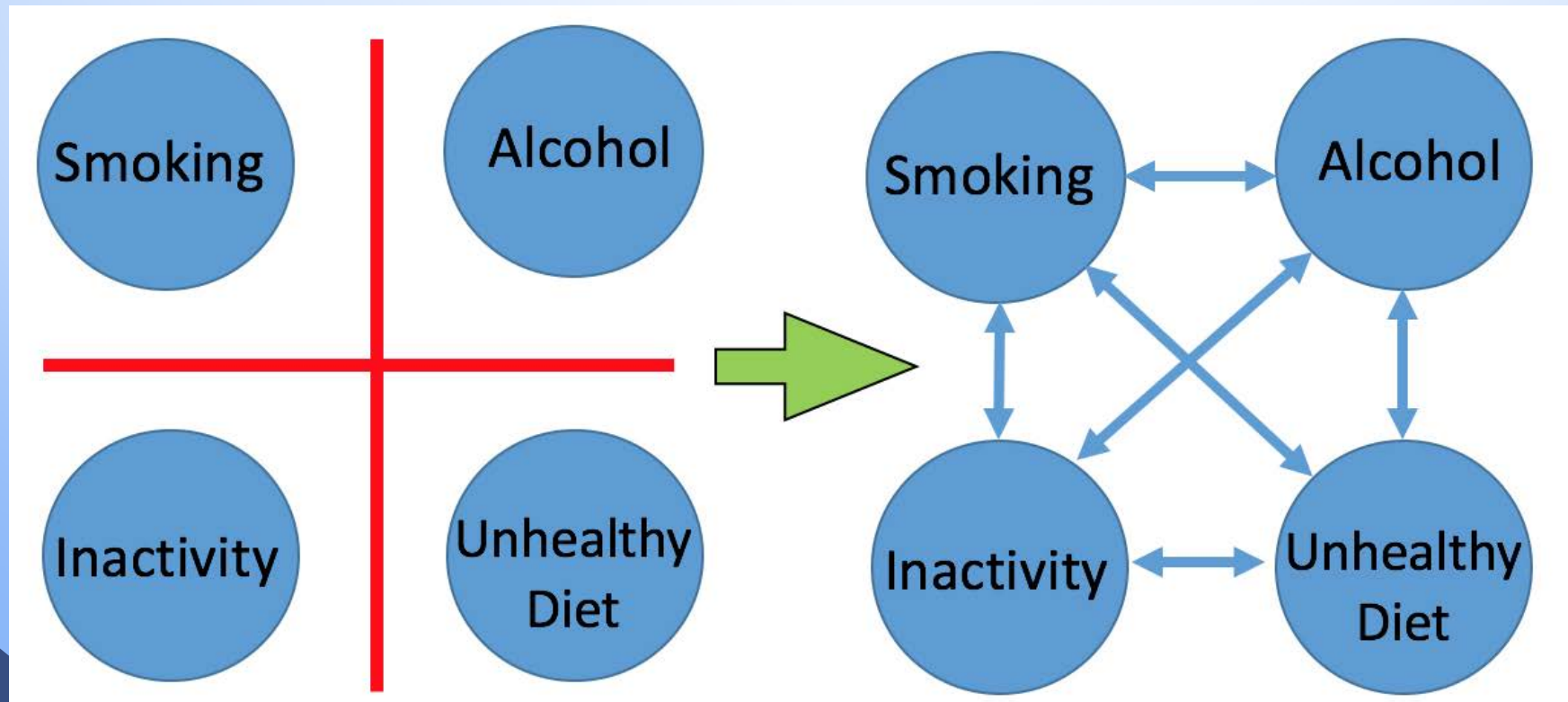
1. Diet → 529,000
2. Smoking → 490,000
3. Inactivity → 90,000-100,000
4. Alcohol → 88,000
5. Drugs → 63,500
6. Sex → 20,000
7. Sun Exposure → 20,000



PROPOSAL: The magnitude of risk associated with health behaviors is best understood when we consider them as a system

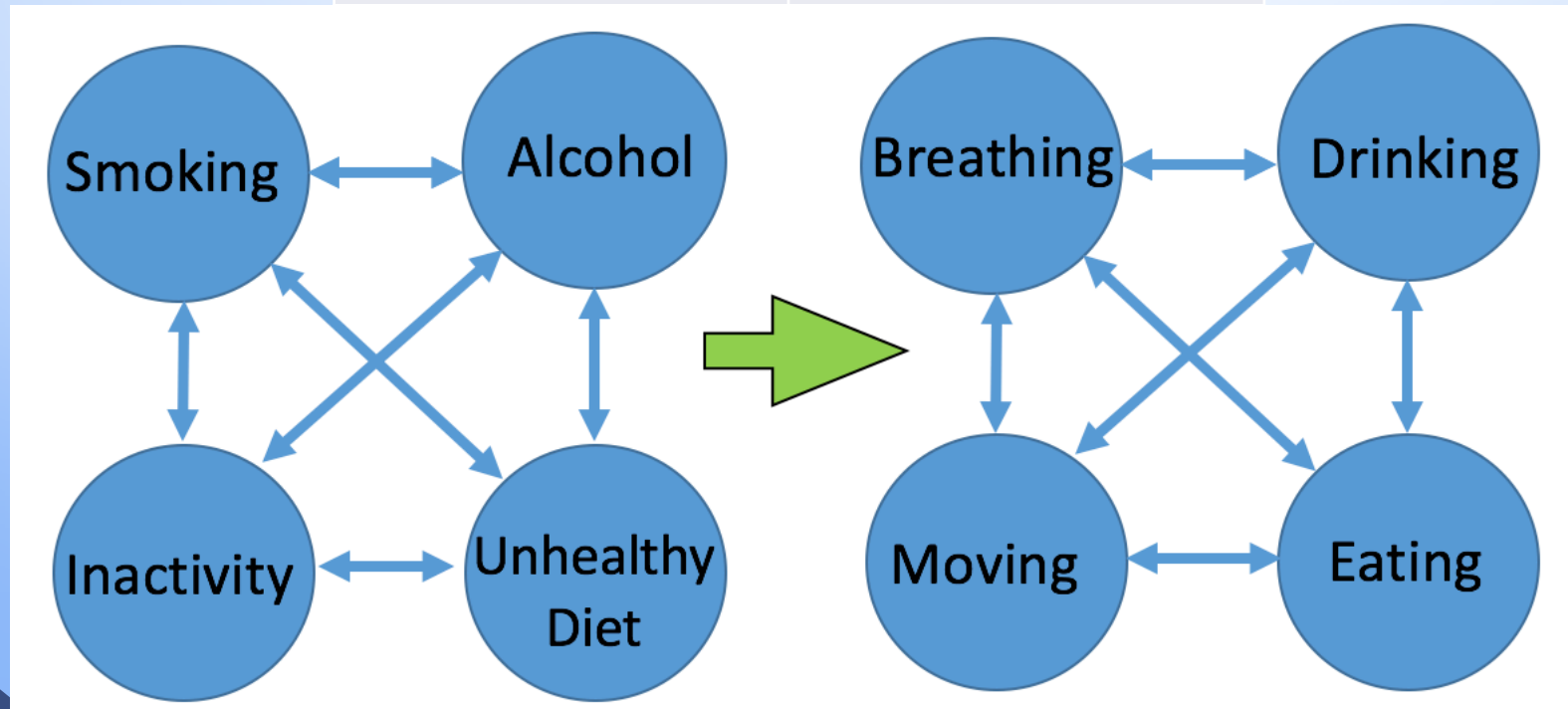
Single-Separate or Multiple-Systemic

- ❖ Big 4 behaviors co-occur in nearly 80% of adults₁
- ❖ High risk, high cost populations are those with multiple health risk behaviors_{5,12,16}.
- ❖ Need for theory-driven methods of clustering or systematizing co-occurring behaviors₁₃.



Progressing from 'The Big 4': Identifying the Fundamental Functions (FFs)

<u>Behavior</u>	<u>Function</u>
Smoking	Breathing
Alcohol Misuse	Drinking
Unhealthy Diet	Eating
Inactivity	Moving

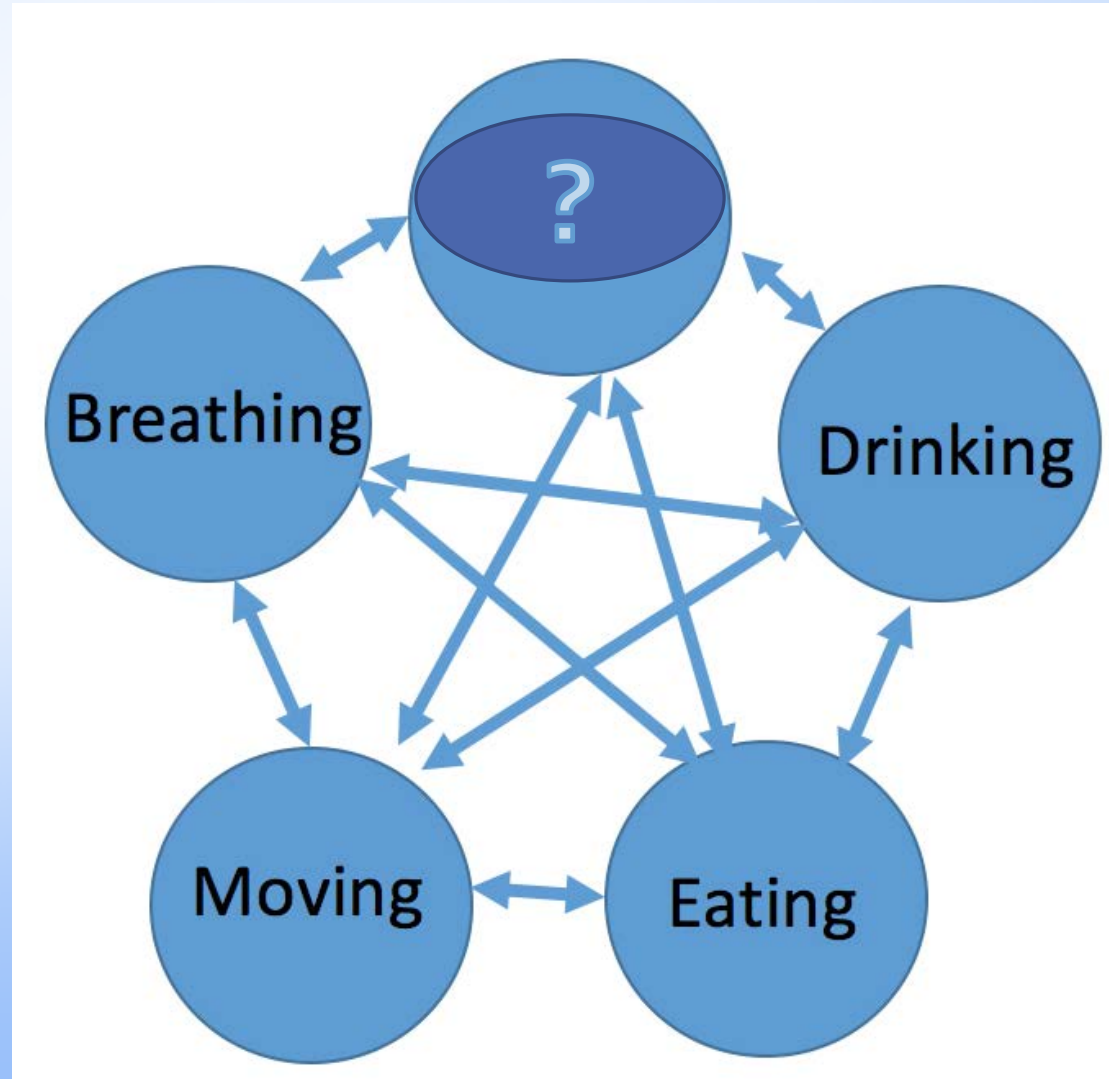


What makes a function 'Fundamental'?

❖ Operationalizing the FFs:

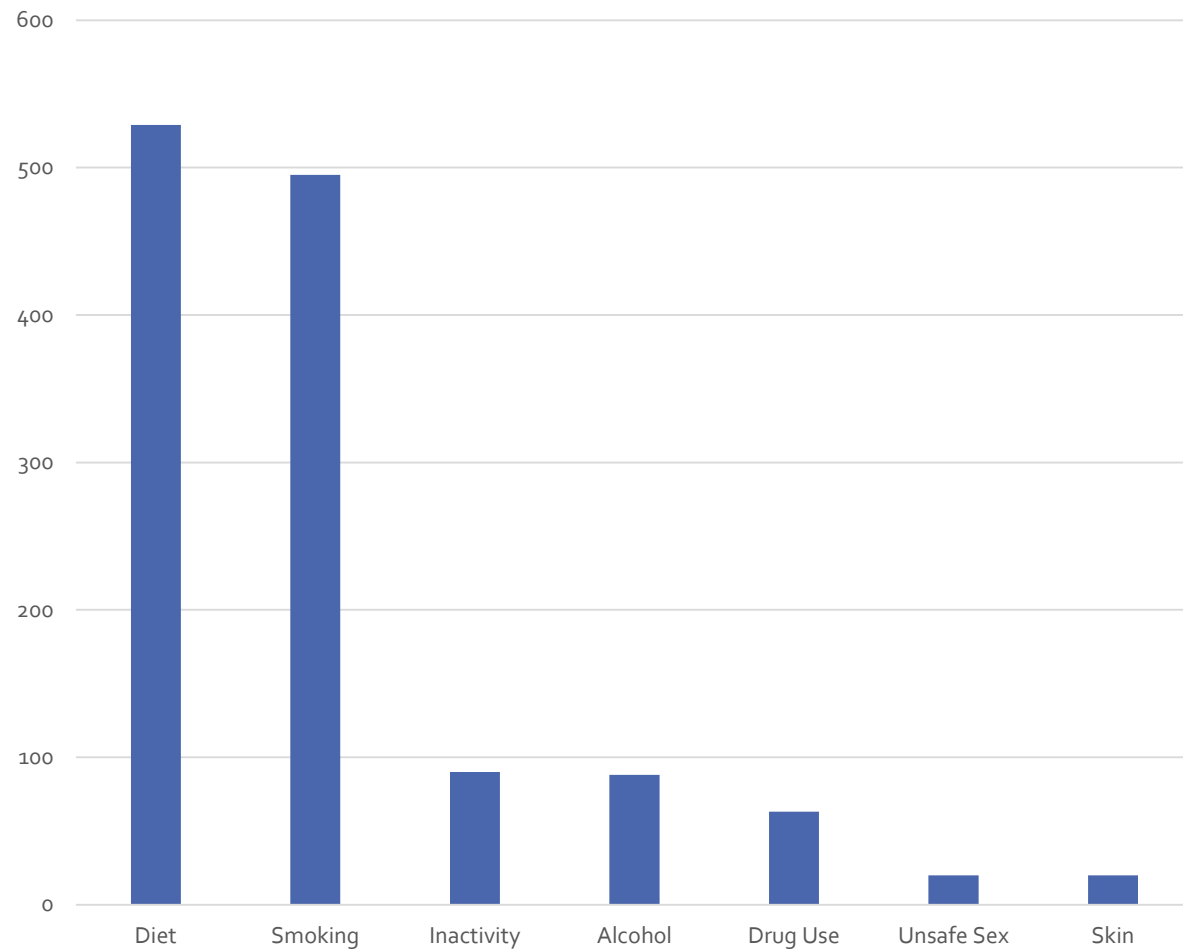
1. They typically occur **every day**
2. They are **iterative** (i.e. prior repetitions impact present repetitions)
3. They can be expressed as **functional** or **dysfunctional**
4. **Dysfunctional** expression coincides with excess buildup of resources, toxins, and inflammation within the biological system_{6,7,20-22,27-29}

Nominations for a fifth FF?

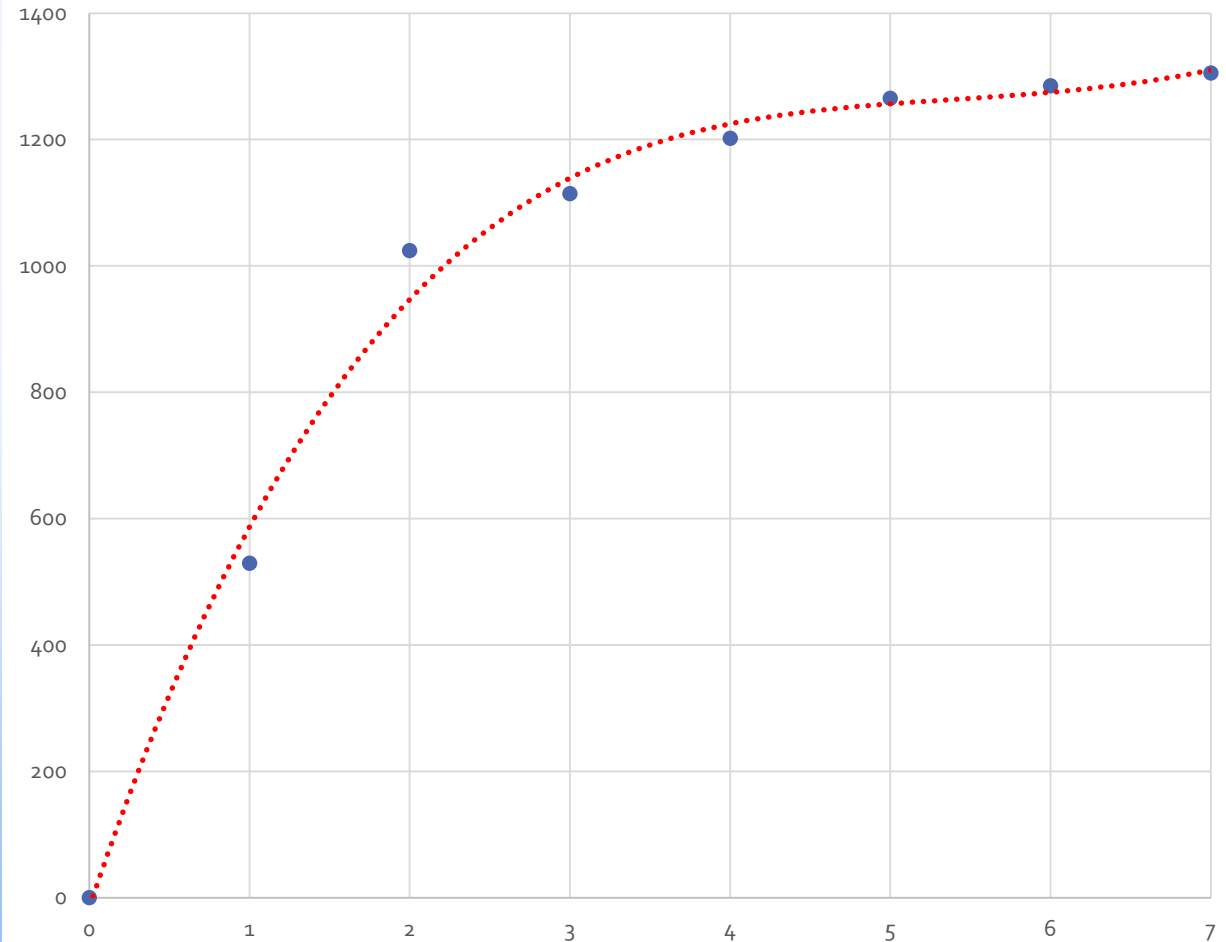


Viewing the Data with the ABIS: Single-Separate vs. Multiple-Systemic

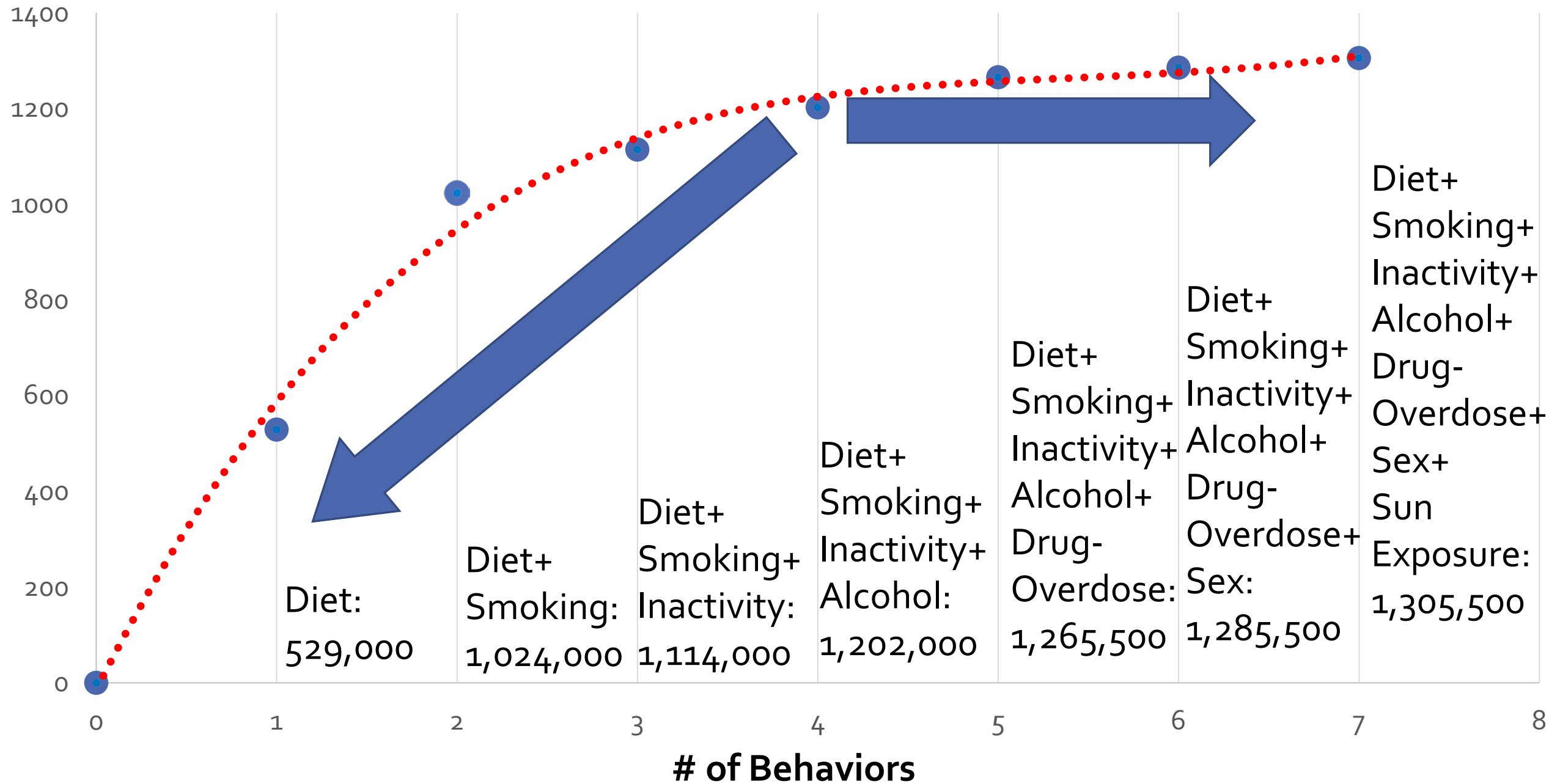
Single-Seperate Behaviors



Multiple-Systemic Behaviors



Multiple-Systemic Behaviors



Completing the ABIS

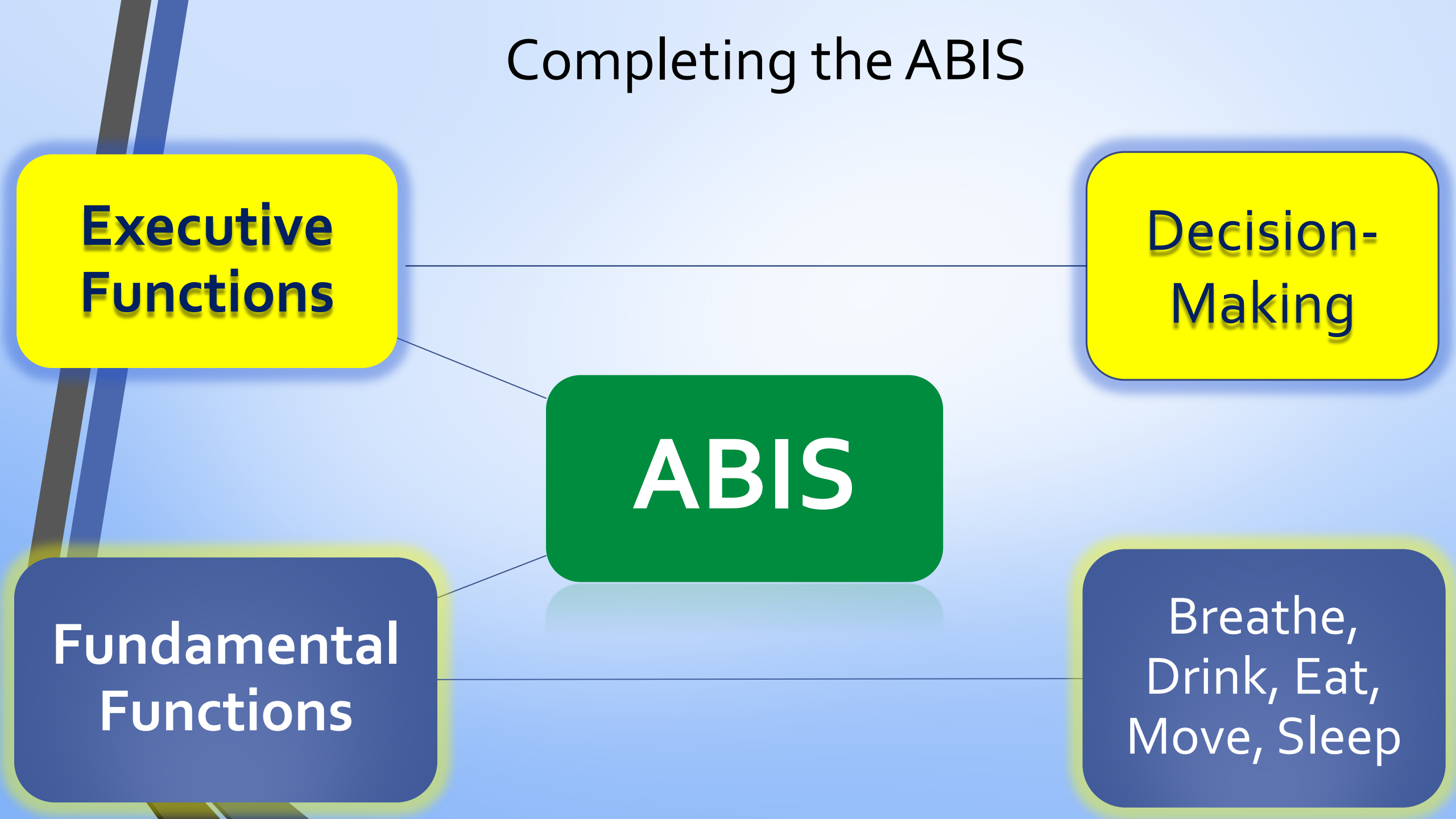
**Executive
Functions**

**Decision-
Making**

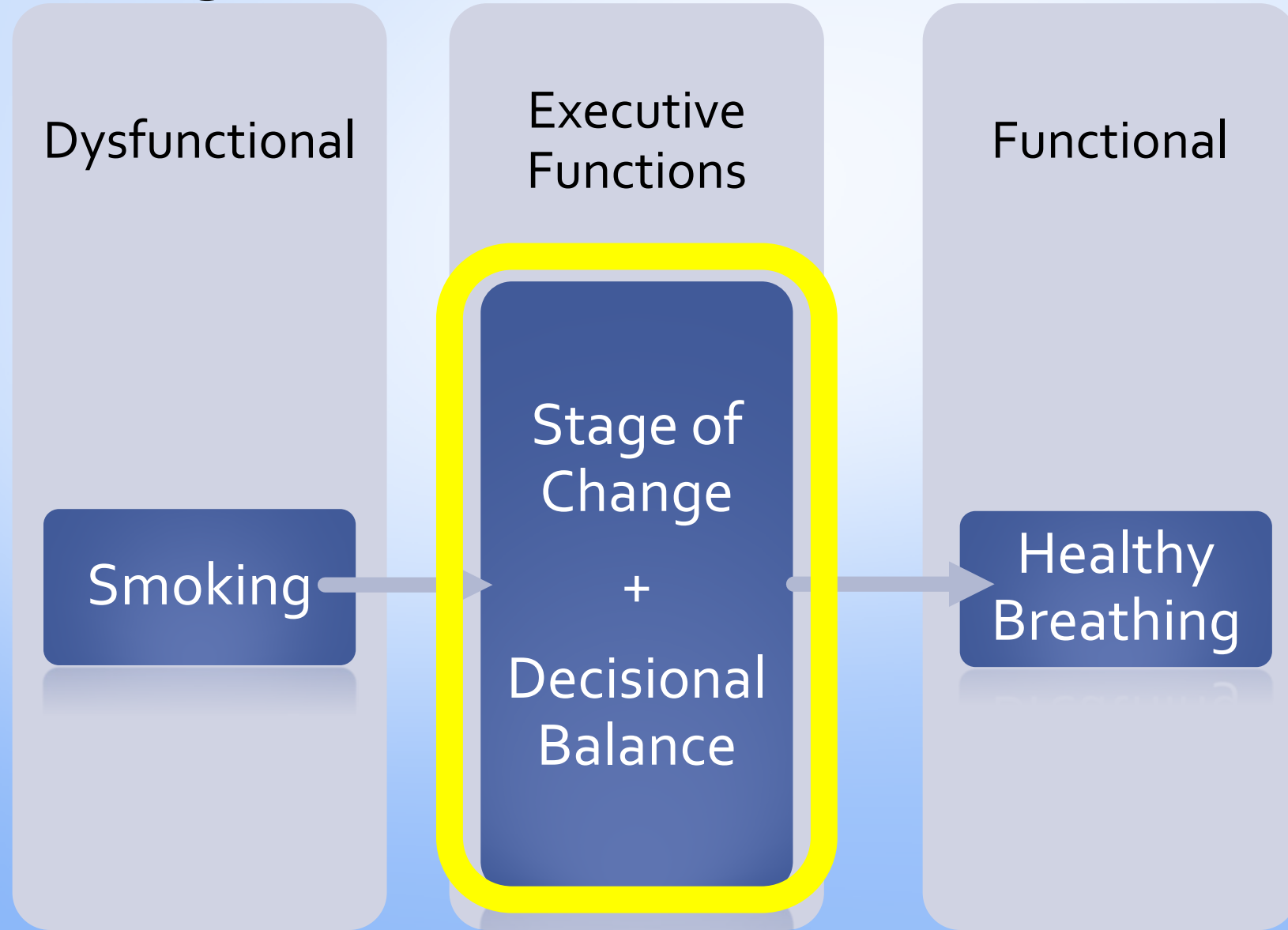
ABIS

**Fundamental
Functions**

Breathe,
Drink, Eat,
Move, Sleep



The Role of Executive Functions (EFs): Recognition, Decision, Direction



From the Strong & Weak Principles of Change to Executive Functions (EFs)

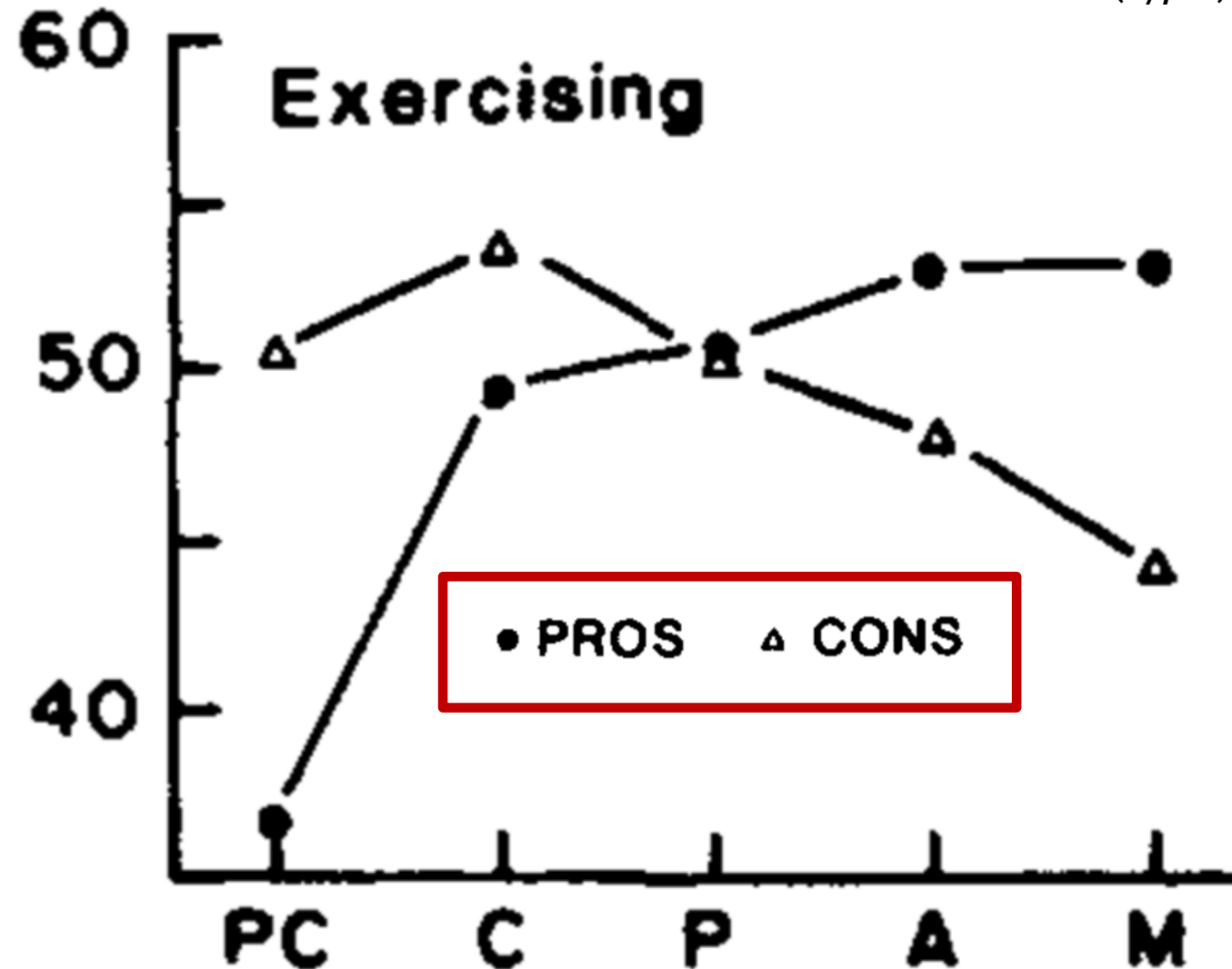
(17,18)

$PC \rightarrow A \cong 1 SD \uparrow PROS_H$

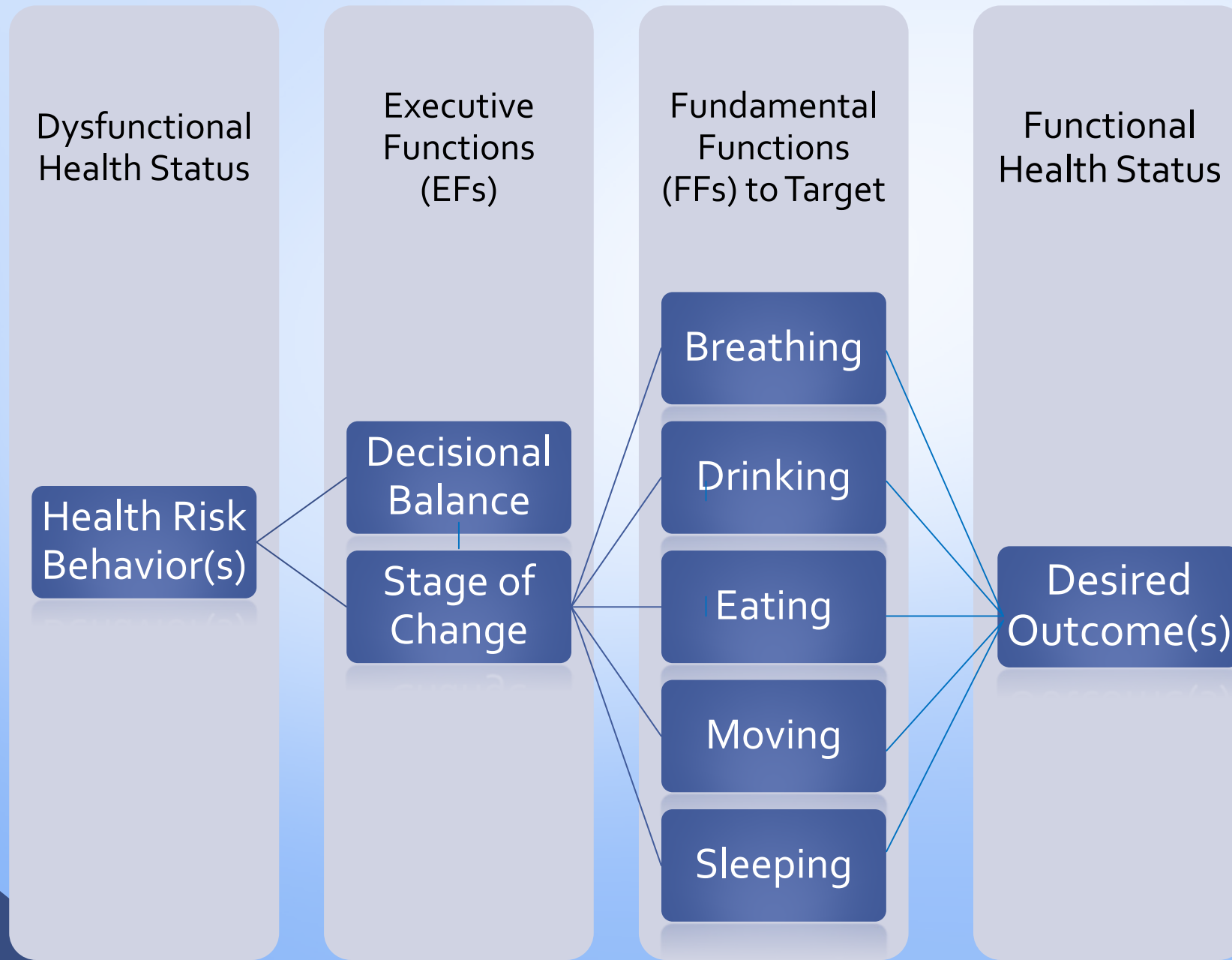
Strong Principle of Change

Weak Principle of Change

$PC \rightarrow A \cong 0.5 SD \downarrow CONS_H$



Integrating Levels of the ABIS



Parallels that Connect of ABIS and Biological Immune System (BioIS): Executive-Fundamental Functions

Expression of Health

Health
Status

Health-Supporting
System

Adaptive Behavioral
Immune System (ABIS)

Biological Immune System
(BioIS)

Executive Level

Stage of Change,
Pros/Cons

Innate & Adaptive Immune
System Branches

Fundamental Level

Breathing, Drinking,
Eating, Moving, Sleeping

Colonies of the Human
Microbiome

Parallels that Connect of ABIS and BioIS: Dysfunction

Expression of Health

Chronic Condition

Health-Supporting
System

Adaptive Behavioral
Immune System

Biological Immune System

Executive Level
Dysfunction

Remaining in PC despite
disease diagnosis

Autoimmunity

Fundamental Level
Dysfunction

"I really wanted to change,
but I just found myself
smoking"

Dysbiosis*

*Dysbiosis, is a term for a microbial imbalance or maladaptation on or inside the body

Parallels that Connect of ABIS and BIS: Signaling

Process of Health

Adaptation to
Changing Environment

Health-Supporting
System

Adaptive Behavioral
Immune System

Biological Immune
System

Systemic Signaling
Mechanism

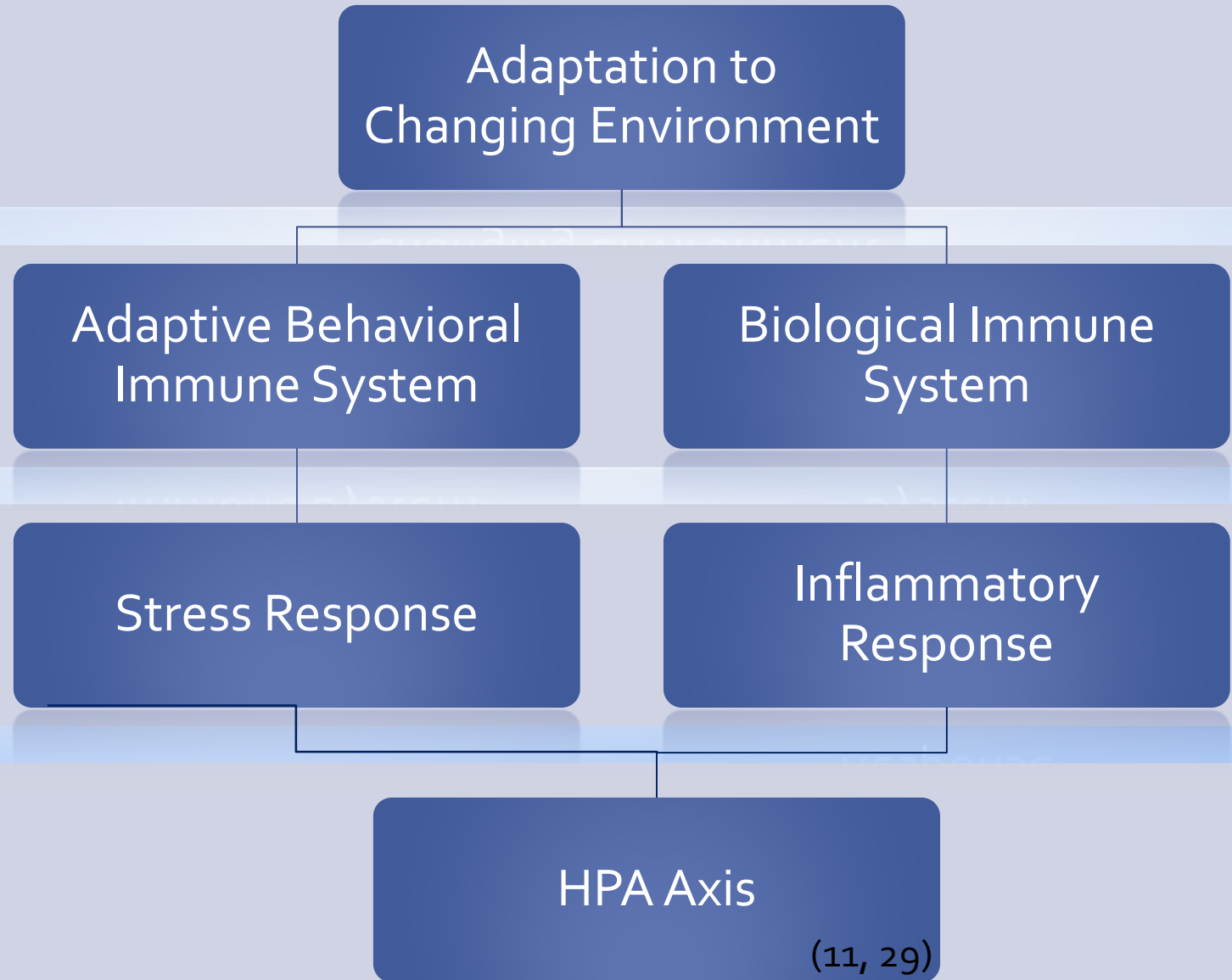
Stress Response

Inflammatory
Response

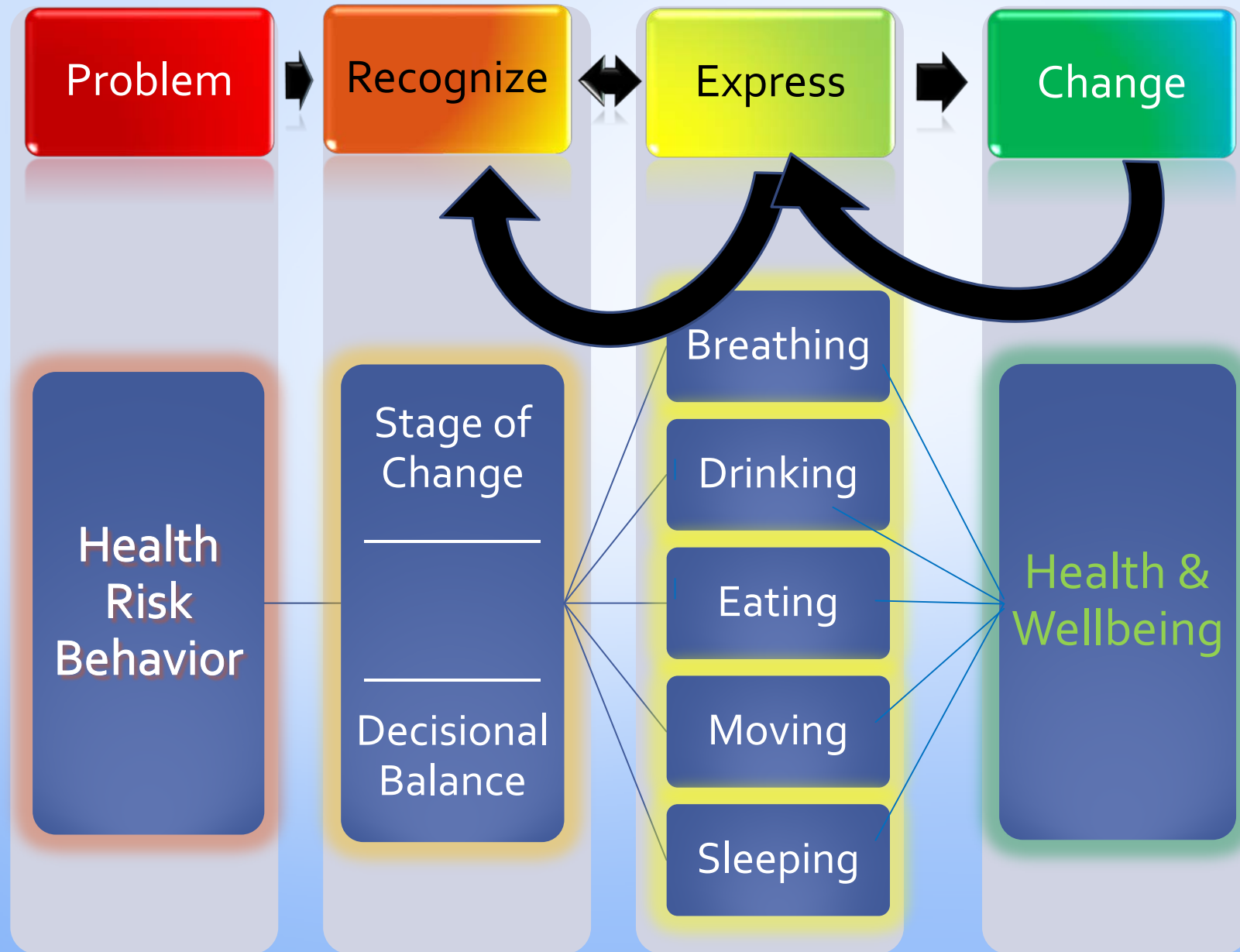
Intersection of the
Immune Systems

HPA Axis

(11, 29)



Future Directions of the ABIS



ABIS

Before dysfunction...

there was function

Before disease...

there was ease


A return to function and ease...

is a breakthrough towards

Health and WELLBEING!

Citations

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