

HSE203 Exercise Behaviour

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Module 4

Understanding PA: Correlates and Theory

Definition

- Also referred to as ‘determinants’ or ‘influences’
- Factors that *directly* or *indirectly* influence or associate with a particular behavior or set of behaviours e.g., education can *directly* influence PA or *indirectly* influence PA through effecting weight status
- Correlates can be:
 - Fixed e.g., age, sex, genetic factors – used to focus on target groups
 - Modifiable e.g., behavior, traits, beliefs – focus of intervention

Purpose of studying correlates

- To understand why some groups are active while other groups are inactive
- To identify target for change in campaigns, interventions and policy
- To inform the development of effective intervention strategies for the Australian public or particular population groups
- To shape the focus and content of programs for particular groups in particular settings

How correlates are studied

- Cross-sectional or correlational studies – “correlates”
 - Snapshot in time
 - Identify associations or correlates – weakest evidence
- Longitudinal cohort studies
 - Identify predictive value of ‘correlate’ (predictor/correlates comes before behavior)
- Experimental studies (e.g., interventions, RCT)
 - Causation – strongest evidence
- Meta-analysis
 - Useful to see which correlates are most influential
- Reproduced results = strongest evidence

Types of correlates

- Demographic and biological
- Psychological, cognitive and emotional
- Behavioural attributes and skills
- Social and cultural factors
- Physical environment
- PA characteristics

Theories/models

- Many correlates are derived from theories and models and vice versa
- They can provide the development and refinement of interventions

Summary of terms

- Theory
 - Interrelated constructs that explain and predict a behavior, not change it
 - A set of principles that tell us how and why concepts are related to each other

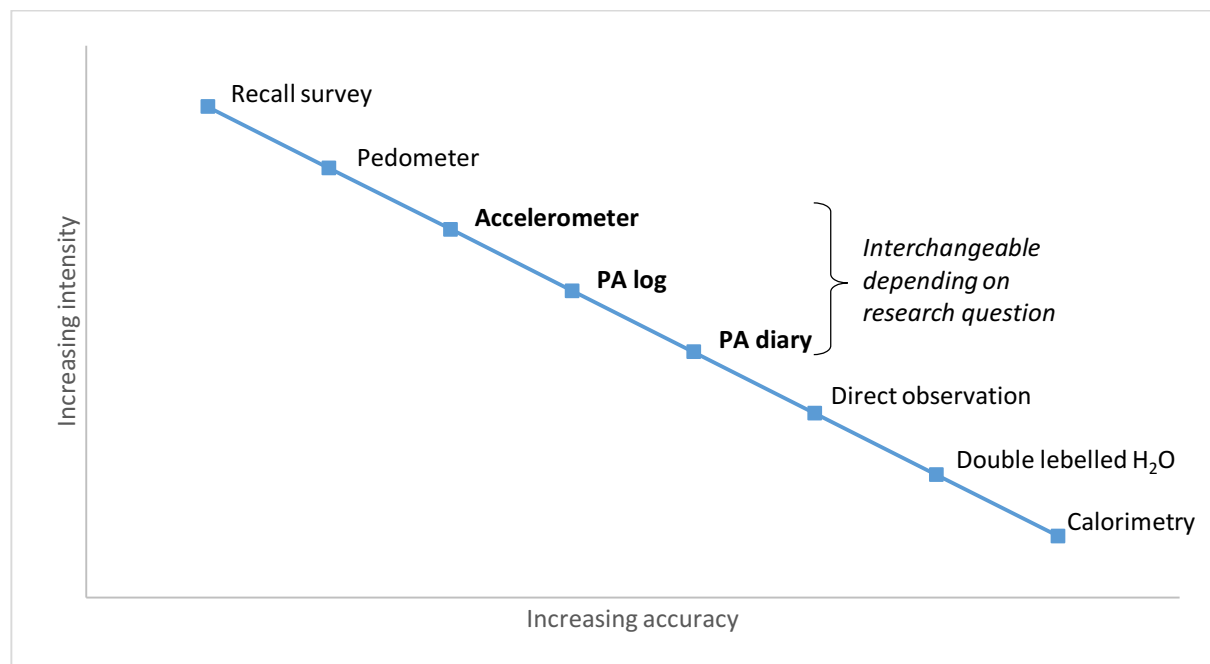
- Cons
 - Requires multiple observers
 - Extensive training required
 - Data reduction is labour intensive
- Location: inside class inside play/outside play/kitchen
- Structure/context: teacher's direction, child-free choice
- Type of activity: standing, sitting, standing moving, slow walking, fast walking, running
- Interactors: teachers, peers, none

Doubly labeled water

- Pros
 - Water ingested: [^2H] and [^{18}O]
 - ^2H leaves body as water (urine, sweat, etc.)
 - ^{18}O leaves body as both water and CO_2
 - Difference in rate of elimination – VCO_2 allows for the calculation of VO_2 and EE
 - Output: EE
- Cons
 - Accurate but very expensive
 - No data on type, freq or intensity

Indirect calorimetry

- Pros
 - Collects and analyses respiratory gas exchange (RER)
 - Measures O_2 consumption and CO_2 production
 - Requires person to use mouthpiece, facemask back pack (short periods) or confined to a metabolic chamber (long periods)
 - Very precise – 'gold standard' for field-based assessment
 - Output: EE
- Cons
 - Costly, has high participant burden, no info on PA
 - Not practical for population-based research



Coupling subjective with objective measures is most ideal for well-rounded results

Module 3

1. *You are trying to convince your uncle that he needs to participate in physical activity. He says that he just read an article explaining that exercise can kill you (Working Out Too Much As Bad As No Exercise At All). What would be your evidence based response?*

Warburton (2006) found the effectiveness of regular physical activity and the many chronic diseases it prevents such as CVD, diabetes, cancer, hypertension, and obesity. Exercising won't "kill you" but sedentary behavior might. **Dunstan et al. (2012)** suggests that increased sitting time is a grave health concern and can lead to T2DM and premature mortality. If my uncle is still concerned and skeptical, then talking to health professionals, such as GP, personal trainers or exercise physiologists, about exercise may change his point of view (**Warner et al 2011**). Research suggests that the best evidence based information you can provide is through health professionals (**Warner et al 2011**).

Physical activity has a wide variety of health benefits, including better health related quality of life, better functional capacity and an elevated mood states. A review by **Penedo and Dahn (2005)** provides evidence for this, and states that participants generally display more desirable health outcomes when engaging in regular physical activity.

However, I also agree that exercise can kill you even if it is not vigorous. Sudden Arrhythmic Death Syndrome or SADS is a disorder, which can involve ventricular arrhythmias and cause sudden cardiac arrest during exercise (**Koplan and Stevenson 2007**). This disease can cause death in patients without any symptoms and can be the first manifestation of cardiac disease.

Although this is a serious issue, it is not enough to outweigh the benefits of physical activity. The risk of SADS is very low with an estimate of 1 in 1000 patients a year dying from arrhythmic malfunctions (**Zardini et al. 1994**). If my uncle is worried of the risk of exercise, I would encourage him to see a health practitioner who can test for signs and characteristics of SADS before he commences physical activity to reassure him that is safe and is important to his physical and mental health.

2. *Do you think that the bicycle helmet laws in Australia should be changed?*

FOR.

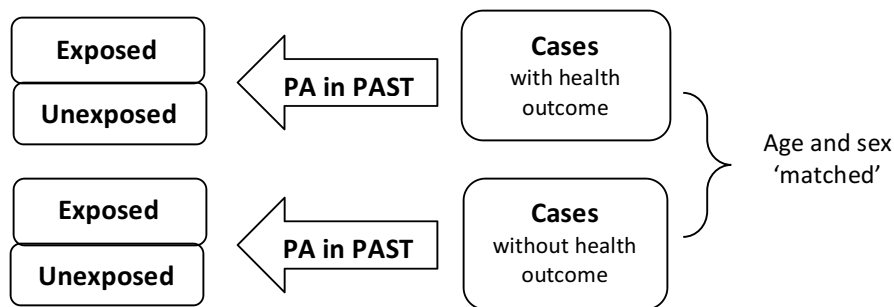
Currently the law requires bike riders and their passengers to wear a helmet. This covers riding for transport or leisure. The legislation aims to prevent injuries and fatalities and should remain. According to VicRoads 'since the legislation has been introduced there has been a 23% reduction in head injuries throughout Victoria' (**VicRoads 2015**). The use of helmets provides users the ability to modify risk factors associated with bicycle use. 'Protective gear has been shown to reduce injuries however there is still a need for safer environments including lower traffic speeds and separation from traffic to implement an increase in the safety of bicycle use' (**Risk Factors, Module 3.1**).

The use of a helmet is important for the prevention of head trauma and injuries and this has been acknowledged through the **Thompson et al. (1990)** case-control study which concluded that 'the results suggest a protective effect of bicycle safety helmets on serious injuries of the upper facial region'. Bicycle incidents are a serious issue although many are not fatal head injuries caused by cycling accidents are still a major cause for concern. As **Egberts et al. (2013)** states 'in addition to bicycle fatalities, stemming from head injuries, non-fatal traumatic brain injuries occur more often and can result in long-term negative health effects'.

Wearing a helmet is an extremely important safety precaution when sharing the roads with other vehicles the implementation of the helmet laws is a preventative measure from the government. As **Meehan et al (2013)** found states with helmet laws were had a 20% decreased rate of motor vehicle deaths and injuries compared to state without helmet laws.

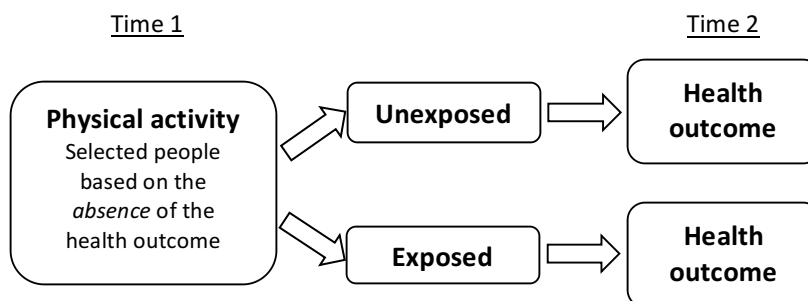
I think that the bicycle helmet laws in Australia should not be changed; and this is due to the fact that

Case control study



- Participants are selected based on the presence of a disease of interest and matched with control without that disease – matched for age and sex
- Advantages
 - Relatively quick and easy to conduct
 - Useful for studying diseases that occur infrequently (rare events)
 - Useful for hypothesis testing
 - Can study multiple risk factors
 - Require small number of participants
- Disadvantages
 - Difficult to obtain a truly representative control group
 - Cannot determine absolute risk
 - Temporal relationship may be uncertain
 - Recall bias

Longitudinal, perspective or cohort study



- Group of people are selected at random from a defined population group
- Baseline info is collected and these people are tracked over a long period of time
- Advantages
 - Provides an absolute measure of risk
 - Allows the study of multiple disease risk outcomes
 - Better sense of temporality
- Disadvantages
 - Expensive, time consuming, and resource intensive
 - Difficult to study diseases that occur infrequently
 - Results can be biased by loss to follow up

Repeat cross-sectional study

- Cross-sections of people are studied at different time points
- Used in studies that want to report trends over time