



A Framework for Physical Activity as a Complex and Multidimensional Behavior

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Measurement of Active and Sedentary Behaviors: Closing the Gaps in Self-Report Methods

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OBJECTIVES

- PA Self-Report Methods: 'Hit and Miss'
- Conceptual Framework: PA
- Revisiting Definitions
- Considerations: Selecting Self-report Methods



BACKGROUND

- Research Link: PA and Health Outcomes
- PA Incorporated: Design and Implementation
 - Need: Accurate Quantification of PA
- Lack of 'Gold Standard' Measure(s)
- Relevant Construct Confusion



SELF-REPORT HIT AND "MISS"

- Misconstrue
- Miscount
- Mistakenly
- Misname
- Misrepresent
- Mishear

Individual-Level Population-Level Surveillance

- Missay
- Miscode
- Misdescribe
- Misquote
- Misguide
- Misidentify
- Misinform
- Miscue
- Misinterpret
- Mischievous

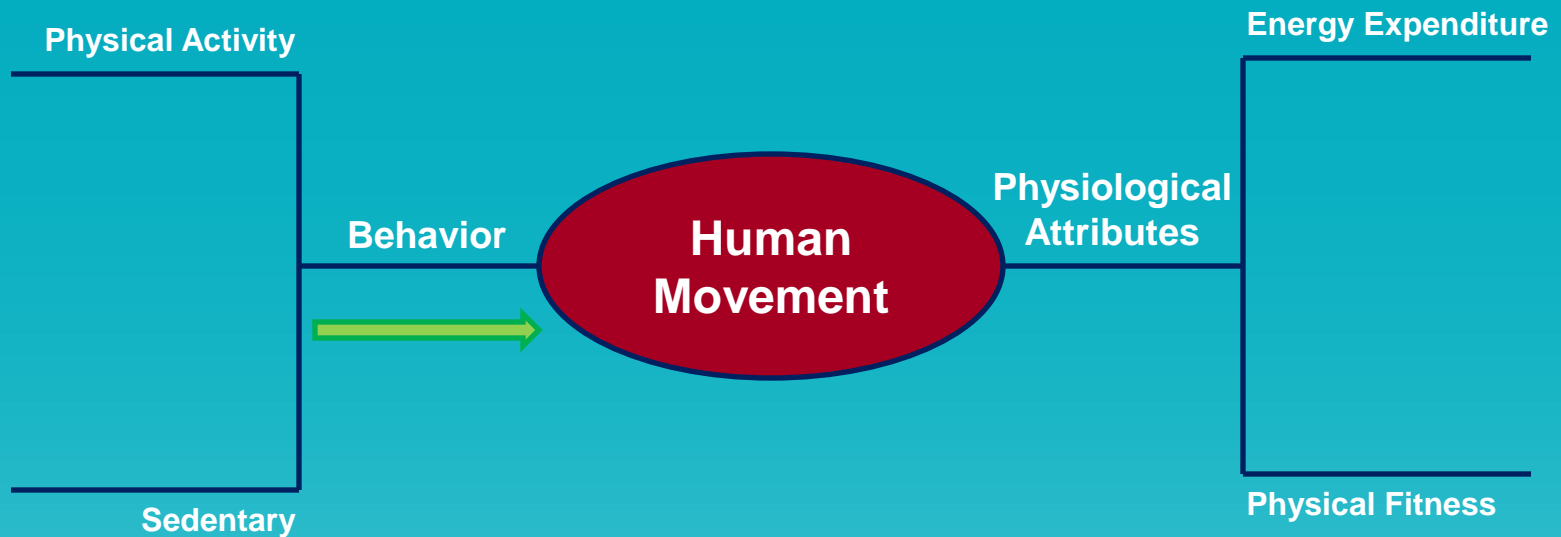




FRAMEWORK

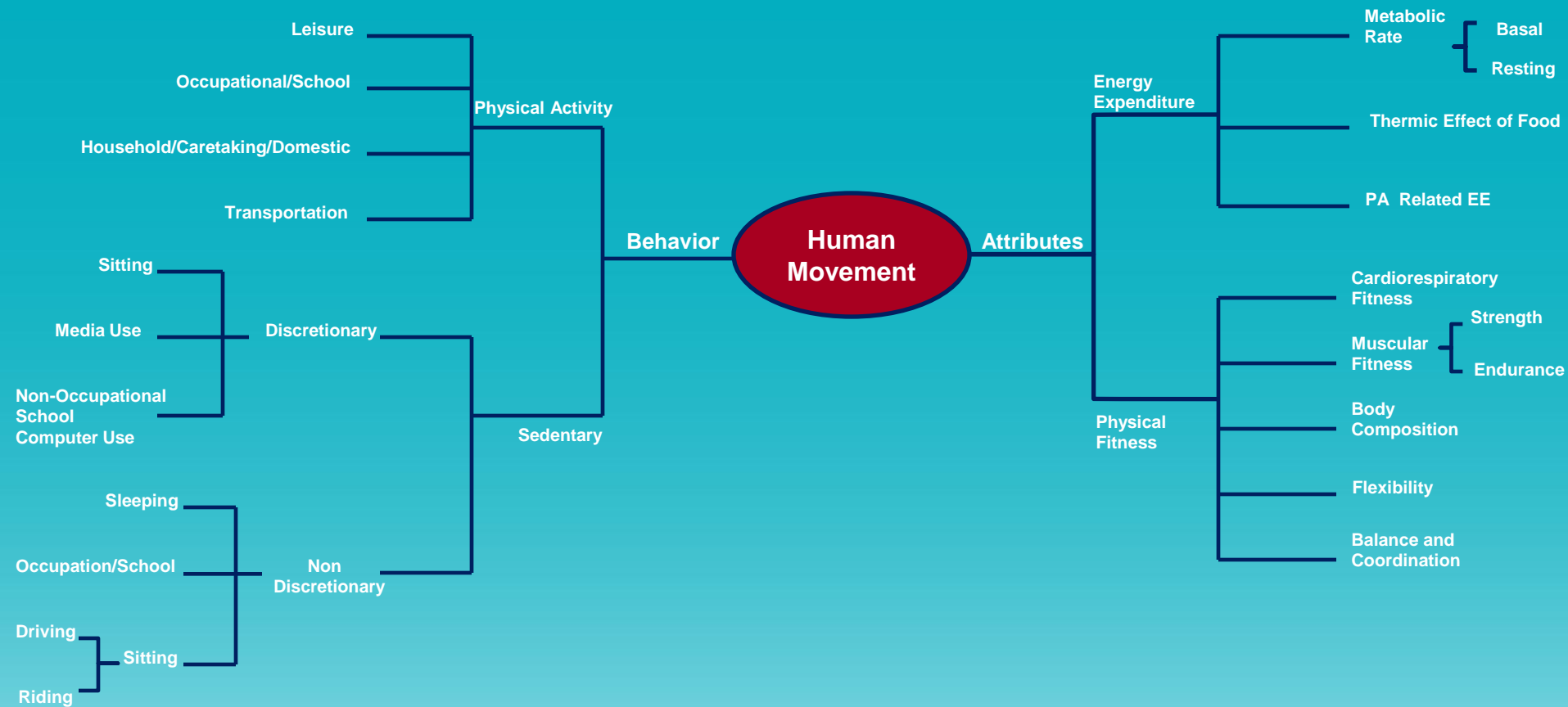


CONCEPTUAL FRAMEWORK HUMAN MOVEMENT



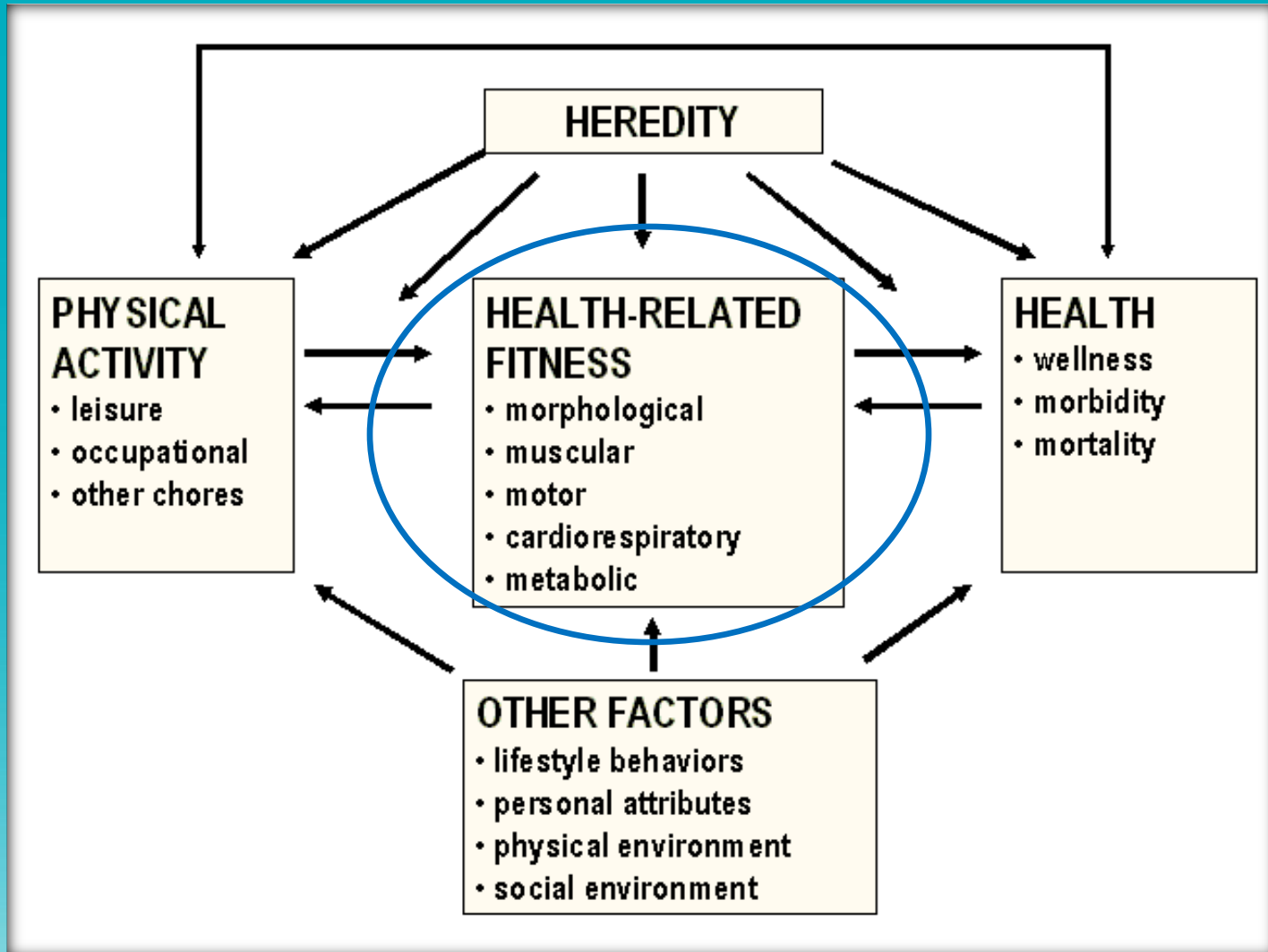


Human Movement Framework





BOUCHARD AND SHEPHARD





LAMONTE and AINSWORTH

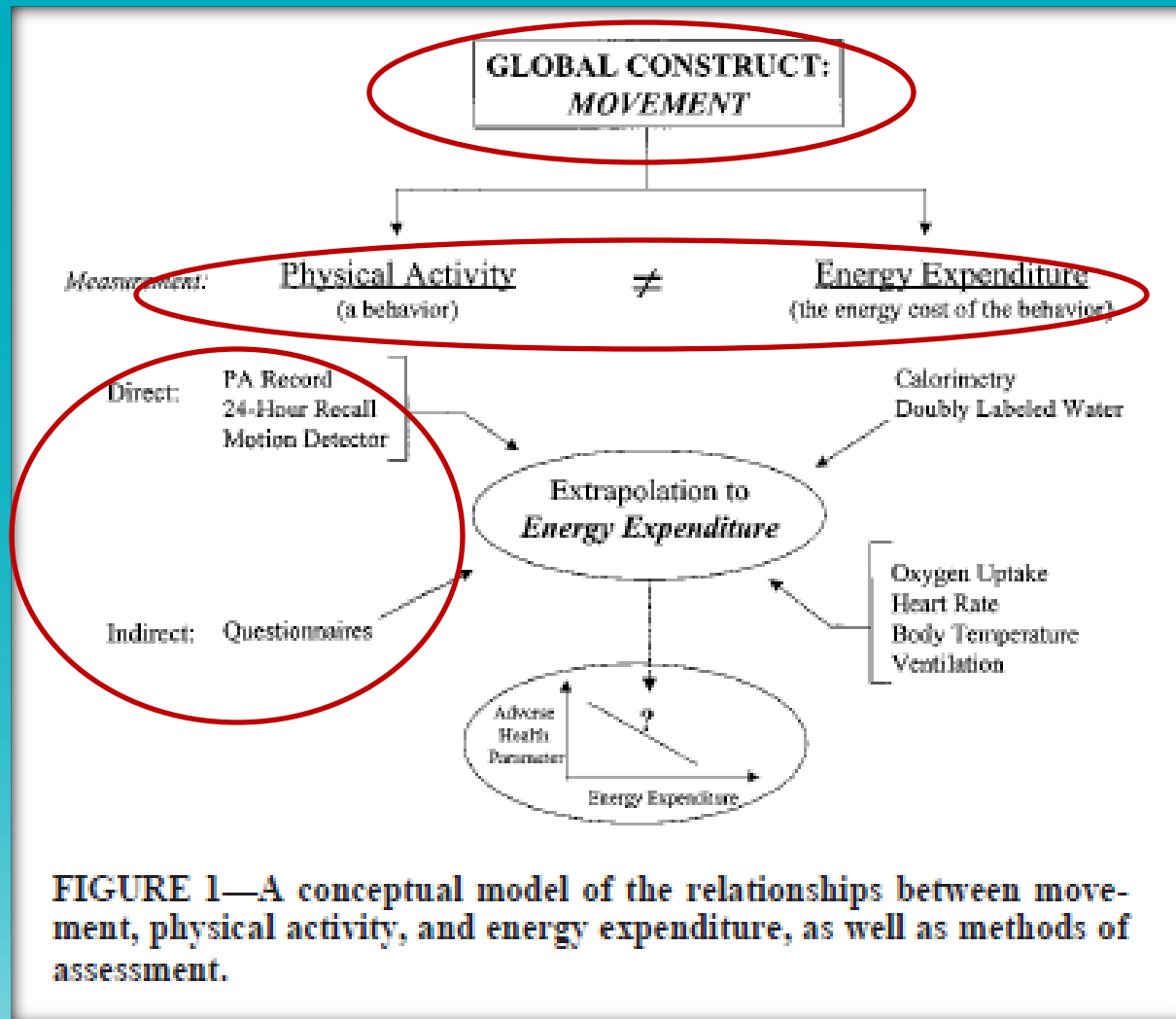
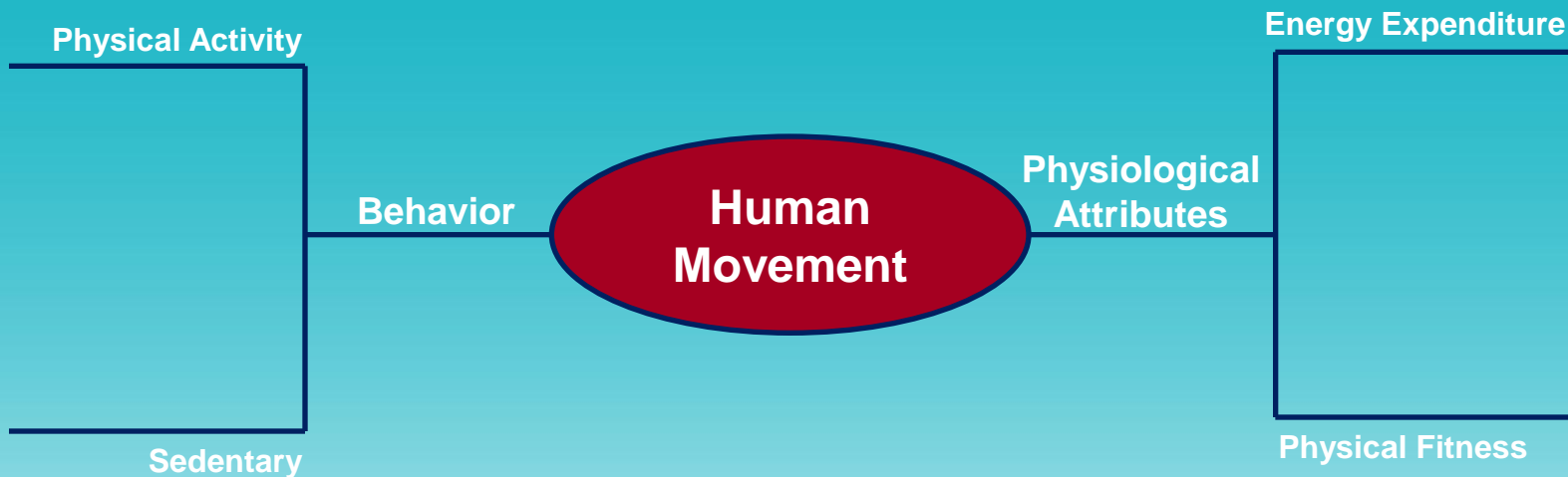


FIGURE 1—A conceptual model of the relationships between movement, physical activity, and energy expenditure, as well as methods of assessment.



PHYSICAL ACTIVITY MODEL COMPARISON

	Bouchard & Shephard 1994	LaMonte & Ainsworth 2001	Pettee Gabriel & Morrow 2010
Main Construct	Health-Related Fitness	Movement	Movement
Sedentary Behavior	No	No	Yes
Relationship between Behavior & Attributes	No	No	Yes





DEFINITIONS



DEFINITIONS

Physical Activity, Exercise, and Physical Fitness: Definitions and Distinctions for Health-Related Research

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Tearsheet requests to Dr. Caspersen.

Synopsis

“Physical activity,” “exercise,” and “physical fitness” are terms that describe different concepts.

However, they are often confused with one another, and the terms are sometimes used interchangeably. This paper proposes definitions to distinguish them.

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure. The energy expenditure can be measured in kilocalories. Physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities. Exercise is a subset of physical activity that is planned, structured, and repetitive and has as a final or an intermediate objective the improvement or maintenance of physical fitness. Physical fitness is a set of attributes that are either health- or skill-related. The degree to which people have these attributes can be measured with specific tests.

tional framework for comparing studies that relate physical activity, exercise, and physical fitness to health.



DEFINITIONS

Terminology of Physical Activity, Physical Fitness, and Health

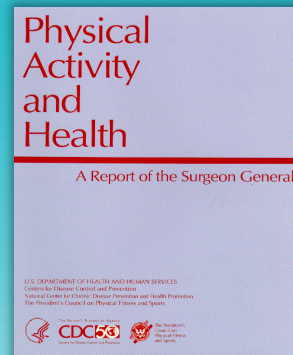
This section discusses four broad terms used frequently in this report: physical activity, exercise (or exercise training), physical fitness, and health. Also included is a glossary (Table 2-1) of more specific terms and concepts crucial to understanding the material presented in later parts of this chapter and report.

Physical activity. Physical activity is defined as bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal level. Physical activity can be categorized in various ways, including type, intensity, and purpose.

Physical activity—Bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure.

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DEFINITIONS

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure above resting level (Caspersen et al., 1985).

Health Enhancing Physical Activity is any form of activity that benefits health.

Health Enhancing Physical Activity is any form of physical activity that benefits health and fitness without undue harm or risk (Foster, 2000). This can be all daily activities and can, but does not necessarily, include sports. Not all physical activity is beneficial for health (Hagströmer, 2007). To be beneficial for health, physical activity should be 'moderate' or 'vigorous':

Moderate-intensity physical activity raises the heart-beat and leaves the person feeling warm and slightly out of breath. It increases the body's metabolism to 3-6 times the resting level (3-6 MET 's) (Cavill et al., 2006). Brisk walking, for example, has an equivalent of 4.5 MET's (Ainsworth et al., 2000).

Vigorous-intensity physical activities enable people to work up a sweat and become out of breath. They usually involve sports or exercise, like running or fast cycling. They raise the metabolism to at least six times its resting level.



WHAT'S MISSING?

- Recognition that PA is a Complex Behavior
- Sedentary Behavior
- PA in Context of Other Constructs of HM
- Appropriate Use of Measurement Tool(s)



Conceptual Framework Human Movement

Physical Activity

Physical Activity: The behavior that drives human movement which results in physiological attributes including increased physical activity-related energy expenditure and improved physical fitness.

Sedentary

Sedentary: Behavior that produces little to no human movement resulting in minimal (or no) physiological gain.

**Human
Movement**

Physiological
Attributes

Health Enhancing PA: Activity that, when added to the light-intensity activities of daily life, produces health benefits.

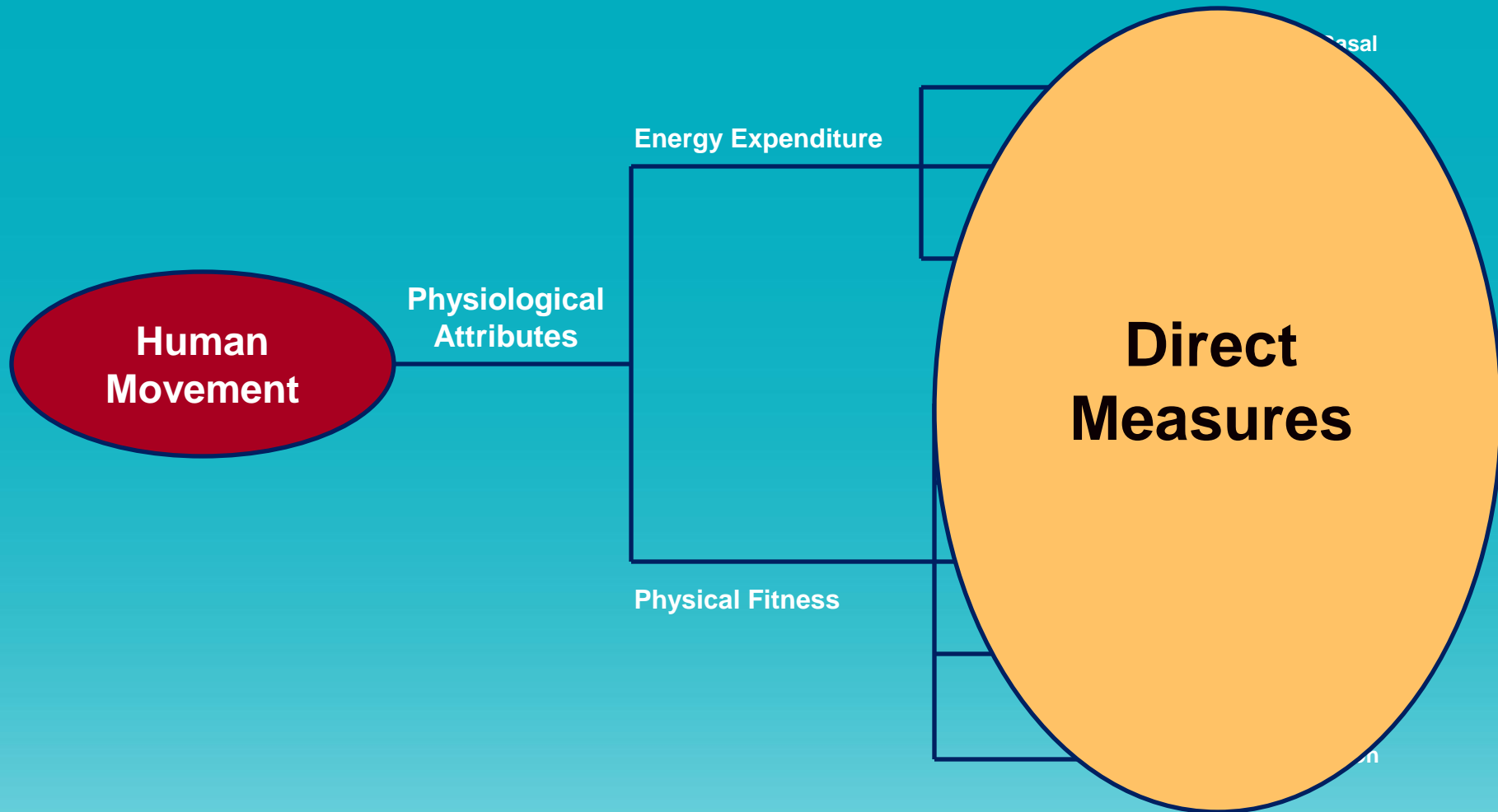
Physical Fitness



FRAMEWORK COMPONENTS

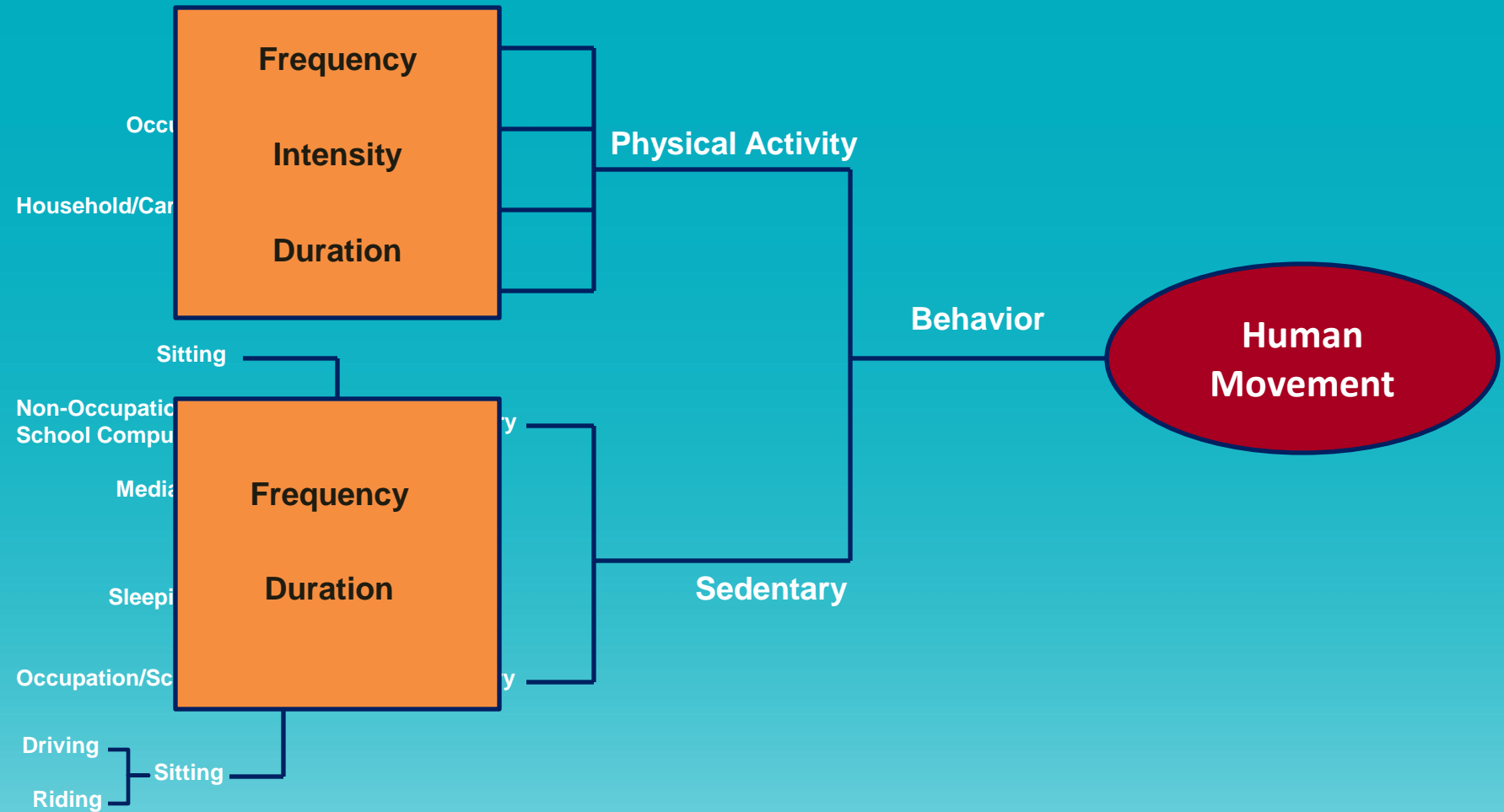


PHYSIOLOGICAL ATTRIBUTES





Behavior





PHYSICAL ACTIVITY DOMAINS

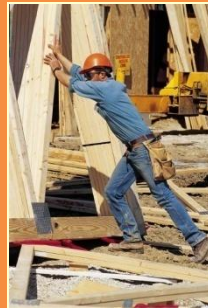
Leisure



**Household
Caretaking
Domestic**



**Occupational
School**

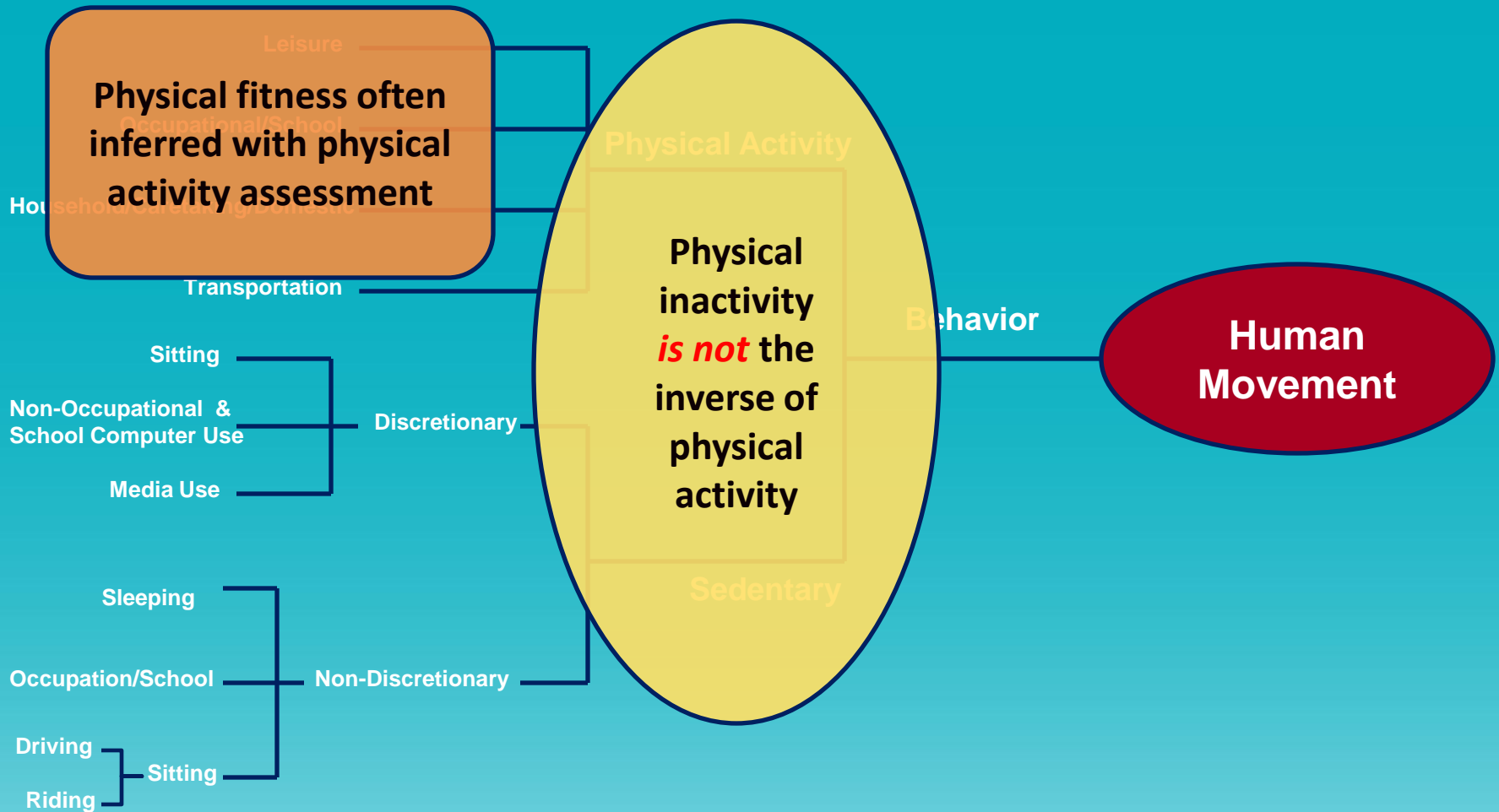


Transportation





BEHAVIOR





BEHAVIOR

Self-Report



Human Movement

Behavior

Perceived Behavior

Leisure

Occupational/School

Physical Activity

Household/Caretaking/Domestic

Transportation

Sitting

Non-Occupational & School computer use

Discretionary

Media Use

Sleeping

Sedentary

Occupational/School

Non-Discretionary

Driving

Riding

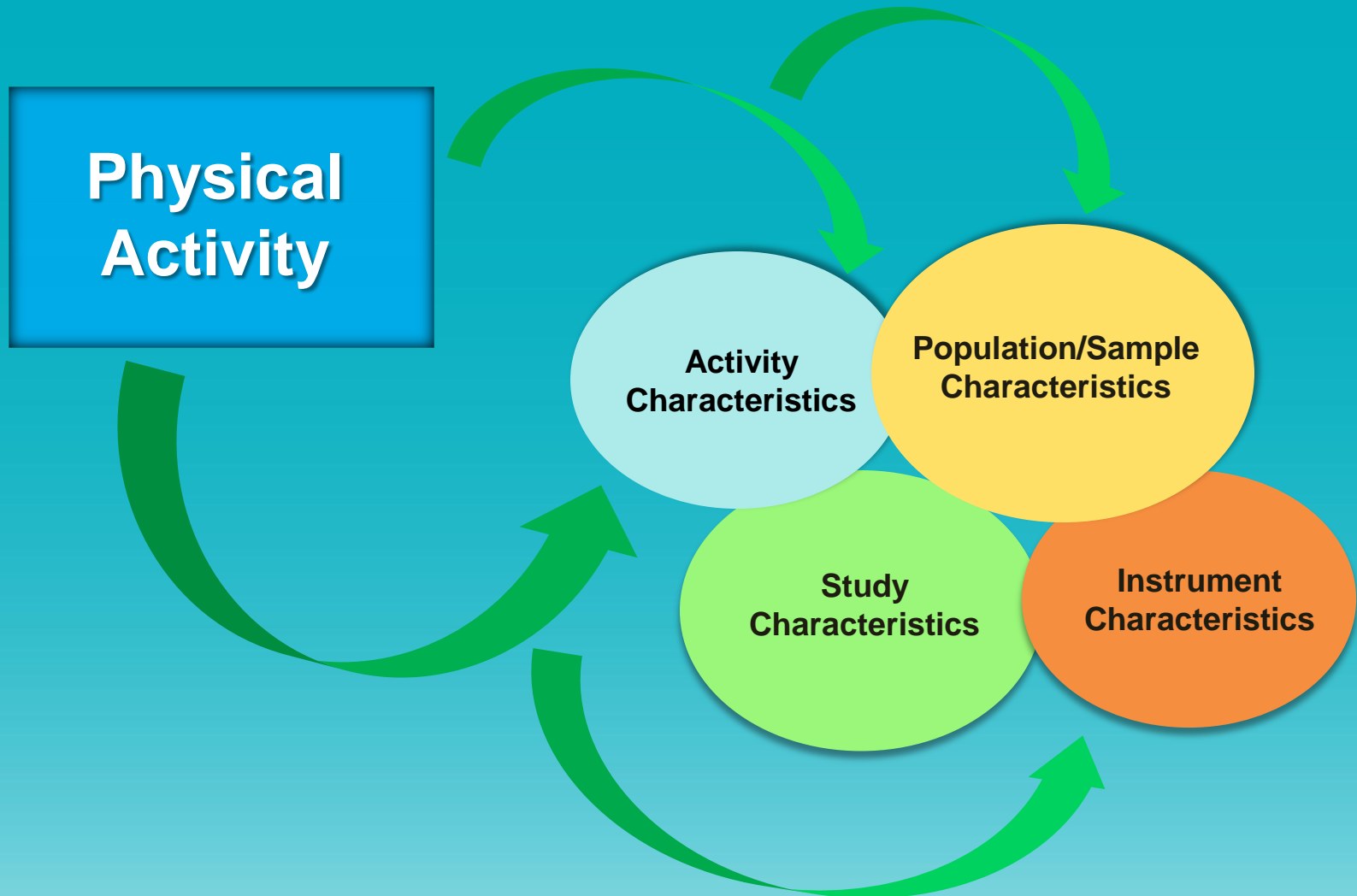
Sitting



CONSIDERATIONS



METHODOLOGICAL ISSUES





METHODOLOGICAL ISSUES

STUDY CHARACTERISTICS

**Study
Characteristics**

Budget

Staff Resources

Study Design

Population

Sample Size

Study Objectives

Outcomes and Confounders

Geographical Location/Seasonality

Temperature, Precipitation, Daylight Hours



METHODOLOGICAL ISSUES

POPULATION CHARACTERISTICS



- Age
- Gender
- Race
- Ethnicity
- Primary Language
- Cultural Norms
- Socio-Economic Status
- Educational Attainment
- Health Status
- Cognition
- Disability Status
- Functional Ability



METHODOLOGICAL ISSUES

INSTRUMENT CHARACTERISTICS

Instrument Characteristics

Activity v Intensity Specific

Psychometric Properties
Reliability, Validity, Sensitivity

Measured Constructs
Relevant to Study Population and Outcomes

Mode of Administration
Interviewer, Self, Computer/Electronic

Recall Time Frame
Specific, Historical, Usual



METHODOLOGICAL ISSUES

ACTIVITY CHARACTERISTICS

**Activity
Characteristics**

Aerobic (BRFSS)

Moderate (BRFSS)

Vigorous (BRFSS)

Walking (BRFSS)

Sedentary (NHANES)

Muscular Strengthening (HP2010)

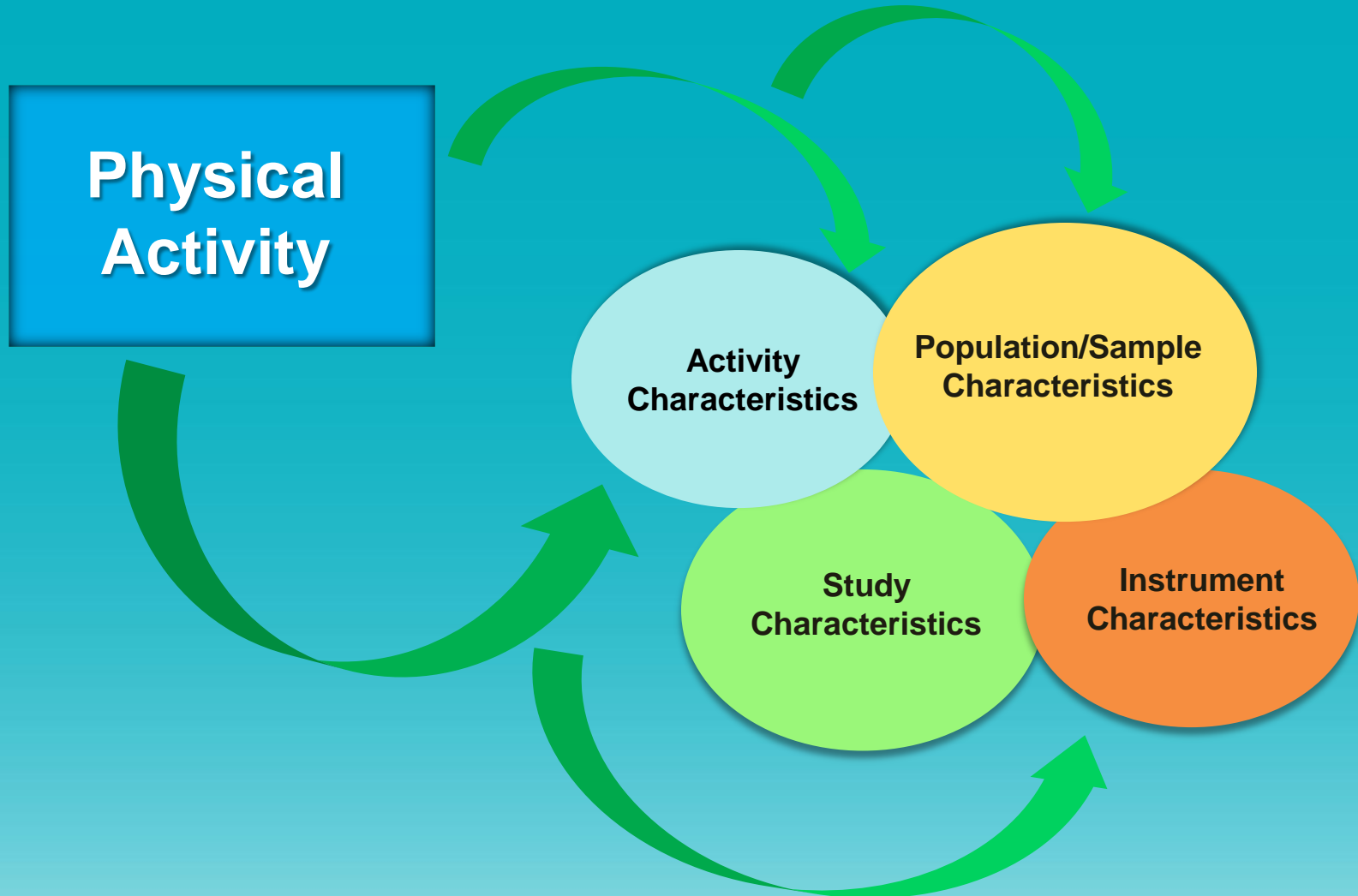
Flexibility (HP2010)

Balance & Coordination

Sports (YBRS)



METHODOLOGICAL ISSUES





HUMAN MOVEMENT FRAMEWORK

A Complex and Multidimensional Behavior with a Simple Message

THINK

- Assessing Component(s) of Human Movement v Measuring the Whole of Human Movement and the Possible Implications.
- Consider what Physical Activity Connotes to the Health Outcomes of the General Population.
- Consider what Physical Activity Denotes to the Researcher or Health Practitioner.



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