Typology for Linking Self-Report Methods to Study Design and Data Modeling Strategies

Barbara Sternfeld

Lisa Goldman Rosas

Division of Research, Kaiser Permanente

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Overview

- Current situation
- Framework for selecting self-report method
  - questions to think about
  - database for narrowing the choices
- Applying the framework
  - real life examples
  - lessons to learn
- Future steps
  - web-based smart tool

Current State of the Field

Reliable, valid, practical, non-reactive

Types of instruments

- diaries
- logs
- recalls
- semi-quantitative & quantitative questionnaires
- global questions

Recall error, social desirability, incomplete assessment

Little systematic guidance for selecting instrument

A New Systematic Approach

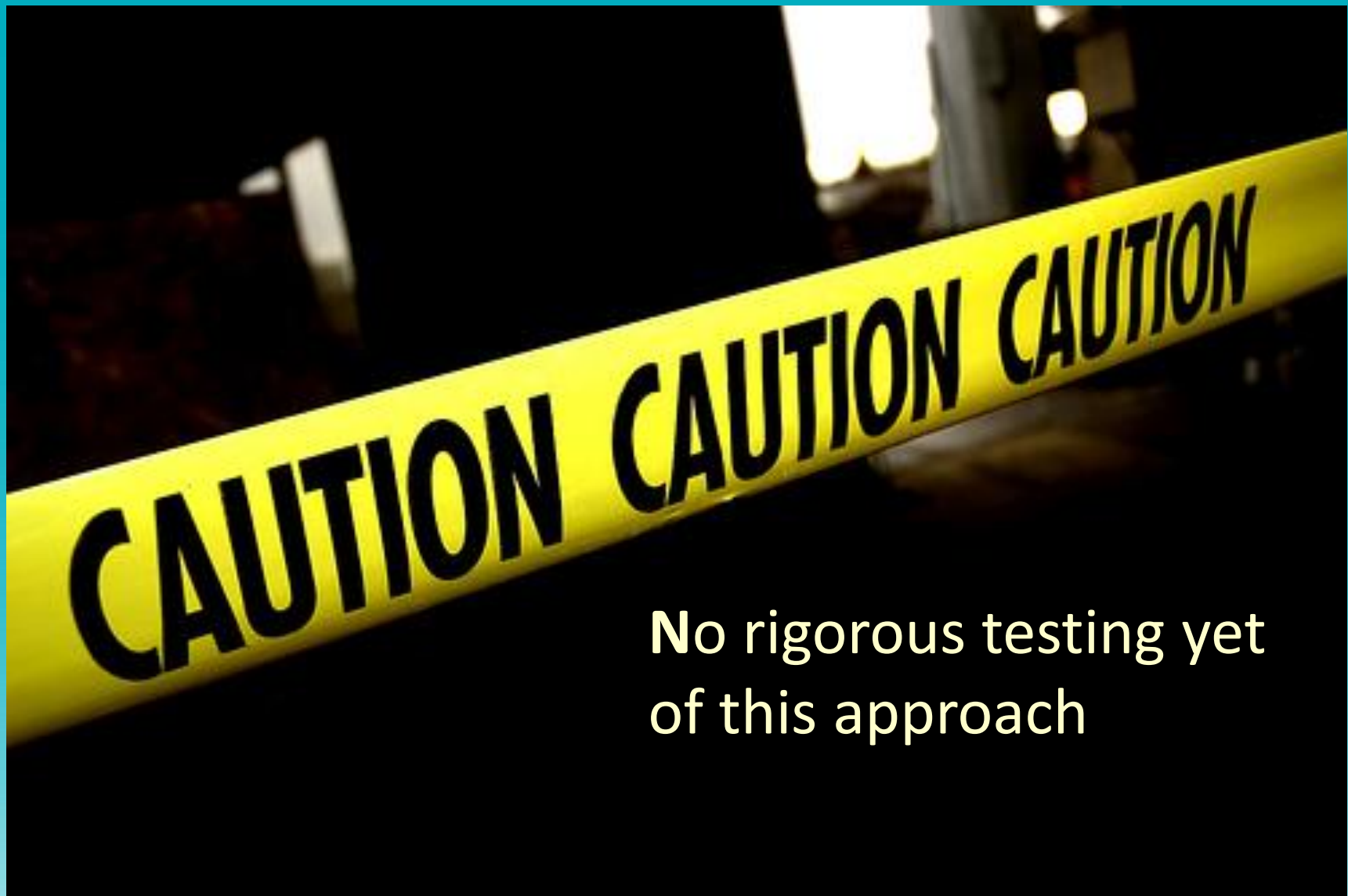
Database of instruments

10 Questions to narrow the pool of instruments

Potential instruments to fit needs

- Reflects process of decision-making about study design and implementation
- Widely applicable to variety of different situations
- **Not** proscriptive

Disclaimer



No rigorous testing yet of this approach

Building Self-Report PA Database

38 Instruments and counting!

NHANES

National Health Interview Survey

Stanford Usual Activity Questionnaire

Baecke

CARDIA

YALE Physical Activity Survey

Modifiable Activity Questionnaire

Friedenrich Lifetime

KPAS

Modified Baecke Questionnaire for Older Adults

7-d Physical Activity Recall

IPAQ

Historical Leisure Activity

Godin

BRFS

CAPS

Physical Activity Questionnaire for Older Children

Canada Fitness Survey

Alumni Study (Paffenbarger)

Women's Health Initiative PAQ

Minnesota Leisure-time

Building Self-Report PA Database

Rows					
Instrument	Description	Domain	Frequency	Duration	Intensity
Seasonality	Walking	Strength	Flexibility	Sedentary activity	Time frame
Mode	Population	Type of instrument	Outcomes	Relation to others	Reference

Question #1

THINKING QUESTION!

What is the primary aim of your study?

Intervention Study: assess targeted behavior

- defin … measure PA; v…
- diffe… …cific to parti…
- some instruments better for some purposes than others

Question #2

THINKING QUESTION!

What is the study design?

- narrows choices of PA instruments in terms of temporal relations
  - case-control study
    - diary or short-term recall not appropriate
    - time frame of exposure prior to disease outcome
    - historical questionnaire may be good choice
- helps determine level on which PA is measured

Cross-sectional survey, retrospective or prospective cohort study, or intervention targeting individuals?
Think individual

Surveillance survey, environmental intervention?
Think population

Question #3

THINKING QUESTION!

Where is the PA variable located in the study hypotheses?

- independent variable (exposure, predictor, treatment)
- dependent variable (outcome)
- covariate (confounder, mediator)
- all of the above (large cohort studies)

– may have implications for level of precision of measurement
  - similar level of precision for similar type of variables

– may help narrow appropriate summary PA variable

Some Examples

- Prospective cohort study in midlife women of diverse race/ethnicity, many outcomes (SWAN)
- Community-based participatory obesity intervention in Mexican American teens
- National surveillance survey of temporal trends in sedentary behavior

Question #4

What is the PA construct to be measured?

SWAN

Leisure

Occupational/School

Household/Caretaking/Domestic

Transportation

Sitting

Media Use

Discretionary

Non-occupational
School
Computer use

Physical Activity

Sedentary

Sleeping

Occupation/School

Non
Discretionary

Driving

Sitting

Riding

Obesity intervention

Behavior

Human
Movement

Attributes

Energy
Expenditure

Metabolic
Rate

Basal

Resting

Thermic Effect of Food

PA Related EE

Physical
Fitness

Cardiorespiratory
Fitness

Muscular
Fitness

Strength

Endurance

Body
Composition

Flexibility

Balance and
Coordination

Sedentary

For SWAN

Instrument	Description	Specificity of Activities
Paffenbarger	8-item questionnaire assessing walking, stair climbing and recreational sports and exercise (with open-ended questions) .	specific activities: respondent writes down specific sports and exercises individually;
7-d Recall	5-item recall assessing amount of time over the last 7 days spent sleeping, moderate, hard and very hard activity; time in light activity is inferred.	categories pooled by intensity: interview probes for specific activities by intensity level day by day to aid pooling
KPAS	19- item questionnaire adapted from the Baecke to assess physical activity specifically in women	specific activities: occupational activity (8 items) active living (4 items) sports and exercise (3 items); up to 2 sports can be listed for open-ended question

For Obesity Intervention

Instrument	Description	Specificity of Activities
Physical Activity Question for Children	10-item questionnaire assessing physical activity in the last 7 days among elementary and middle school children	specific activities: gives a long list of activities
Modifiable Activity Questionnaire for Adolescents	6-item quantitative questionnaire based on the most frequent activities in the past year, including sports teams.	specific activities, chosen from a list of activities, plus one category for frequency of hard exercise in past 14 days
Youth Risk Behavior Survey	8 items that assess vigorous activity, stretching, strengthening, walking/biking and participation in physical education classes and organized sports	categories: asks about types of exercise and participation in PE classes and sport teams

For Sedentary Trends

Instrument	Description	Sedentary activity included?
Baecke	16-item questionnaire that assesses usual recreation, occupation, and trasnport physical activity using likert scale responses. For the 2 most frequently reported sports, additional questions query the number of months per year and hours per week of participation.	Television time, sitting at work included
KPAS	19- item questionnair, adapted from the Baecke to assess physical activity in women specifically	TV time included
Arizona	78-item questionnaire assessing activity in a wide range of domains	Several leisure time sedentary activities are included (eg. reading, watching TV, playing cards)

Question #5

What domains of PA are of interest?

- Capture the full spectrum of women's activities
- Attractive feature of KPAS domain specific activity indices

SWAN

- School/community partnerships
- PE curriculum development, teacher training
- Recreational team sports, swimming, running, track and field
- Activities in PE class

Obesity intervention

- Recreational (tv screen time)
- transport

Sedentary trends

Question #6

<u>What parameters of PA are of interest?</u>

- Duration
- Frequency
- Intensity
- Seasonality

Relevant question for every study aim, design

Duration, frequency and intensity necessary for establishing specific dose response relations

Duration and intensity helpful for translation of summary activity measure into meaningful behavior

Seasonality important source of intra-individual variability

Intensity Issue

Should intensity be measured in relative or absolute terms?

-absolute intensity

- standard values of energy expenditure (METs, kcals) assigned to activities

- relative intensity

- respondent-determined inter

t providing phys

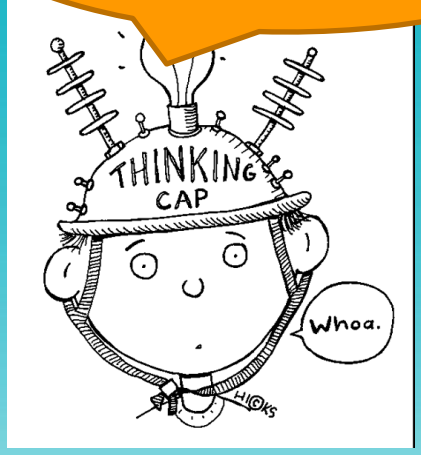
Relative: allows for individual variability, open to interpretation

Absolute: provides comparability across studies, but doesn't account for differences due to age, gender, mechanical efficiency, environmental conditions

Question #7

Should activities be listed individually or pooled by category?

Whoa, pooling my activities together is hard!



activity lists

- cohort studies capturing major contributors to MVPA
- interventions targeting specific behaviors
- surveillance of trends in activities

pooling categories

- intensity, activities of similar intensity
- advantages: more efficient, more comprehensive, allows for individual variability in energy expenditure of same activity
- disadvantages: more challenging cognitive tasks

Question #7

Instrument	Specificity of Activities
The Aerobics Center Longitudinal Study Physical Activity Questionnaire	9 recreational activities, 2 categories of moderate and vigorous sports, 2 household activities
Historical Leisure Activity Questionnaire	specific list 40 of activities, including an 'other' category
IPAQ long and short forms	Categories pooled by intensity

Question #8

What is the desired summary PA measure?

- Ranking: exercise units
- Categorical: low, medium, high
- Quantitative: hrs/wk, kcals/wk, MET-hrs/wk

SWAN

- Quantitative: hrs/wk, kcals/wk, MET-hrs/wk

Obesity intervention

- Dichotomous: active vs. not, sedentary vs. not
- Quantitative: hrs/wk, kcals/wk, MET-hrs/wk

Sedentary trends

Question #9

Who is the target/sample population?

- SWAN
  - midlife women
  - diverse race/ethnicities
  - non-English speaking (Cantonese, Spanish)
- Obesity intervention
  - Mexican American adolescents
  - Spanish speaking
- Sedentary trends
  - population

Question #9

Instrument	Population
KPAS	adult women (20-65) and pregnant women; Kaiser members
PASE	older adults (men and women at least 65)
CAPS	minority women over 40
PDPAR	adolescents (grades 7-12)
IPAQ	multinational populations

Question #10

What are the practical/logistical constraints?

➔ often driving factor in choice

Mode of administration

- self-administered, mail or in-person
- interviewer-administered, phone or in-person
- mobile or web technology

- time burden/cost
  - participants
  - staff
  - competing investigator interests/needs

Lessons from 25 Years of PA Assessment

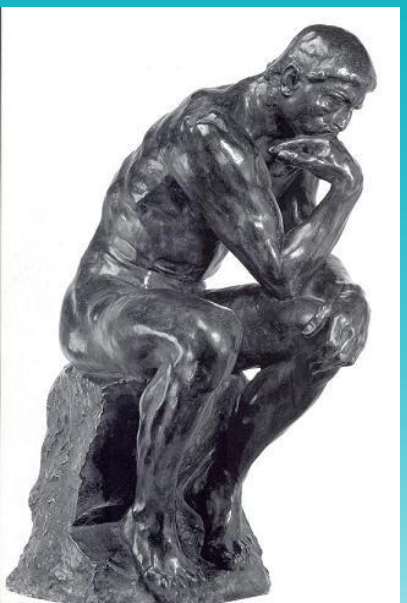
- Think about study comprehensively before looking at specific instruments; think long-term
  - framework proposed here can help
- Understand a PA instrument thoroughly before choosing it
  - sources of error
  - interpretation
  - resources required
  - comparison with other options

- No need to be apologetic about self-reported PA measurement
  - no less accurate than
    - objective measures of PA
    - other self-reported measures (e.g. diet, quality of life)
    - many “gold standard” measures (e.g. DXA for body composition)

General Thoughts

Making more specific lists vs. broader pooled categories

- adding to lists to be more relevant
- broadening categories to be more comprehensive
- both may lead to over-reporting
  - social desirability with lists, cognitive challenges with categories



De-constructing, re-constructing existing instruments

- different types of questions in same instrument
- using them separately, or putting them together in different ways

Tendency to make "little fixes"

- makes sense in any specific situation
- makes it an untested instrument
- creates yet another instrument, has led to current situation

Next Steps

- A web-based smart tool
  - continue building PA self-report database
  - develop expert system for linking user needs to database
  - test tool, disseminate tool
- Could lead to set of “good” practices in self-reported PA assessment
- BUT, always think critically
  - never trust the GPS lady when you know where you’re going!