

**VCE PSYCHOLOGY AOS1**

# SOMATIC AND AUTONOMIC NERVOUS SYSTEMS

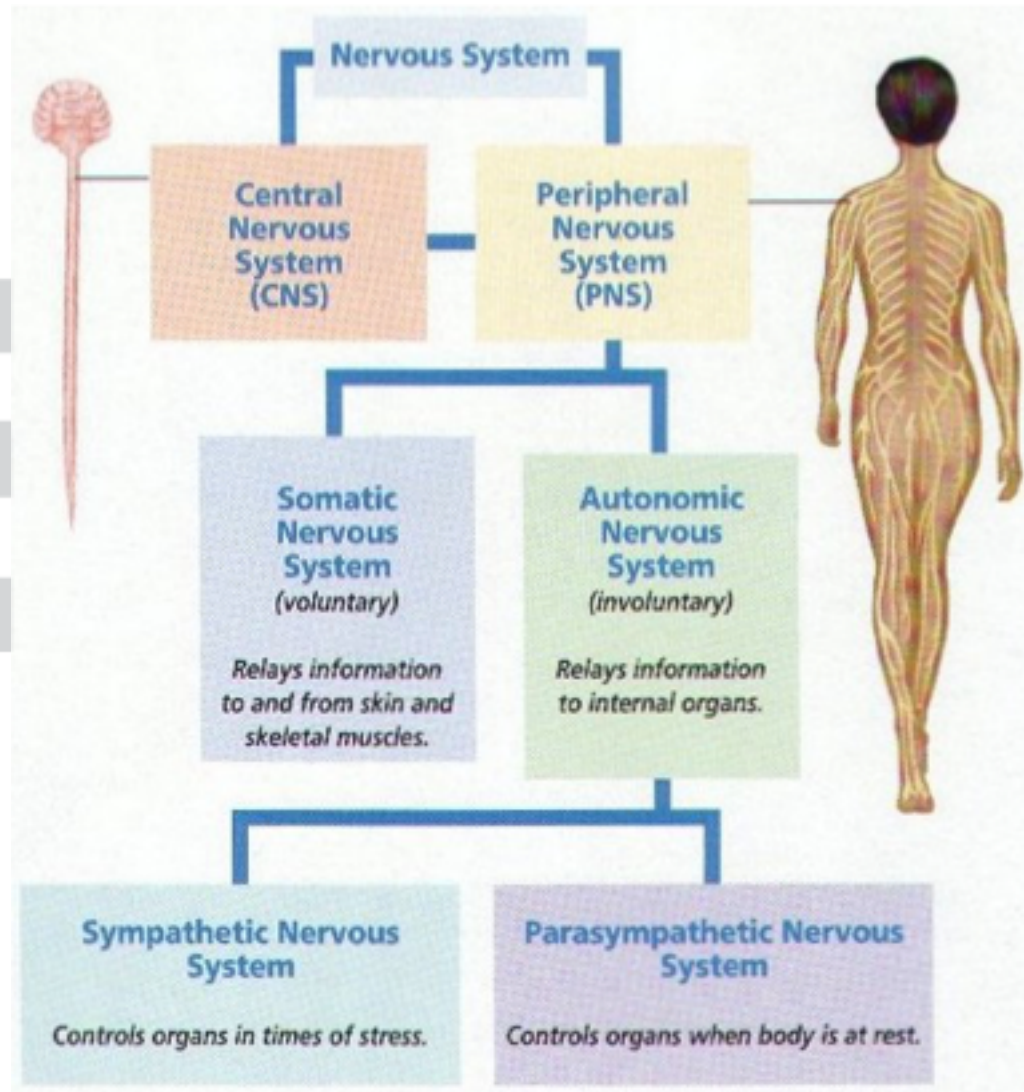
**Study Design Dot Points:**

- the roles of different divisions of the nervous system (central and peripheral nervous systems and their associated sub-divisions) in responding to, and integrating and coordinating with, sensory stimuli received by the body.





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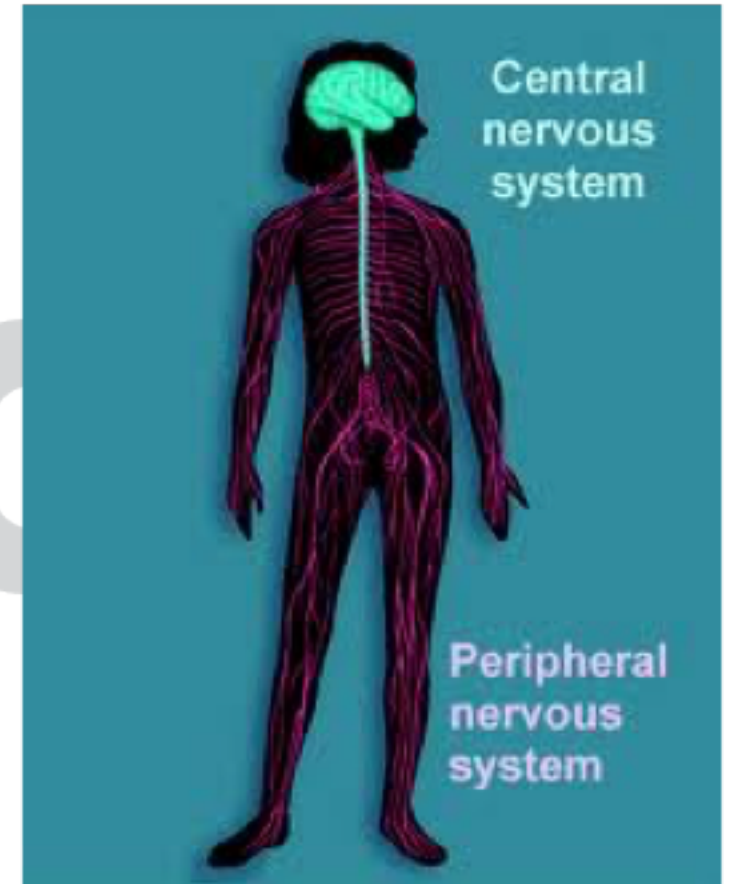


# Somatic nervous system

A network of neurons within the body that transmits information from the receptor sites on the sense organs to the CNS and carries information from the CNS to the **muscles** that control movement.

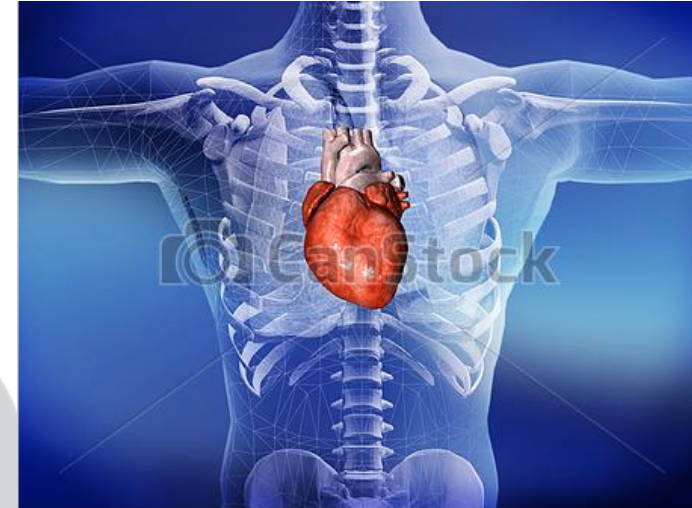
It controls all voluntary movement and responses.

**What does the word *soma* mean?**



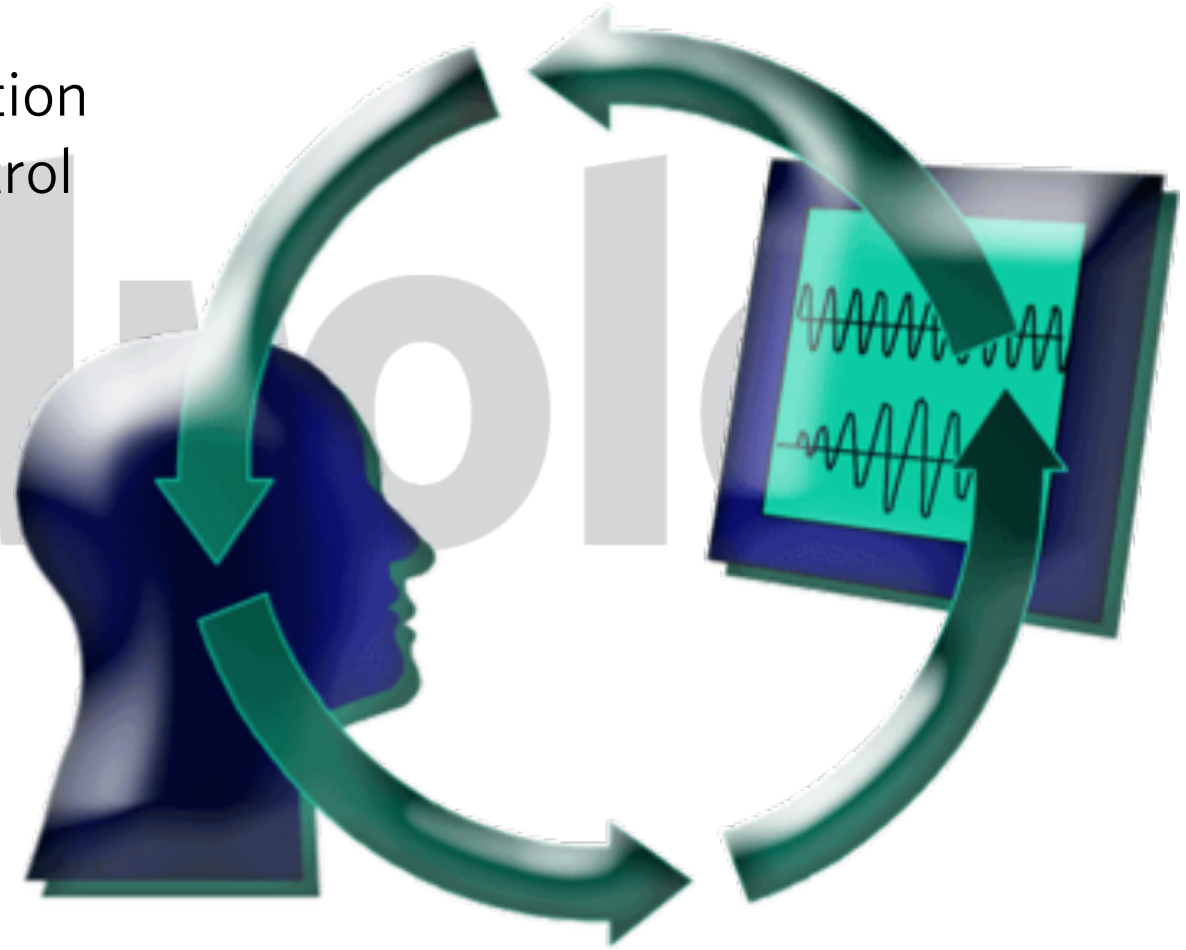
# Autonomic nervous system (ANS)

- A network of neurons that carries neural messages between the CNS and the heart, lungs and other **organs** and **glands**.
- The autonomic nervous system regulates the functioning of internal organs and glands automatically – without you being consciously aware of it.
- It is possible to exert some conscious control over ANS responses, typically this can be done through a process of biofeedback.



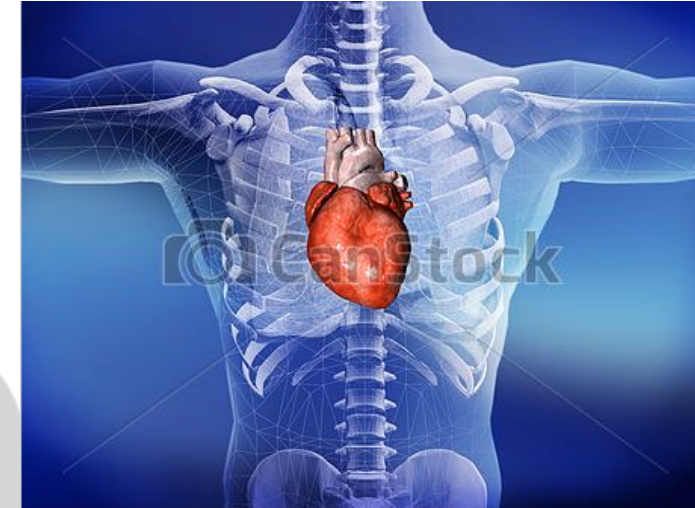
# What is biofeedback?

- Learn technique
- Receive ANS information
- Use technique to control ANS function

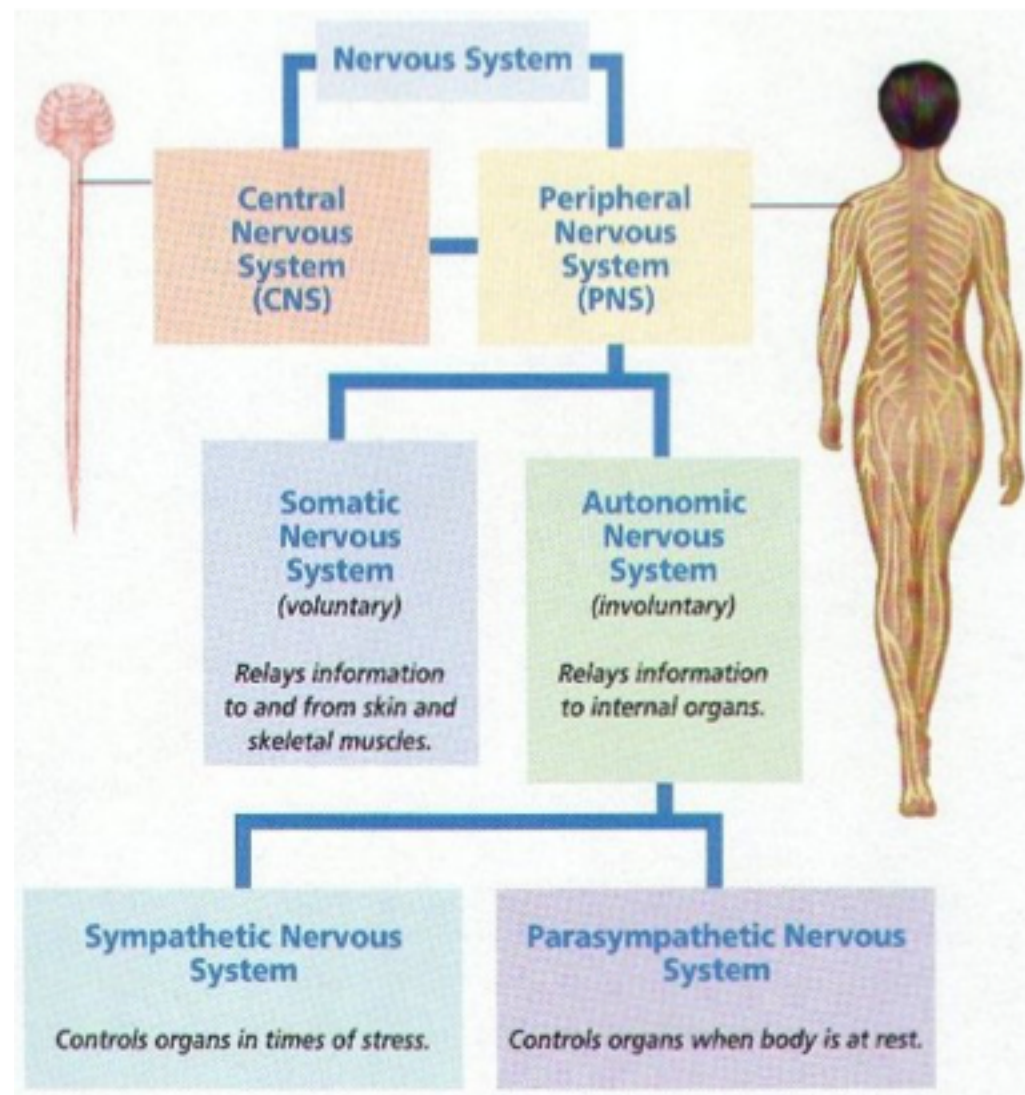


# Autonomic nervous system (ANS)

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- The autonomic nervous system regulates the functioning of internal organs and glands automatically – without you being consciously aware of it.
- It is possible to exert some conscious control over ANS responses, typically this can be done through a process of biofeedback.
- It has 2 sub-divisions; sympathetic and parasympathetic nervous systems

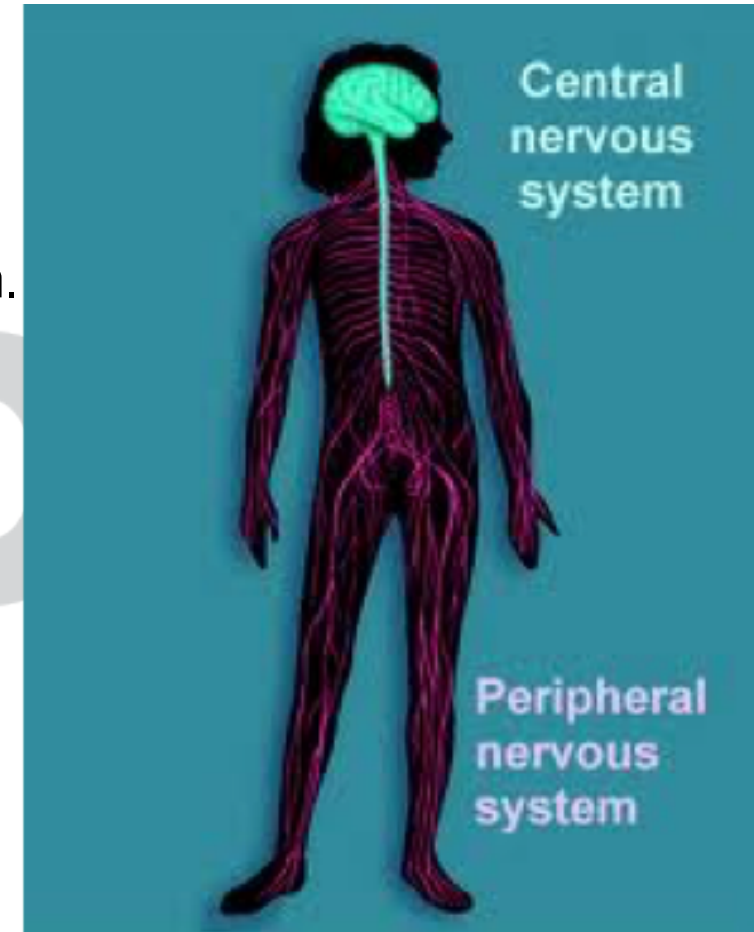






# Sympathetic nervous system

- A division of the ANS that activates the internal muscles, organs and glands to prepare the body for vigorous activity, or to deal with a stressful or threatening situation.
- The sympathetic nervous system releases adrenalin, increases heart rate and respiration and dilates the pupils to enable better vision. To allow this to happen other physiological functions are suppressed.
- The sympathetic nervous system also activates the fight-flight-freeze response.



# What is the fight-flight-freeze response?

- The fight-flight-freeze response is initiated by the sympathetic nervous system and prepares the body to confront a stressful situation to optimise the chance of survival.
- Which mechanism is adopted is dependent on the likelihood of survival in each situation; fight – stay and attack, flight – run, freeze – go unnoticed or detected.



## Short Answer Activity: Write a response

Jonah was very scared of spiders. One morning, he walked into the bathroom and saw a very large spider on the mirror. He screamed and ran out of the bathroom. His mouth was dry, his heart was beating very fast and he was also breathing quickly. With reference to the human nervous system, explain why Jonah would have experienced these changes in his body.

(3 marks)

## Short Answer Activity: Mark this response

Jonah was very scared of spiders. One morning, he walked into the bathroom and saw a very large spider on the mirror. He screamed and ran out of the bathroom. His mouth was dry, his heart was beating very fast and he was also breathing quickly. With reference to the human nervous system, explain why Jonah would have experienced these changes in his body.

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Sample Response:

Seeing the spider made Jonah's sympathetic nervous system activate, hence he experienced increased heart beat and breathing.

# Short Answer: Teacher's mark

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Sample Response:

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<i>Key Points</i>	<i>Mark Allocation</i>
<b>Fearful stimulus activates Jonah's sympathetic nervous system</b>	<b>1 mark</b>
<b>Sympathetic nervous system activates fight-or-flight response</b>	<b>1 mark</b>
<b>Physiological responses characteristic of fight-or-flight response</b>	<b>1 mark</b>

**(2014 VCAA Exam Section B Q5)**

## Short Answer Activity: Read this top band exemplar

Jonah was very scared of spiders. One morning, he walked into the bathroom and saw a very large spider on the mirror. He screamed and ran out of the bathroom. His mouth was dry, his heart was beating very fast and he was also breathing quickly. With reference to the human nervous system, explain why Jonah would have experienced these changes in his body.

(3 marks)

Exemplar Response:

Seeing a spider (a fearful stimulus) activated Jonah's sympathetic nervous system. The activation of the sympathetic nervous system produced the physiological responses characteristic of the fight-or-flight response, including increased heart rate and breathing.

<i>Key Points</i>	<i>Mark Allocation</i>
<b>Fearful stimulus activates Jonah's sympathetic nervous system</b>	<b>1 mark</b>
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**(2014 VCAA Exam Section B Q5)**

# Short Answer Activity: Analysis of exemplar

Jonah was very scared of spiders. One morning, he walked into the bathroom and saw a very large spider on the mirror. He screamed and ran out of the bathroom. His mouth was dry, his heart was beating very fast and he was also breathing quickly. With reference to the human nervous system, explain why Jonah would have experienced these changes in his body.

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**(2014 VCAA Exam Section B Q5)**



# Short Answer Activity: Mark your response

Jonah was very scared of spiders. One morning, he walked into the bathroom and saw a very large spider on the mirror. He screamed and ran out of the bathroom. His mouth was dry, his heart was beating very fast and he was also breathing quickly. With reference to the human nervous system, explain why Jonah would have experienced these changes in his body.

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# Parasympathetic nervous system

- A division of the autonomic nervous system that keeps the body functioning effectively.
- It counterbalances the sympathetic nervous system by returning the body to a state of calm once the cause of stress or threat is no longer present.
- It maintains homeostasis in times of low stress. Homeostasis is the body's natural state of equilibrium.

# Discussion Question

- What is the purpose of homeostasis?



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## Did you think about:

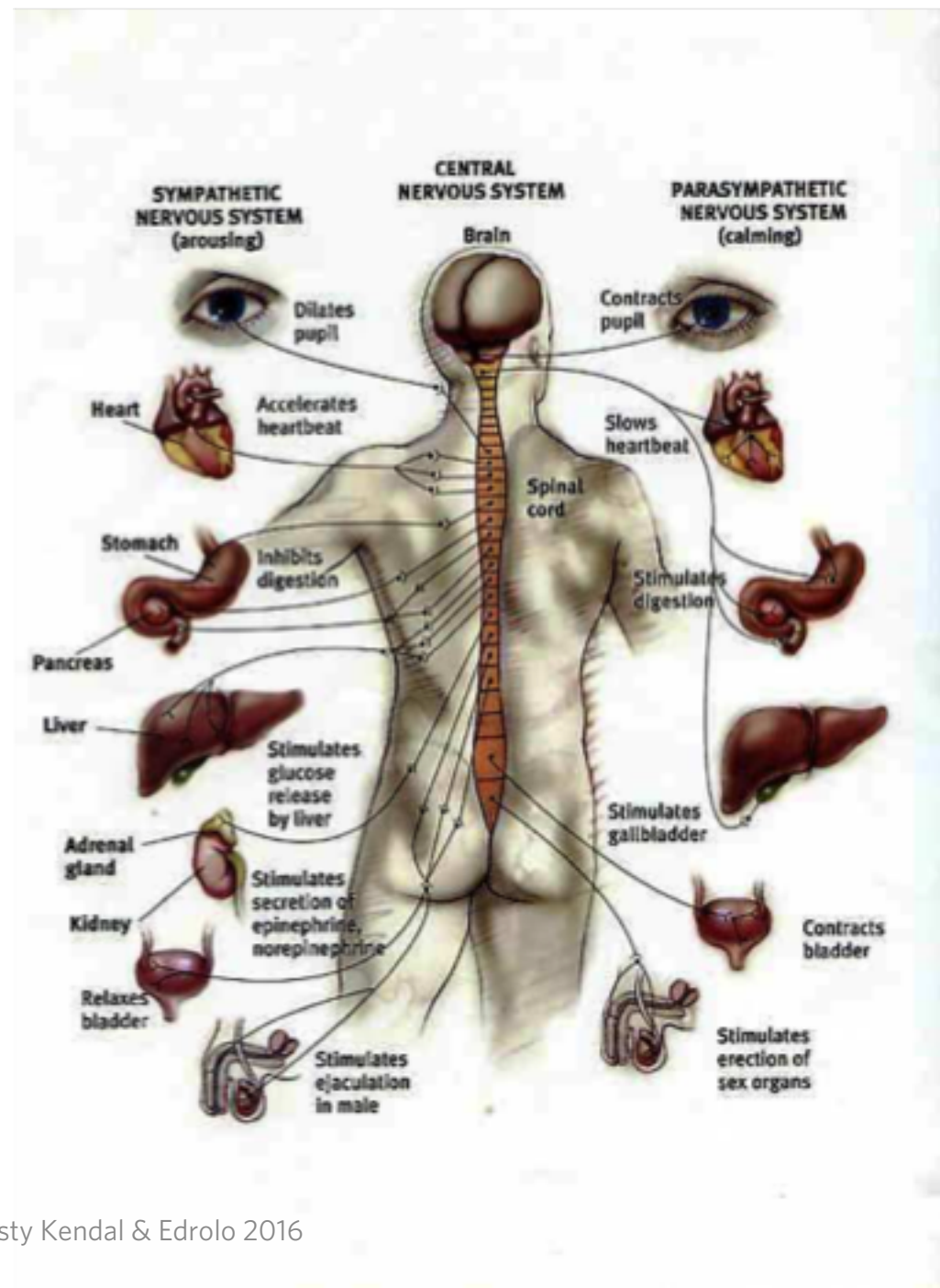
- Homeostasis maintains equilibrium and keeps all functions operating during times of low stress; this is integral
- Its purpose also includes allowing resources to be saved for when needed, and restoring depleted resources



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# You might be asking...

- Why do we need both the sympathetic and parasympathetic nervous systems?
- Why don't we just stay on high alert all the time?
- How do they work together to keep the body functioning at its optimal?



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# Discussion Questions

- How do the sympathetic and parasympathetic nervous systems work together to optimise survival?
- Can both nervous systems function at the one time?



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# Did you think about:

How do the sympathetic and parasympathetic nervous systems work together to optimise survival?

- The give and take from nervous systems should be acknowledged here.
- Restoration and depletion of resources is a major issue for sympathetic nervous system arousal, hence the importance of the parasympathetic nervous system
- Optimizing survival and harnessing resources is vital

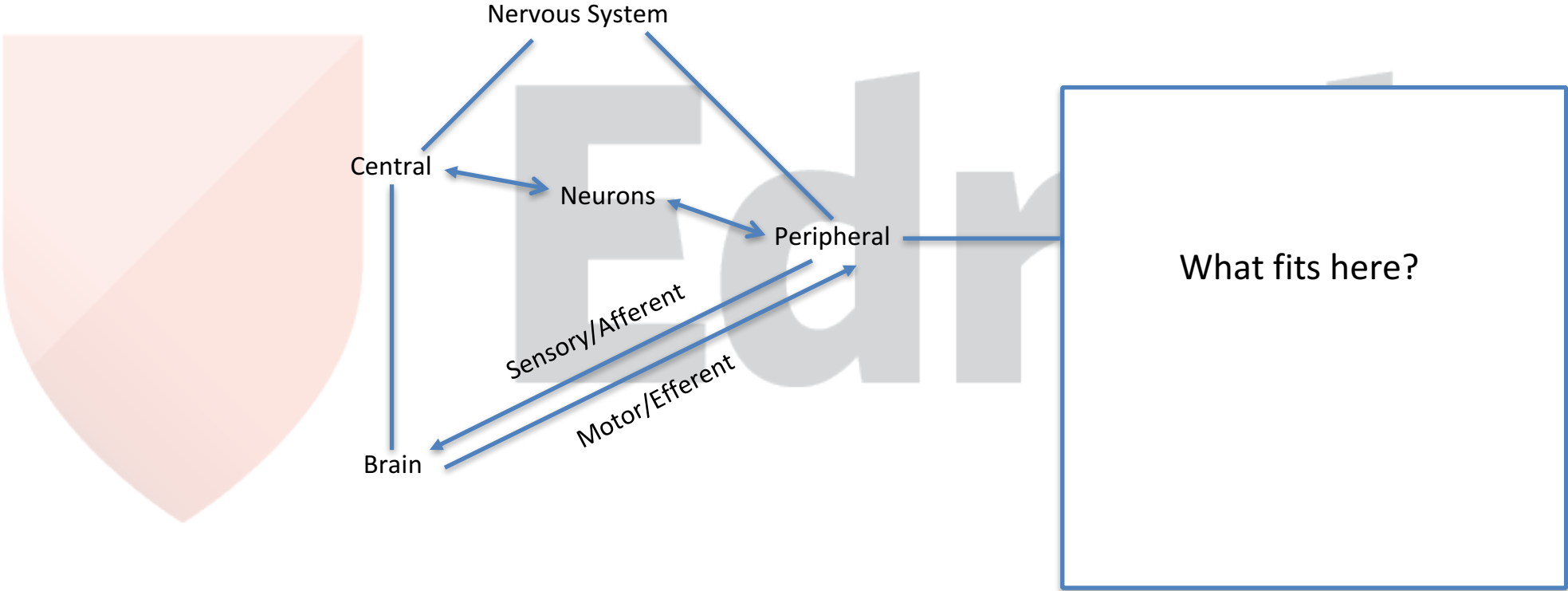


# Did you think about:

Can both nervous systems function at the one time?

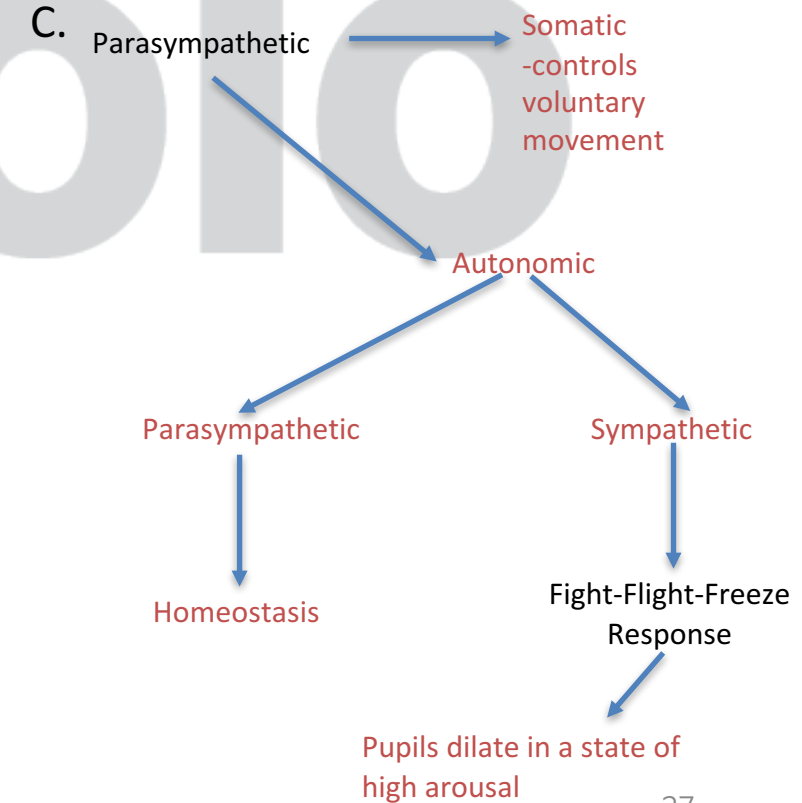
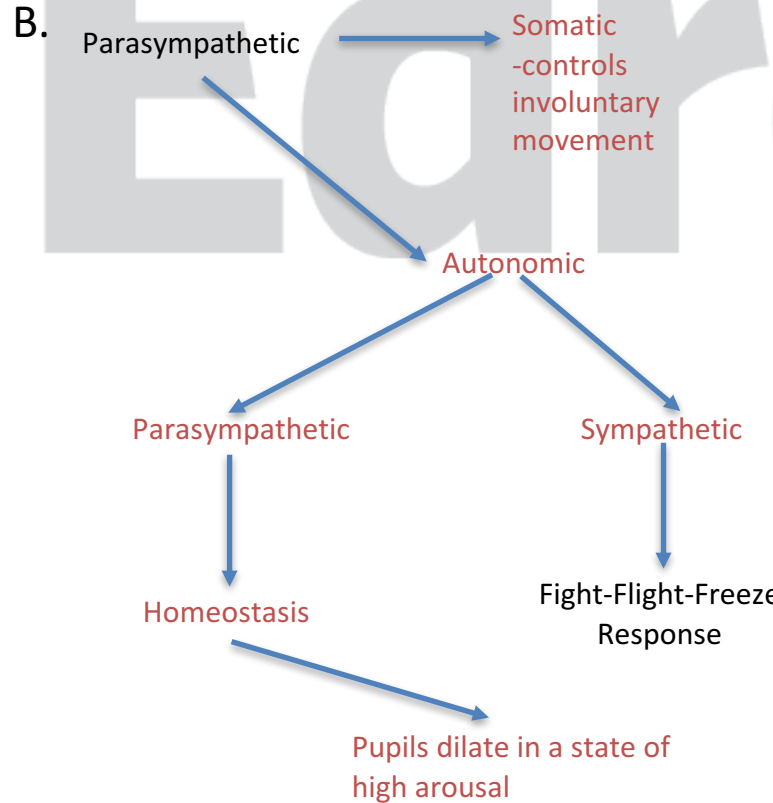
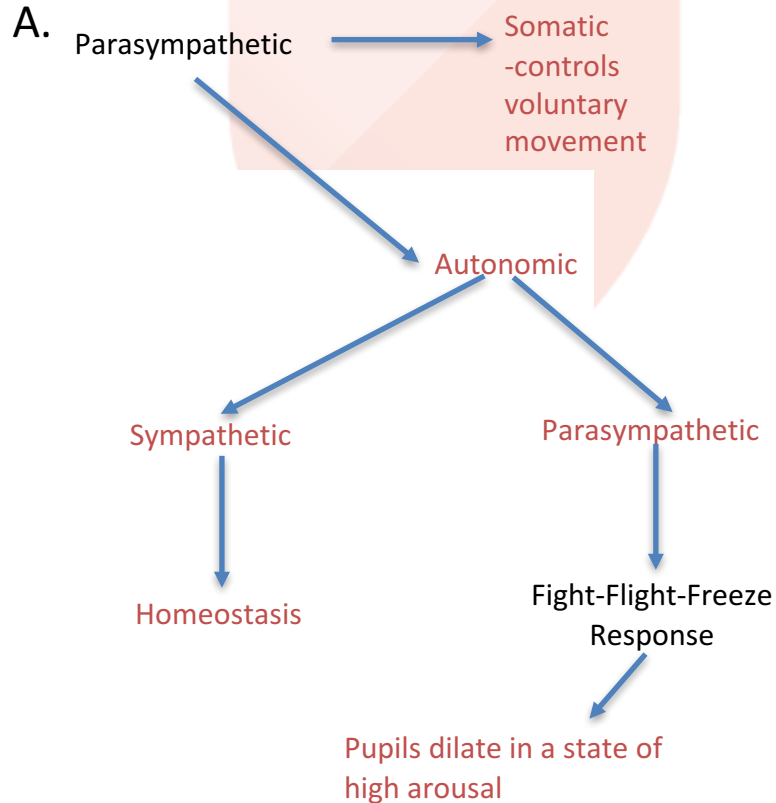
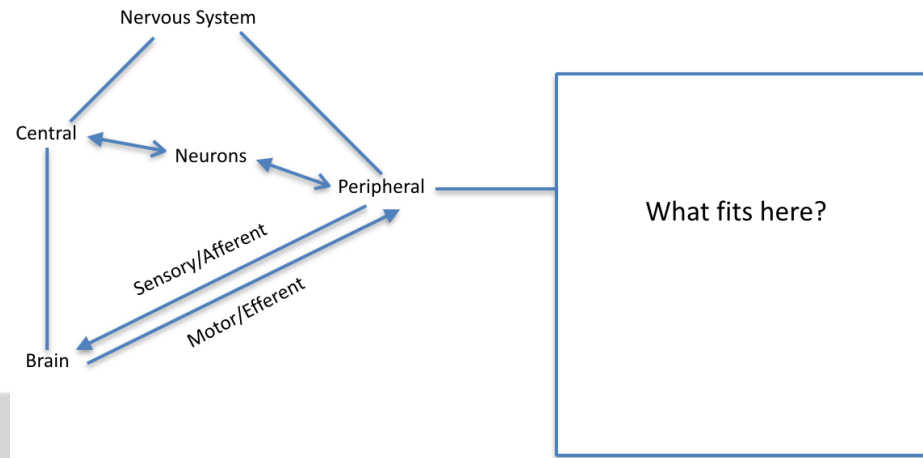
- This is a theoretical question, so although it isn't really support by theory there are always exceptions to the rule in humans
- Essentially though, there are good reasons above why each nervous system operates at one time, while the other does not

# Mind Map



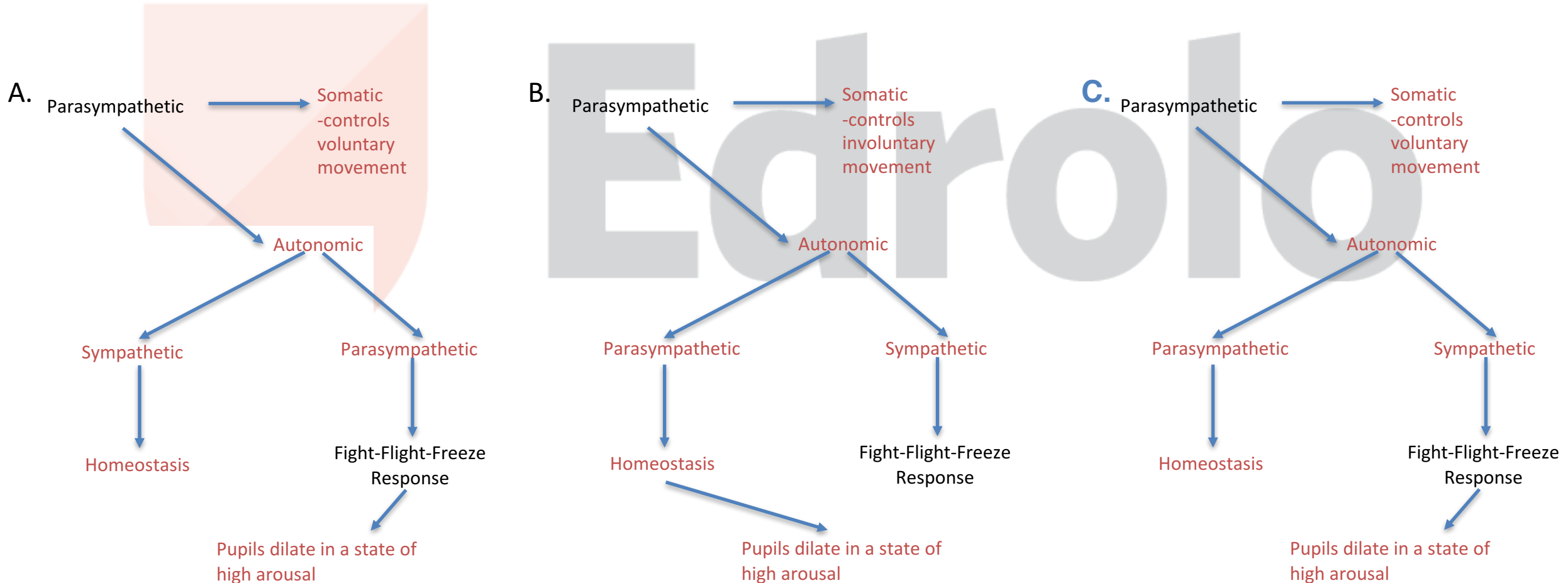
# Mind Map Activity

Which of the following mind maps is correct?

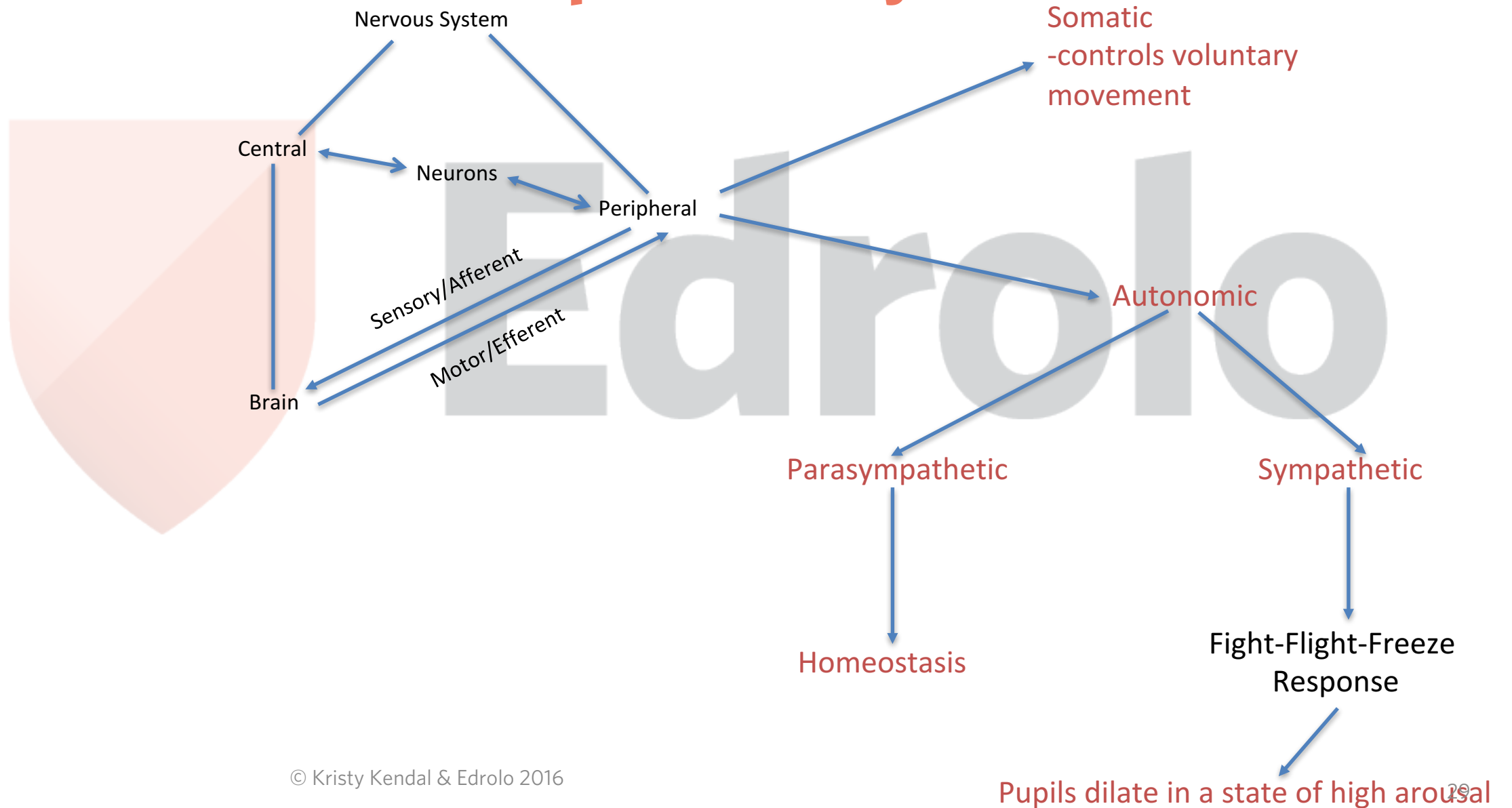


# Mind Map Response

Which of the following mind maps is correct?



# Mind Map Summary



# Fast five - Question 1

What are the two subdivisions of the peripheral nervous system?



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# Fast five - Question 1 (Answer)

What are the two subdivisions of the peripheral nervous system?

**Answer:**

Somatic and autonomic

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## Fast five - Question 2

Which of these subdivisions controls voluntary movement?



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## Fast five - Question 2 (Answer)

Which of these subdivisions controls voluntary movement?

**Answer:**  
Somatic

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## Fast five - Question 3

What are the two subdivisions of the autonomic nervous system?



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## Fast five - Question 3 (Answer)

What are the two subdivisions of the autonomic nervous system?

**Answer:**

Parasympathetic and sympathetic

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## Fast five - Question 4

What is the name of the state when the body is maintaining equilibrium?

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## Fast five - Question 4 (Answer)

What is the name of the state when the body is maintaining equilibrium?

**Answer:**

Homeostasis

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## Fast five - Question 5

What happens to the pupils in a state of high arousal?



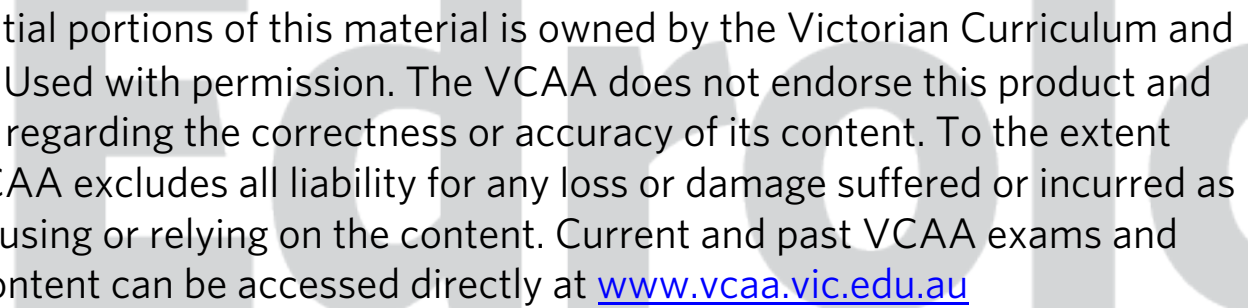
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## Fast five - Question 5 (Answer)

What happens to the pupils in a state of high arousal?

**Answer:**  
Dilate

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