The harmonisation of reported physical activity data: Process and reporting

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Outline

- International Children's Accelerometry Database (ICAD)
- Example 1: Parent physical activity
- Data collation and cataloguing
- Example 2: School travel
- Record keeping

ICAD

PEACH; CHAMPS UK; SPEEDY; ALSPAC; MAGIC

KISS; Ballabeina; Belgium Preschool study; CoSCIS EYHS Denmark, Estonia, Norway, Portugal

N≈32 000

TAAG
CHAMPS US
IBDS
NHANES

CLAN, HEAPS

Pelotas

ICAD

- Accelerometry
- Demographics
- Anthropometry
- Metabolic markers
- Home and family
- Sedentary behaviours
- School / diet
- Reported PA
  - * Parent PA
  - * School travel


Harmonising data on the correlates of physical activity and sedentary behaviour in young people: Methods and lessons learnt from the international Children's Accelerometry database (ICAD)

http://www.mrc-epid.cam.ac.uk/research/studies/icad/

Data collation and cataloguing

1. Identification of key constructs / variables
2. Identify sources and collate data
3. Data cataloguing (create data dictionaries)
4. Data extraction and review
5. Generate harmonised variables
6. Document harmonisation process

Example 1: Parental physical activity

Example 1: Parental physical activity

THE FOLLOWING QUESTIONS ASK ABOUT YOUR OWN PHYSICAL ACTIVITY.

Q-34. On how many of the past 7 days did YOU exercise or participate in sports activities for at least 20 minutes that made you sweat and breathe hard, such as basketball, soccer, running, swimming laps, fast bicycling, fast dancing, or similar aerobic activities? (check one circle)

- ❑ 0 days
- ❑ 1 day
- ❑ 2 days
- ❑ 3 days
- ❑ 4 days
- ❑ 5 days
- ❑ 6 days
- ❑ 7 days

CHAMPS US

Example 1: Parental physical activity

IV. PARTICIPATION IN SPORTS AND EXERCISE. Answer the following about your participation in sports and exercise during the past year.

7. How often did you play sports or exercise?
   a. Never or less than once a month
   b. Once a month
   c. 2 to 3 times a month
   d. Once a week
   e. More than once a week

Iowa Bone Development Study

Example 1: Parental physical activity

8. Which sport or exercise, if any, did you do most frequently? **If none, skip questions 9-16.**
   Specify only one (see list) or write *none*_____

9. How many **months per year** did you do this activity?
   a. Less than 1 month
   b. 1 to 3 months
   c. 4 to 6 months
   d. 7 to 9 months
   e. More than 9 months

10. How many **hours per week** did you do this activity?
    a. Less than 1 hour
    b. More than 1 hour but less than 2 hours
    c. 2 or more hours but less than 3 hours
    d. 3 or more hours but less than 4 hours
    e. 4 or more hours

Iowa Bone Development Study

Example 1: Parental physical activity

11. What, if any, was the second most frequent sport or exercise you did? **If none, skip questions 12-16.**
    Specify only one (see list) or write *none*_____

12. How
    a. L
    b. 1
    c. 4
    d. 7
    e. M

13. How
    a. L
    b. M
    c. 2
    d. 3
    e. 4

14. What, if any, was the third most frequent sport or exercise you did? **If none, skip questions 15-16.**
    Specify only one (see list) or write *none*_____

15. How many **months per year** did you do this activity?
    a. Less than 1 month
    b. 1 to 3 months
    c. 4 to 6 months
    d. 7 to 9 months
    e. More than 9 months

16. How many **hours a week** did you do this activity?
    a. Less than 1 hour
    b. More than 1 hour but less than 2 hours
    c. 2 or more hours but less than 3 hours
    d. 3 or more hours but less than 4 hours
    e. 4 or more hours

Example 1: Parental physical activity

6.3. Profitez-vous activement des offres d'un ou de plusieurs club(s) sportif(s)?
6.4. Oui non

Père ☐ ☐
Mère ☐ ☐

6.5. Si oui, combien d'heures par semaine y consacrez-vous?
Père: .....heures/semaine
Mère: .....heures/semaine

6.6. Combien de temps par semaine consacrez-vous en moyenne aux activités physiques qui vous mettent hors d'haleine et vous font transpirer? (les activités comme le nettoyage, le jardinage ou une activité professionnelle physique sont aussi à prendre en compte)
Père: .....heures/semaine
Mère: .....heures/semaine

Sports club membership

Hours / week

MVPA (leisure / occupation) – hours / week

Ballabeina

Data collation and cataloguing

- Data cataloguing
  - Variable name
  - Study / wave
  - Variable label
  - Variable description
  - Variable grouping
  - Format (eg catergorical / continuous)
  - Value labels
  - Units

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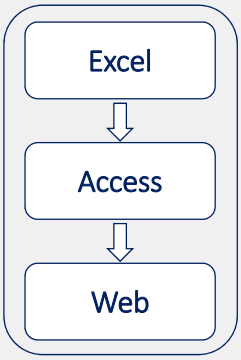


Data collation and cataloguing

MAGIC (n≈460)

- Two-arm cluster RCT
- Glasgow, Scotland

CLAN (n≈1100)

- Prospective cohort
- Melbourne, Australia

Example 2: School travel

- 14 studies with relevant data (25 waves); 156 variables
- Constructs: - Travel mode, frequency, duration
  - Journey to or from school
- Respondent: Parent, Child

Example 2: School travel

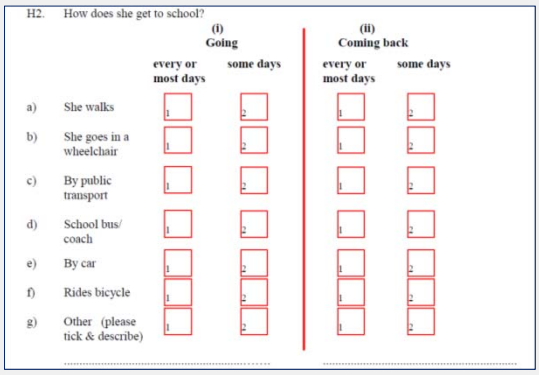
Part 3: Travelling to school and other places

22. How do you usually travel to school? *(Please tick one box for each letter)*

- ☐ By Car
- ☐ By Bus or train
- ☐ By bicycle
- ☐ On foot

SPEEDY, wave 1

Example 2: School travel



H2. How does she get to school?

		(i) Going		(ii) Coming back	
		every or most days	some days	every or most days	some days
a)	She walks	1	2	1	2
b)	She goes in a wheelchair	1	2	1	2
c)	By public transport	1	2	1	2
d)	School bus/ coach	1	2	1	2
e)	By car	1	2	1	2
f)	Rides bicycle	1	2	1	2
g)	Other (please tick & describe)	1	2	1	2

ALSPAC, wave 1

Example 2: School travel

Wie kommt Ihr Kind normalerweise <u>in die Schule</u> und wie lange braucht es, wenn es auf direktem Weg von zu Hause in die Schule gelangt? Bitte nennen Sie nur die **häufigste** Fortbewegungsart.

		im Sommer	im Winter
θ	zu Fuss	.....Minuten	.....Minuten
θ	mit Velo/Inline Skates/Trottinett/Scooter	.....Minuten	.....Minuten
θ	mit dem Auto	.....Minuten	.....Minuten
θ	mit dem Bus/Tram/S-Bahn	.....Minuten	.....Minuten

KISS

Example 2: School travel

Study Name	Variable Name	Variable Description	Units	Notes
SPEEDY	W1_school_travel	Mode of child's travel to school. Child reported. Item - How do you usually travel to school. Response options - by car (coded 1) / by bus or train (coded 2) / by bicycle (coded 3) / on foot (coded 4).		
ALSPAC	ccp210	C2a1: Child walks all the way to school. Assessed when child was age 166 months. Child reported. Item - How do you get to and from school? (You can tick more than one answer in each column). Prompt - walk all the way (to school). Response coding - Consent withdrawn by YP-data set to missing (-9999) / Triplet or quadruplet (-11) / Not completed (-10) / No response (-1) / Yes (1).		

Example 2: School travel

Variable name	Description Coding
SchoolTravel1	Mode of travel to school Walk (coded 0); Cycle (1); Public transport (2); Car (3); Other (4); Missing (999)

Example 2: School travel

Study / Wave	Source data	
	Variable(s): name(s), respondent, description	Summary
SPEEDY Wave: 1	Var' name: W1_school_travel Child-reported Mode of travel to school	Car, n=923 Bus/train, n=127 Bicycle, n=189 On foot, n=814 Missing, n=11

Example 2: School travel

School Travel 1

Mode	Count
Walk	12985
Cycle	2319
Public transport	5206
Car	8136
Other	140
Missing	30588

N≈28k

School Travel 2

Mode	Count
Active	16081
Other	14566
Missing	31777

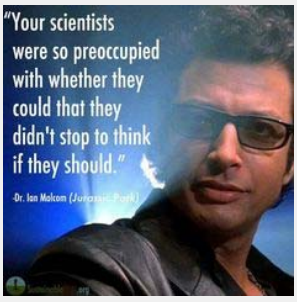
N≈30k

Record keeping

- Studies / waves with relevant data
- Assessment characteristics
- Variables created
- Studies / waves included in each harmonised variable
- Item selection / prioritisation
- Study-specific notes
- Harmonisation tables (variable recoding)

Key messages

- Inc. data management expertise in project team
- Be realistic about timelines (esp. data cataloguing)
- Partner engagement is essential
- Document process fully



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Box 3. Examples of data processing models

Algorithmic transformation: Continuous and categorical variables, or both, with different but combinable ranges or categories (e.g. education level, household income)

Simple calibration model: Continuous metrics with calibration model (e.g. weight in kilograms or pounds)

Standardization model: Continuous constructs measured using different scales, with no known calibration method or bridging items (e.g. two independent memory scales)

Latent variable model: Continuous constructs measured using different scales, with no known calibration method but with bridging items (e.g. two memory scales, with some common items)

Multiple imputation models: Continuous or categorical constructs measured using overlapping scales permitting imputation of missing values (e.g. two overlapping scales measuring activities of daily living)

Fortier et al. Maelstrom Research guidelines for rigorous retrospective data harmonization. Int J Epidemiol. 2017 Feb 1;46(1):103-105.