

# Mobility after SCI: Conceptualized as a Phenotype

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...Question...

When faced with a mobility challenge, what does a person choose to do?

Do they choose the most direct route?

Do they choose a longer, indirect route?

Do they choose not to participate?

...Question...

When faced with a mobility challenge, what does a person choose to do?

Their chosen behavior is 'ICF performance'

Could mobility 'performance'  
also be considered a phenotype?



What then is the Genotype?

# Genotype

- injury motor & sensory level
- injury motor & sensory completeness
- fitness level
  - muscular strength
  - cardvascular endurance
  - anaerobic power
- Gender
- Age
- duration of injury
- wheelchair skill
- wheelchair configuration
- pain
- Spasticity
- walking ability

# Phenotype

- mobility performance in the community  
(ICF performance)
  
- mobility performance on standardized tests  
(ICF capacity)



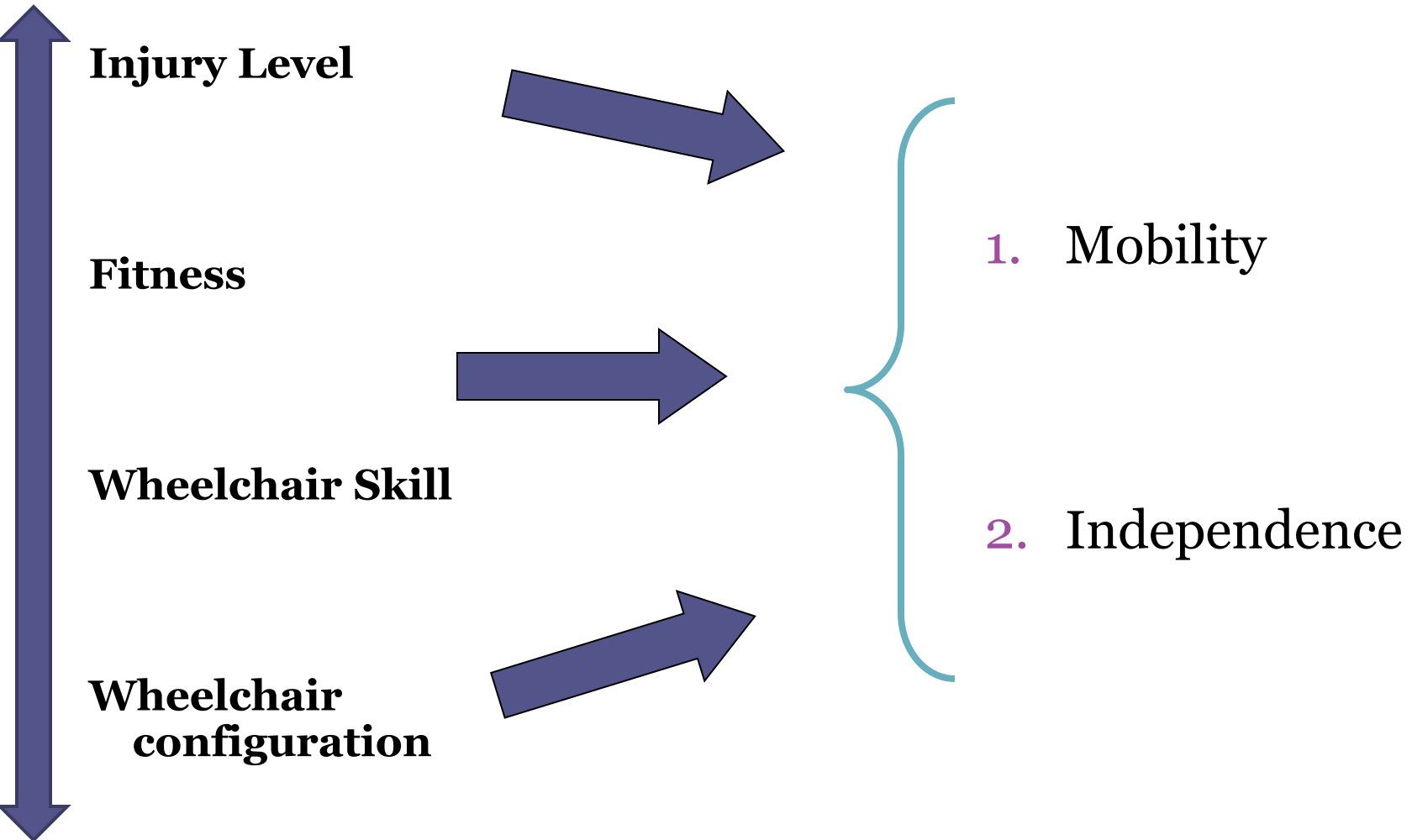
# Phenotype

- A range of possible performances
  - Day to day variance
  - Vary over time
  - Can shift towards increased or decreased mobility
  
  - Goal: shift towards maximal mobility....
  
  - Does a person do all that you think they could do?
    - Paralympian vs. Early post injury

# What are we measuring?

- Mostly genotype
- Phenotype
  - ICF capacity... But is that enough?

# Development of a Research Theme



# Research Questions

1. How is ABILITY to complete a Mobility skill affected by or related to..
  1. Injury Level
  2. Fitness
  3. Wheelchair configuration
  
2. If a person can complete a skill, how is mobility skill PERFORMANCE affected by or related to...
  1. Injury Level
  2. Fitness
  3. Wheelchair configuration

# Initial Research

## Testing Protocol

- 4 test days
  1. Aerobic Capacity (Endurance)
  2. Strength Capacity (Strength)
  3. Anaerobic Capacity (Power)
  4. 14 wheelchair/mobility skills (adapted wheelchair circuit)
- Each test day separated by at least 48 hours
- All testing completed in 5 weeks

- **14 Skills**

- Completed as fast as possible
- Time to complete recorded (Performance)

1. Figure 8 propulsion
2. Small threshold (1.2 cm)
3. Large threshold (4.0 cm)
4. Platform Climb (10.0 cm)
5. 15m Sprint
6. Grass
7. 3% Ramp
8. 6% Ramp

9. Open, enter, close door
10. Side Slope
11. Stationary Wheelie
12. Propulsion in a Wheelie
13. Level Transfer
14. 3 minute wheel

# But what is missing?

When faced with a mobility challenge, what does a person choose to do?

# Additional Personal Factors

- Personality
  - Risk Takers vs. Risk Adverse
- Skill Self-Efficacy
- Cost vs Benefit
- Role of personal experiences
  - Failed attempts
  - Successful experiences



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# Genotype

- Defines the upper boundary
- Defines the motor & sensory resources available to support mobility

# From Genotype to Phenotype

- Genotype – what a person ‘should’ be able to do based on ....
- Phenotype - what they actually do ‘ICF Performance’

...Question...

When faced with a mobility challenge, what does a person choose to do?

Do they choose the most direct route?

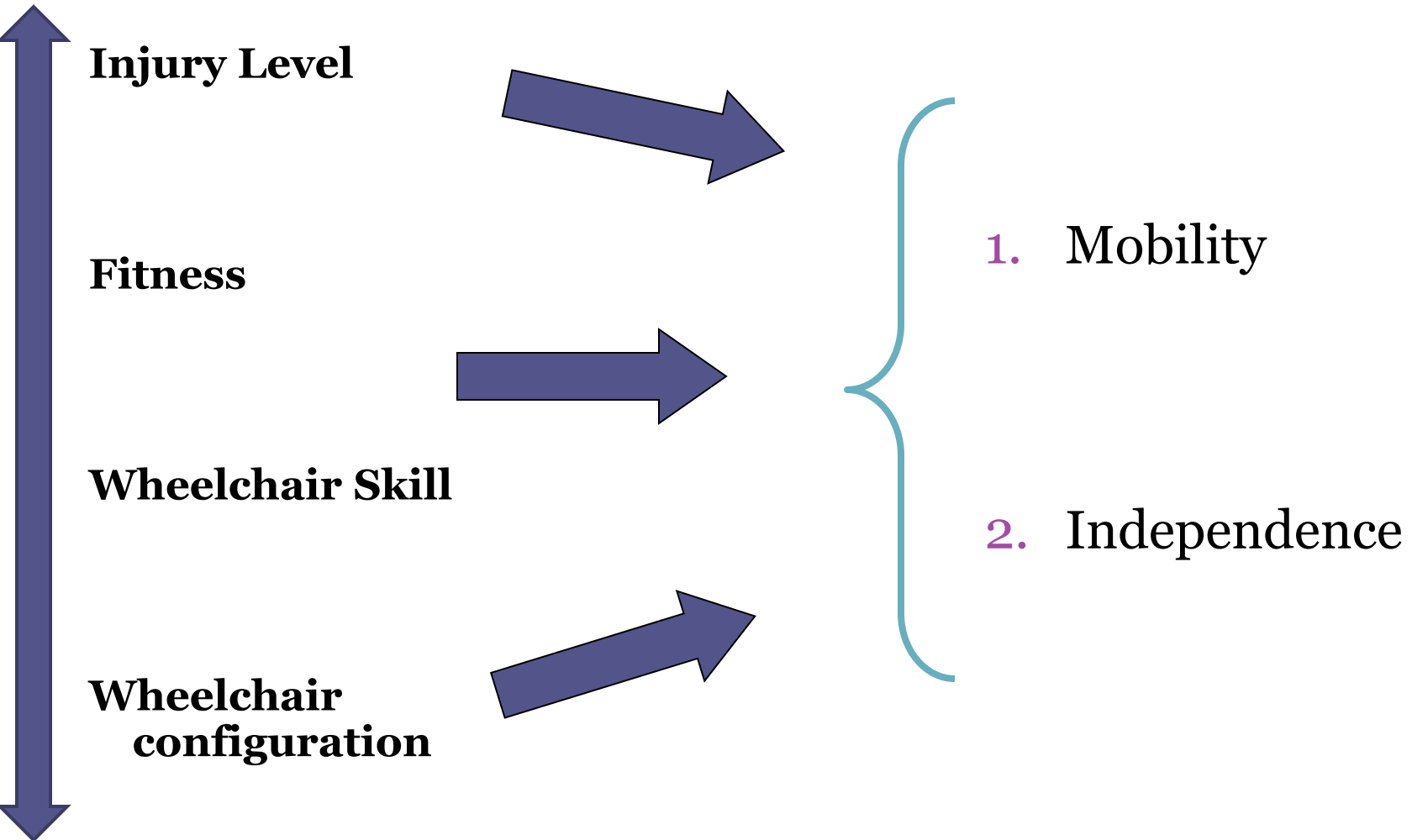
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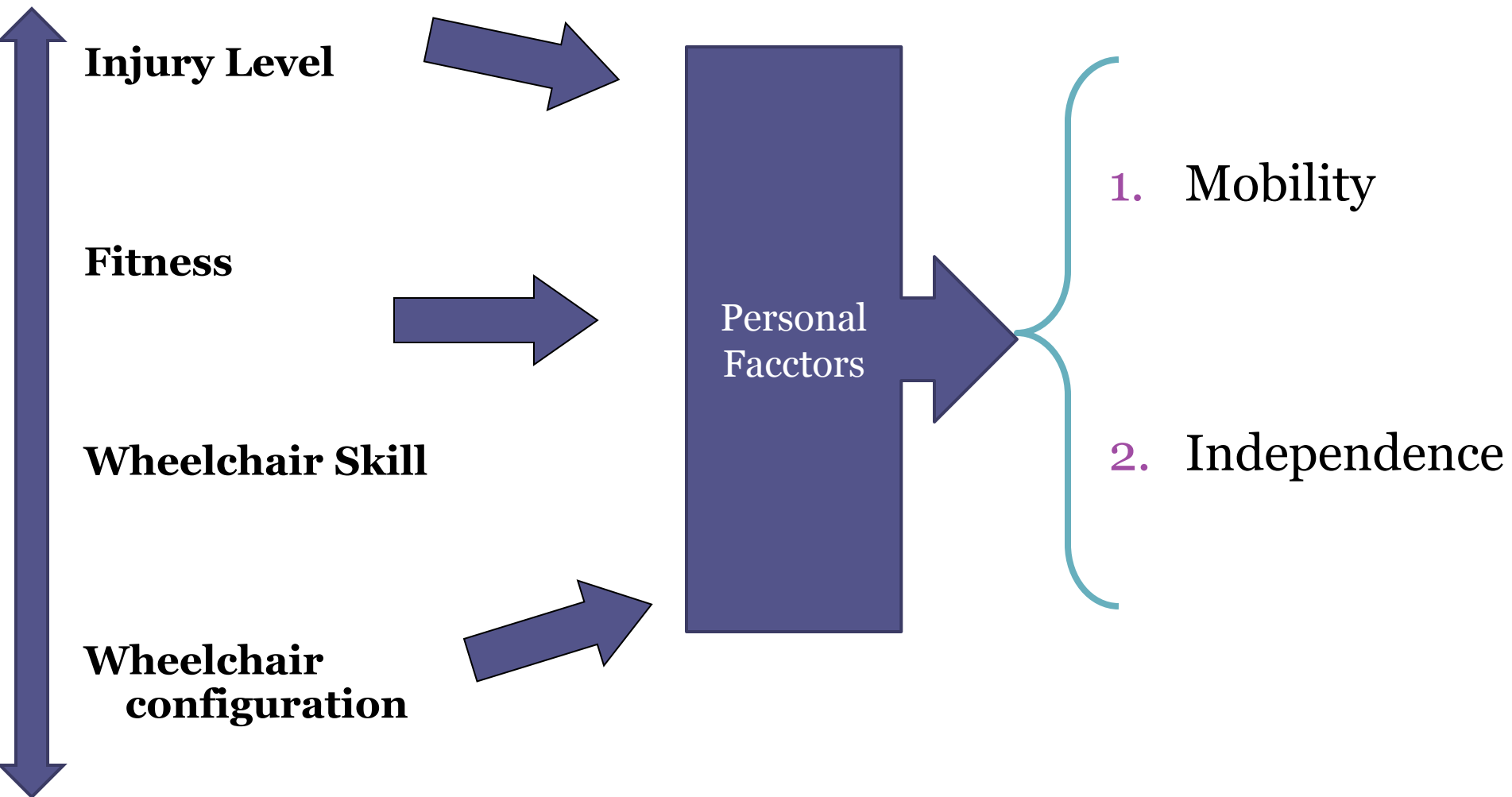
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# Development of a Research Theme



# Development of a Research Theme





ICF

Health Condition

Capacity

Performance

Body Structure  
Body Function

Activity  
Mobility

Participation

Personal

Environmental

Contextual Factors



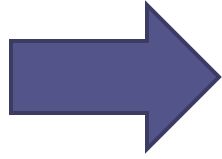
Questions

Comments

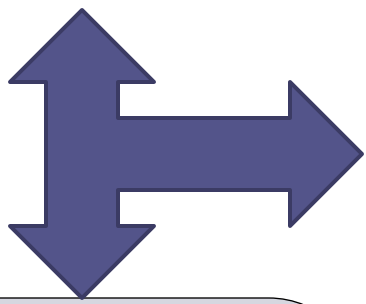
Thoughts

ICF

Health Condition



Body Structure  
Body Function

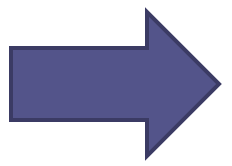


Activity

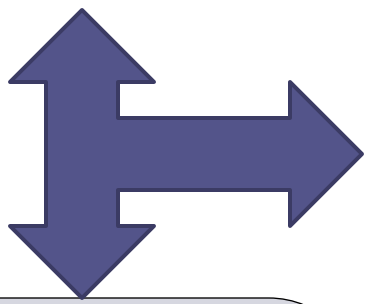
Personal

ICF

Health Condition



Body Structure  
Body Function



Personal

Activity

ICF

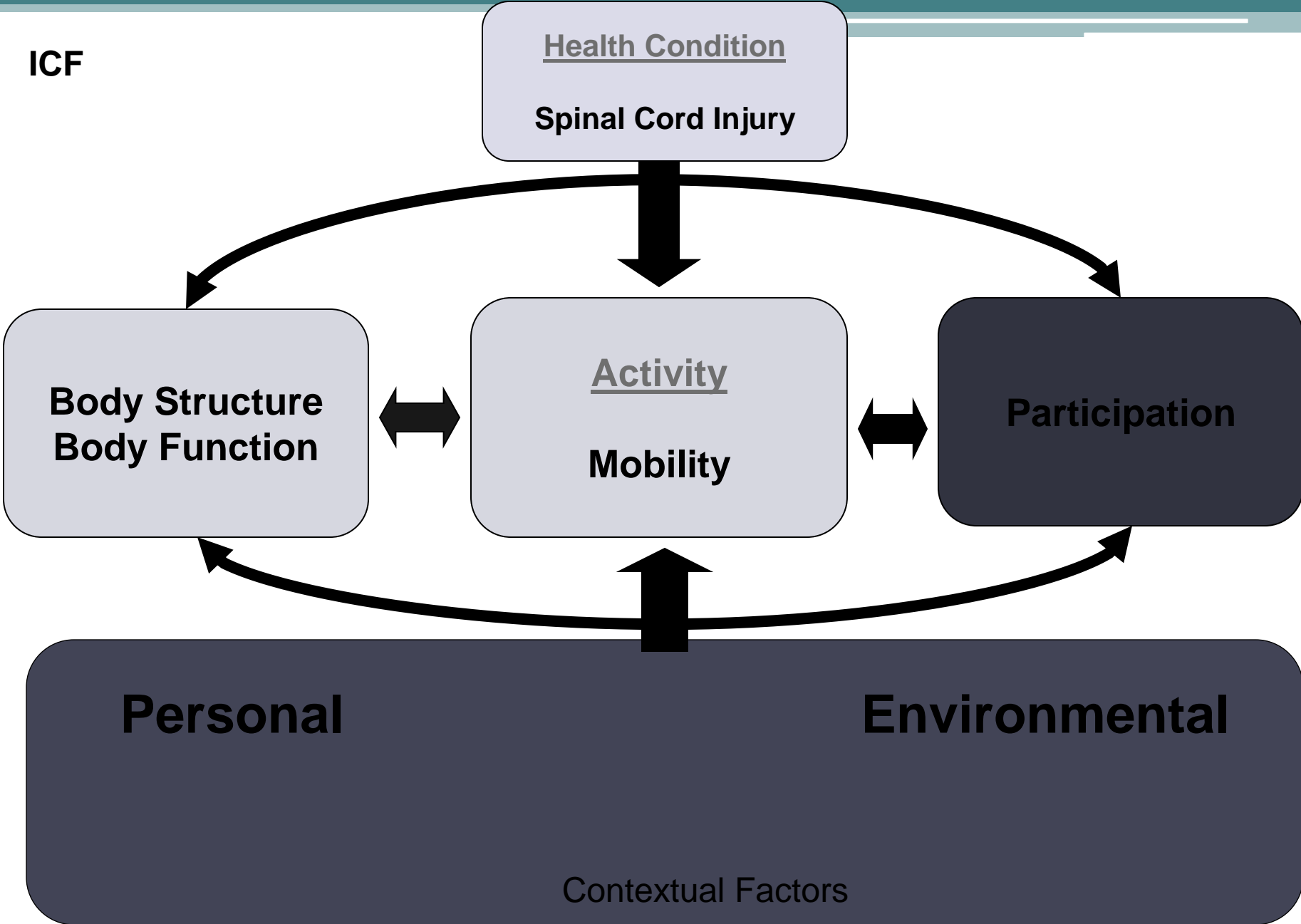
Health Condition  
Spinal Cord Injury

Body Structure  
Body Function

Activity  
Mobility

Participation

Personal Environmental  
Contextual Factors



# Different Approaches

- Clinical
  - Comprehensive, all inclusive picture, individual adjustments
- Research
  - Reductionist approach

ICF

Health Condition

Body Structure  
Body Function

Activity

Participation

Personal

Environmental

Contextual Factors

