



1



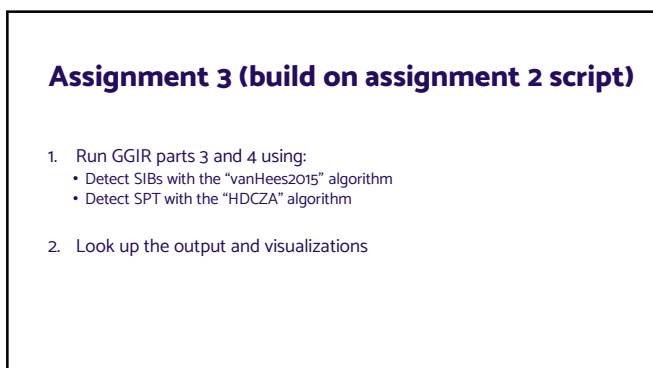
2



3



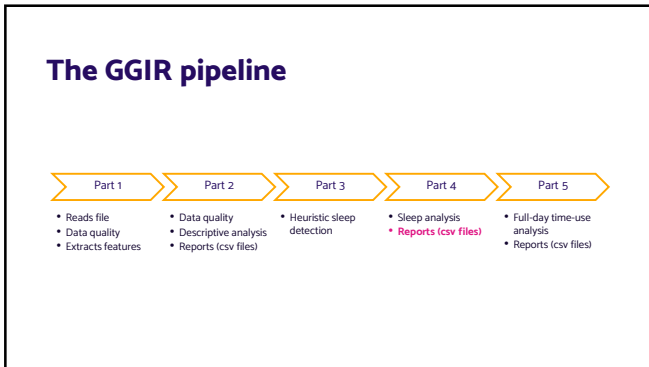
5



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Part 3 & 4

Output

- results
 - QC
 - part4_nightsummary_sleep_full.csv
 - part4_summary_sleep_full.csv
 - part4_nightsummary_sleep_cleaned.csv
 - part4_summary_sleep_cleaned.csv
 - visualisation_sleep.pdf

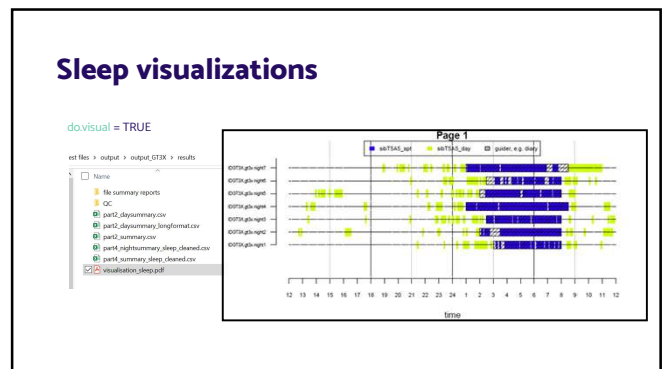
15

Part 3 & 4

Output

- results
 - QC
 - part4_nightsummary_sleep_full.csv
 - part4_summary_sleep_full.csv
 - part4_nightsummary_sleep_cleaned.csv
 - part4_summary_sleep_cleaned.csv
 - visualisation_sleep.pdf

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Part 3 & 4

Output

- results
 - QC
 - part4_nightsummary_sleep_full.csv
 - part4_summary_sleep_full.csv
 - part4_nightsummary_sleep_cleaned.csv
 - part4_summary_sleep_cleaned.csv
 - visualisation_sleep.pdf

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Output from Part 4

Night-level features (full report)

ID	Onset_n1	Wakeup_n1	Onset_n2	Wakeup_n2	Onset_n3	...
01	23:00:00	07:00:00			23:15:00	-

part4_nightsummary_sleep_full.csv

ID	night	cleaningcode	sleeplog_used	acc_available	guider
1	1	0	1	1	sleeplog
1	2	1	0	1	IHDCA
1	3	0	1	1	sleeplog
1	4	0	1	1	sleeplog
1	5	0	1	1	sleeplog
1	6	0	1	1	sleeplog
1	7	2	1	0	sleeplog

Cleaning code	Meaning
0	No problem
1	Sleep log not available (IHDCA used)
2	Not enough valid data
3	No accelerometer data available
4	No nights to be analyzed
5	Guider-defined SPT
6	SPT could not be defined either by sleeplog or algorithms

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Output from Part 4

Night-level features (full report)

do.report = 4

part4_nightsummary_sleep_full.csv

ID	night	sleeponset	wakeup	SptDuration	SleepDurationInSpt	WASO	sleepefficiency	sleeplatency
1	1	27.201	32	4.799	3.696	1.103	0.864	0.215
1	2	26.5	31.936	5.826	4.888	0.939	0.868	0.282
1	3	26.5	32	5.5	4.997	0.503	0.834	0.004
1	4	25	32.475	7.475	7.115	0.36	0.799	0.512
1	5	26.413	32	5.588	5.071	0.517	0.798	0.428
1	6	27.131	32	4.869	3.526	1.343	0.929	0.003
1	7	25.074	31.761	6.688	6	0.688	0.856	0.261

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Output from Part 4

Night-level features (clean report)

do.report = 4

GGIR [L]
Data cleaning
includenightcrit = 16,
excludelastpart4 = FALSE,
excludelastpart4 = FALSE,
[L]

part4_nightsummary_sleep_cleaned.csv

ID	night	sleeponset	wakeup	SptDuration	SleepDurationInSpt	WASO	sleepefficiency	sleeplatency
1	1	27.201	32	4.799	3.696	1.103	0.864	0.215
1	2	26.5	31.936	5.826	4.888	0.939	0.868	0.282
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1	7	25.074	31.761	6.688	6	0.688	0.856	0.261

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Output from Part 4

Night-level features (clean report)

do.report = 4

GGIR [L]
Data cleaning
includenightcrit = 16,
excludelastpart4 = TRUE,
excludelastpart4 = FALSE,
[L]

part4_nightsummary_sleep_cleaned.csv

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Output from Part 4

Night-level features (clean report)

do.report = 4

GGIR [L]
Data cleaning
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part4_nightsummary_sleep_cleaned.csv

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1	6	27.131	32	4.869	3.526	1.343	0.929	0.003

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Part 3 & 4 Output

- meta
 - sleep.qc
 - graphperday_id_01.pdf
 - ...
- results
 - QC
 - part4_nightsummary_sleep_full.csv
 - part4_summary_sleep_full.csv
 - part4_nightsummary_sleep_cleaned.csv
 - part4_summary_sleep_cleaned.csv
 - visualisation_sleep.pdf



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Output from Part 4

Person-level features

do.report = 4

part4_summary_sleep_cleaned.csv

ID	sptlog_used	n_nights_acc	n_nights_sleeplog	n_WE_nights_complete	n_WD_nights_complete	n_WNights_daysleeper	n_WDnights_daysleeper
1	1	6	6	2	4	0	0

	SptDuration_AD_TsAs_mm	SptDuration_AD_TsAs_sd	SleepDurationInSpt_AD_TsAs_mm	SleepDurationInSpt_AD_TsAs_sd	WASO_AD_TsAs_mm	WASO_AD_TsAs_sd
All days	5.372	1.142	4.695	1.375	0.687	0.363

	SptDuration_WD_TsAs_mm	SptDuration_WD_TsAs_sd	SleepDurationInSpt_WD_TsAs_mm	SleepDurationInSpt_WD_TsAs_sd	WASO_WD_TsAs_mm	WASO_WD_TsAs_sd
Weekdays	5.64	1.277	5.045	1.604	0.594	0.34

	SptDuration_WE_TsAs_mm	SptDuration_WE_TsAs_sd	SleepDurationInSpt_WE_TsAs_mm	SleepDurationInSpt_WE_TsAs_sd	WASO_WE_TsAs_mm	WASO_WE_TsAs_sd
Weekend days	4.938	0.877	3.966	1.609	0.872	0.52


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Output from Part 4

Complete list of variables

Sleeponset, sleeponset_ts	duration_sib_wakinghours	calendar_date
Wakeup, wakeup_ts	number_sib_sleepperiod	filename
SptDuration	number_of_awakenings	cleaningcode
Sleepparam	number_sib_wakinghours	sleeplog_used
guider_inbedStart, guider_inbedStart_ts	duration_sib_wakinghours_atleast5min	acc_available
guider_inbedEnd, guider_inbedEnd_ts	sleeplatency	guider
guider_inbedDuration	sleepefficiency	SleepRegularityIndex
fraction_night_invalid	page	SrIFractionValid
SleepDurationInSpt	daysleeper	longitudinal_axis
WASO	weekday	nonwear_perc_spt


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What is the column cleaningcode? *(Single choice)*

- An indicator of the nights that should be removed from datasets
- An indicator of the time that the device was not worn during nights
- An indicator of the quality of the sleep period time detection
- An estimate of the fraction of time in which the device recorded valid data throughout the measurement

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What is the column cleaningcode? *(Single choice)*

- An indicator of the nights that should be removed from datasets
- An indicator of the time that the device was not worn during nights
- An indicator of the quality of the sleep period time detection
- An estimate of the fraction of time in which the device recorded valid data throughout the measurement

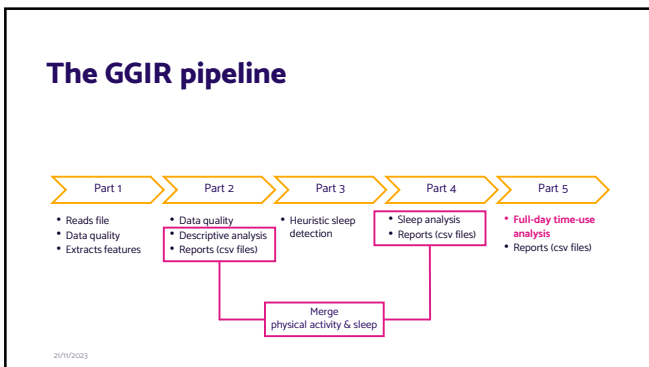
30



Full-day time-use analysis

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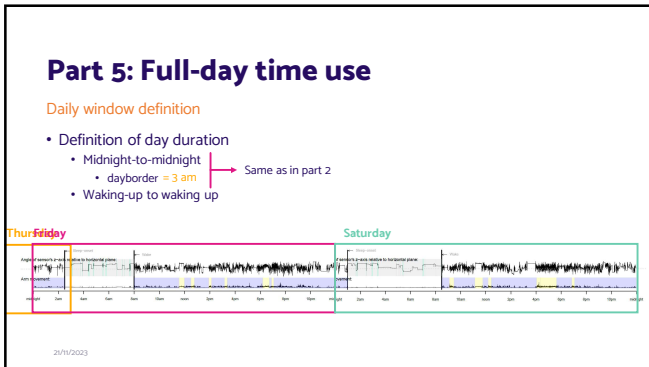
Part 5: Full-day time use

What it does

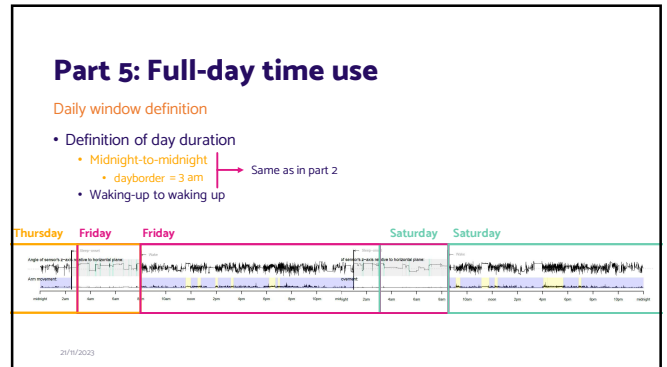
- Loads imputed acceleration data from part 2
- Loads sleep information from part 4 (SPT windows)
- Re-calculate variables based on the merged data (split by SPT & waking hours)
- Part 5 reports includes:
 - Daytime variables: physical activity intensities, inactivity
 - Nighttime variables: sleep indicators

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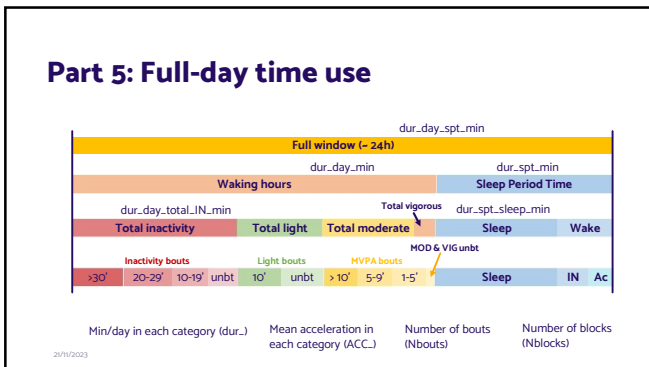
33



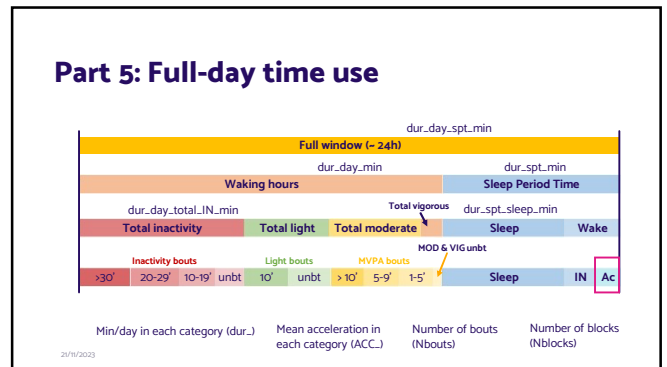
34



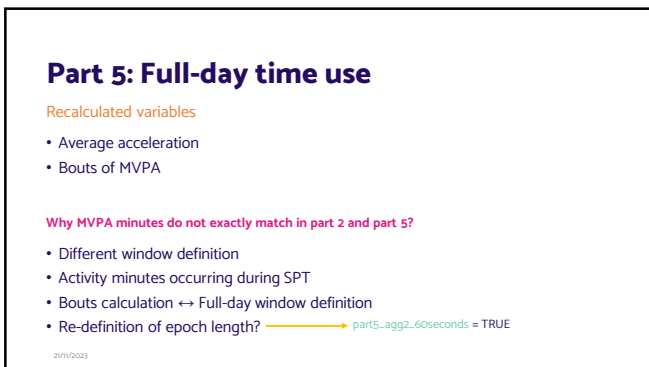
35



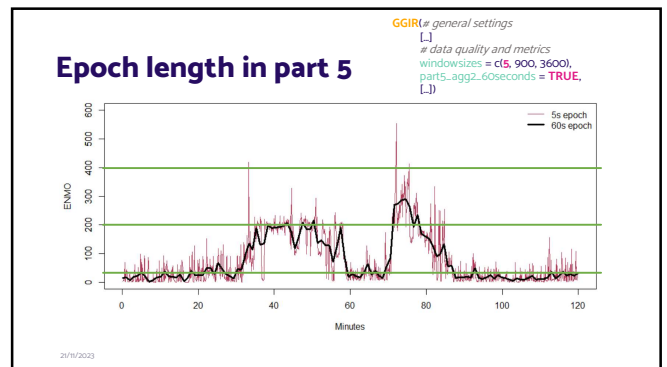
36



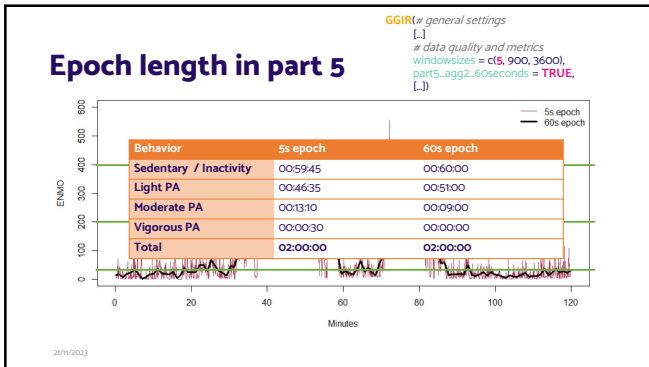
37



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Part 5: Full-day time use

New variables (not in part 2)

- Inactivity
- Light physical activity
- Moderate physical activity
- Vigorous physical activity
- Bouts of inactivity and light physical activity

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The GGIR()

full-day time-use analysis

GGIR
 []
 # Physical activity and Inactivity thresholds
 threshold.lig = 40, threshold.mod = 100, threshold.vig = 400,
 # It can be more than one threshold
 threshold.lig = c(20, 40), threshold.mod = c(100, 120), threshold.vig = 400,
 # Bout durations
 boutdur.in = c(10, 20, 30), boutdur.lig = 10, boutdur.mvpa = c(1, 5, 10),
 # Fraction of a bout that needs to meet the thresholds
 boutcriter.in = 0.9, boutcriter.lig = 0.8, boutcriter.mvpa = 0.8,
 []

Accel (m/s²)

Is this a MVPA bout?

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?

What is the main purpose of part 5 in GGIR? (Single choice)

- To provide visualizations of the data
- To provide datasets for analytical purposes
- To clean the data that was analysed in parts 1 to 4
- To use sleep estimates to derive a more detailed analysis of daytime physical activity.

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?

What is the main purpose of part 5 in GGIR? (Single choice)

- To provide visualizations of the data
- To provide datasets for analytical purposes
- To clean the data that was analysed in parts 1 to 4
- To use sleep estimates to derive a more detailed analysis of daytime physical activity.

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?

Can you redefine the epoch length in GGIR part 5? (Single choice)

- No, this is done in part 1
- Yes, you can select the epoch of your interest in part 5 datasets
- Yes, but only aggregating to 60 seconds is supported in this phase of the pipeline

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?

Can you redefine the epoch length in GGIR part 5?
(Single choice)

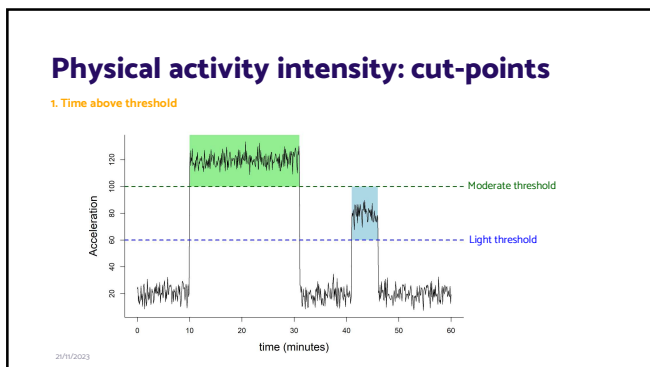
- No, this is done in part 1
- Yes, you can select the epoch of your interest in part 5 datasets
- Yes, but only aggregating to 60 seconds is supported in this phase of the pipeline

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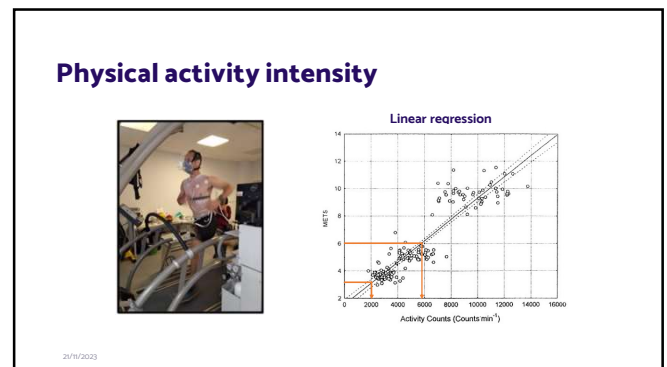
Cut-points & Bouts

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Part 2 and 5: Time spent in MVPA

- Traditionally threshold based => not perfect, but 'easy'
- Energy expenditure estimation should account for:
 - Body acceleration
 - Body weight (+ composition if possible)
 - Activity type
- Hundreds of publications tried to do better than threshold method, but remains difficult

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Why do we want to detect bouts

- Indicator of time spent in activities involving aerobic energy metabolism
- Consistent with historical self-report data
- To aid studying of fragmentation of behaviour

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Defining what a bout/sojourn is

1. What should the cut-point be?
2. What should the epoch length be?
3. What should minimum duration of bout (sojourn) be?
4. Should we allow for gaps in a bout (sojourn)?
5. Should this be a percentage of the bout duration, an absolute minimum in seconds, or both?
6. Are bout gaps counted towards the time spent in bouts?
7. Do the first and last epoch need to meet the threshold criteria?
8. In what order are the bouts extracted?
9. How many bout categories should there be?

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Implementation in GGIR

User decides on:

- Acceleration thresholds for light, moderate, and vigorous intensity
- Fraction of time for which cut-point criteria need to be met (light, inactive, MVPA)
- Bout duration ranges, e.g. [1, 5] [5, 10] and [10, ∞) minutes
- Epoch length

User does NOT decide on:

- Maximum bout gap of 1 minute
- First and last epoch need to meet cut-point criteria
- Number of intensity levels, which are always: inactive, light and MVPA
- Order in which bouts are calculated (1 MVPA; 2 inactive; 3 Light)
- Default code for detecting bout:
<https://github.com/wadpac/GGIR/blob/master/R/g.getbout.R>

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Bouts of physical activity/inactivity

2. Bouts detection:

- $mpathreshold = 100$
- $boutdur = 10$ ✓
- $boutcriter = 0.8$ ✓

Time above $mpathreshold$ without gaps lasting longer than 1 minute = 11 min
 Below $mpathreshold = 1$ min

Rate $x = \frac{11}{12} = 0.92$

Is this a MVPA bout?

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The cut-points vignette

Insert Web Page

This app allows you to insert secure web pages starting with <https://> into the slide deck. Non-secure web pages are not supported for security reasons.

Please enter the URL below:

Note: Many popular websites allow secure access. Please click on the preview button to ensure the web page is accessible.

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Why does GGIR facilitates bout detection?

- Guidelines mainly based:
 - 1-min epoch
 - Data from hip-worn sensors
 - ... but bouts might be useful for:
 - 5-s epochs
 - Data from wrist-worn sensors to smooth out spontaneous movements
- Guidelines based on:
 - Specific health outcomes
 - ... but bouts might be relevant for:
 - health outcomes not covered by current research
- Bouts might be useful to investigate fragmentation of behavior
- We aim to be neutral in the discussion and try to facilitate all approaches


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More reflections on the use of cut-points

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<https://www.accelting.com/updates/why-does-ggir-facilitate-cut-points/>


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Select the sentence/s that apply to MVPA bouts in GGIR. *(Multiple choice)*

- Users can define the bout length
- Users can define when a certain bout is broken (maximum gap length for a bout)
- Users can define the proportion of the bout duration that the acceleration should meet the threshold criteria.
- Users can define in which order the bouts should be detected.

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Select the sentence/s that apply to MVPA bouts in GGIR. *(Multiple choice)*

- Users can define the bout length
- Users can define when a certain bout is broken (maximum gap length for a bout)
- Users can define the proportion of the bout duration that the acceleration should meet the threshold criteria.
- Users can define in which order the bouts should be detected.

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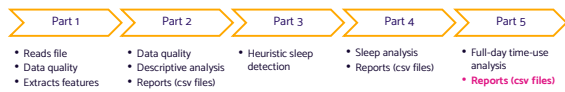


Part 5 Output

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The GGIR pipeline




```

    graph LR
      P1[Part 1] --> P2[Part 2]
      P2 --> P3[Part 3]
      P3 --> P4[Part 4]
      P4 --> P5[Part 5]
  
```

- Part 1**
 - Reads file
 - Data quality
 - Extracts features
- Part 2**
 - Data quality
 - Descriptive analysis
 - Reports (csv files)
- Part 3**
 - Heuristic: sleep detection
- Part 4**
 - Sleep analysis
 - Reports (csv files)
- Part 5**
 - Full-day time-use analysis
 - Reports (csv files)


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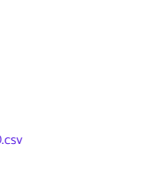


Part 5 Output

- meta
 - ms5,outraw
 - 40_100_400
 - 10tRData
 - 10t.csv
 - behavioralcodes_YYYY-MM-DD.csv
- results
 - file summary reports
 - Report_10t.pdf
- QC
 - part5_dayssummary_full_MM_L40M100V400_T5A5.csv
 - part5_dayssummary_MM_L40M100V400_T5A5.csv
 - part5_personsummary_MM_L40M100V400_T5A5.csv


 Accelting

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Part 5 Output

- meta
 - ms5,outraw
 - 40_100_400
 - 10t_TSAsRdata
 - 10t_TSAs.csv
 - behavioralcodes_YYYY-MM-DD.csv
- results
 - file summary reports
 - Report_10t.pdf
- QC
 - **part5_dayssummary_full_MM_L40M100V400_T5A5.csv**
 - **part5_dayssummary_MM_L40M100V400_T5A5.csv**
 - part5_personsummary_MM_L40M100V400_T5A5.csv

 Accelting

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Output from Part 5

Day-level features (full report)

do.report = 5

GGIR
[.]
Data cleaning includedaycrit.parts = 2/3,
[.]

66% of the waking hours available (wearing the device)

part5_daysummary_full_MM.L40M100V400.T5A5.csv

ID	window_number	weekday	calendar_date	cleaningcode	acc_available	gudler	nonwear_perc_day	nonwear_perc_spt	nonwear_perc_day_spt
1	1	Saturday	7/7/2014	0	1	sleeplog	3	84	30
1	2	Sunday	8/7/2014	1	1	HDCZA	0	0	0
1	3	Monday	9/7/2014	0	1	sleeplog	0	0	0
1	4	Tuesday	10/7/2014	0	1	sleeplog	0	0	0
1	5	Wednesday	11/7/2014	0	1	sleeplog	10	0	6.667
1	6	Thursday	12/7/2014	0	1	sleeplog	0.4	0	0.267
1	7	Friday	13/7/2014	2	1	sleeplog	68	0	45.334

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Output from Part 5

Day-level features (full report)

do.report = 5

GGIR
[.]
Data cleaning includedaycrit.parts = 2/3,
[.]

66% of the waking hours available (wearing the device)

part5_daysummary_MM.L40M100V400.T5A5.csv

ID	window_number	weekday	calendar_date	cleaningcode	acc_available	gudler	nonwear_perc_day	nonwear_perc_spt	nonwear_perc_day_spt
1	1	Saturday	7/7/2014	0	1	sleeplog	3	84	30
1	2	Sunday	8/7/2014	1	1	HDCZA	0	0	0
1	3	Monday	9/7/2014	0	1	sleeplog	0	0	0
1	4	Tuesday	10/7/2014	0	1	sleeplog	0	0	0
1	5	Wednesday	11/7/2014	0	1	sleeplog	10	0	6.667
1	6	Thursday	12/7/2014	0	1	sleeplog	0.4	0	0.267
1	7	Friday	13/7/2014	2	1	sleeplog	68	0	45.334

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Output from Part 5

Day-level features (full report)

do.report = 5

GGIR
[.]
Data cleaning includedaycrit.parts = 2/3,
excludefirstlast.parts = FALSE,
[.]

part5_daysummary_MM.L40M100V400.T5A5.csv

ID	window_number	weekday	calendar_date	cleaningcode	acc_available	gudler	nonwear_perc_day	nonwear_perc_spt	nonwear_perc_day_spt
1	1	Saturday	7/7/2014	0	1	sleeplog	3	84	30
1	2	Sunday	8/7/2014	1	1	HDCZA	0	0	0
1	3	Monday	9/7/2014	0	1	sleeplog	0	0	0
1	4	Tuesday	10/7/2014	0	1	sleeplog	0	0	0
1	5	Wednesday	11/7/2014	0	1	sleeplog	10	0	6.667
1	6	Thursday	12/7/2014	0	1	sleeplog	0.4	0	0.267

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Output from Part 5

Day-level features (full report)

do.report = 5

GGIR
[.]
Data cleaning includedaycrit.parts = 2/3,
excludefirstlast.parts = TRUE,
[.]

part5_daysummary_MM.L40M100V400.T5A5.csv


ID	window_number	weekday	calendar_date	cleaningcode	acc_available	gudler	nonwear_perc_day	nonwear_perc_spt	nonwear_perc_day_spt
1	1	Saturday	7/7/2014	0	1	sleeplog	3	84	30
1	2	Sunday	8/7/2014	1	1	HDCZA	0	0	0
1	3	Monday	9/7/2014	0	1	sleeplog	0	0	0
1	4	Tuesday	10/7/2014	0	1	sleeplog	0	0	0
1	5	Wednesday	11/7/2014	0	1	sleeplog	10	0	6.667
1	6	Thursday	12/7/2014	0	1	sleeplog	0.4	0	0.267

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Part 5 Output

- meta
 - ms5.outraw
 - 40_100_400
 - 10L.T5A5.Rdata
 - 10L.T5A5.csv
 - behavioralcodes.YYYY-MM-DD.csv
- results
 - file summary reports
 - Report_101.pdf
 - QC
 - part5_daysummary_full_MM.L40M100V400.T5A5.csv
 - part5_daysummary_MM.L40M100V400.T5A5.csv
 - part5_personsummary_MM.L40M100V400.T5A5.csv



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Output from Part 5

Person-level features (time-use)

do.report = 5

part5_personsummary_MM.L40M100V400.T5A5.csv

ID	Calendar_date	Nvaliddays	Nvaliddays_WD	Nvaliddays_WE	Ndaysleeper	Ncleaningcodezero	Ncleaningcode1	Nsleeplog_used	Nacc.available
T1	24/08/2022	6	4	2	0	5	1	5	6

Plain avg

ID	nonwear_perc_day	dur_spt_sleep_min	dur_day_IN_unbt_min	dur_day_MOD_unbt_min	dur_day_VIG_unbt_min	dur_day_MVPA_bts_5_to_min	dur_day_MVPA_bts_10_to_min	dur_day_total_MOD_min	dur_day_total_VIG_min
T1	0	325.306	230.986	49.375	0.319	2.806	2.681	72.597	0.514

Weighted avg

ID	nonwear_perc_day	dur_spt_sleep_min	dur_day_IN_unbt_min	dur_day_MOD_unbt_min	dur_day_VIG_unbt_min	dur_day_MVPA_bts_5_to_min	dur_day_MVPA_bts_10_to_min	dur_day_total_MOD_min	dur_day_total_VIG_min
T1	0	327.58	231.009	49.407	0.298	3.006	2.693	72.952	0.497

Weekend

ID	nonwear_perc_day_WD	dur_spt_sleep_min_WD	dur_day_IN_unbt_min_WD	dur_day_MOD_unbt_min_WD	dur_day_VIG_unbt_min_WD	dur_day_MVPA_bts_5_to_min_WD	dur_day_MVPA_bts_10_to_min_WD	dur_day_total_MOD_min_WD	dur_day_total_VIG_min_WD
T1	0	341.229	231.146	47.5	0.167	4.208	2.771	75.083	0.396

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Output from Part 5

Person-level features (acceleration)

do:report = 5

parts_personsummary_MM_L40M100V400_T5A5.csv

ID	Calendar_date	Nvaliddays	Nvaliddays_WD	Nvaliddays_WE	Ndaysleeper	Ncleaningcodezero	Ncleaningcode1	Nsleeplog_used	Nacc_available
T1	24/08/2022	6	4	2	0	5	1	5	6

Plain avg

ID	ACC_day_total_IN_mg_p0a	ACC_day_total_LIG_mg_p0a	ACC_day_total_MOD_mg_p0a	ACC_day_total_VIG_mg_p0a	ACC_day_mg_p0a	ACC_spt_mg_p0a	ACC_day_spt_mg_p0a
T1	12.312	64.438	140.033	497.212	34.072	20.446	30.437

Weighted avg

ID	ACC_day_total_IN_mg_w0a	ACC_day_total_LIG_mg_w0a	ACC_day_total_MOD_mg_w0a	ACC_day_total_VIG_mg_w0a	ACC_day_mg_w0a	ACC_spt_mg_w0a	ACC_day_spt_mg_w0a
T1	12.224	64.535	139.877	495.554	34.114	20.101	30.366

Weekend avg

week_weekend_aggregate_parts = TRUE

ID	ACC_day_total_IN_mg_WD	ACC_day_total_LIG_mg_WD	ACC_day_total_MOD_mg_WD	ACC_day_total_VIG_mg_WD	ACC_day_mg_WD	ACC_spt_mg_WD	ACC_day_spt_mg_WD
T1	11.694	65.119	138.941	485.61	34.365	18.034	29.945

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Output from Part 5

Person-level features (acceleration)

do:report = 5

parts_personsummary_MM_L40M100V400_T5A5.csv

ID	Calendar_date	Nvaliddays	Nvaliddays_WD	Nvaliddays_WE	Ndaysleeper	Ncleaningcodezero	Ncleaningcode1	Nsleeplog_used	Nacc_available
T1	24/08/2022	6	4	2	0	5	1	5	6

Plain avg

ID	ACC_day_total_IN_mg_p0a	ACC_day_total_LIG_mg_p0a	ACC_day_total_MOD_mg_p0a	ACC_day_total_VIG_mg_p0a	ACC_day_mg_p0a	ACC_spt_mg_p0a	ACC_day_spt_mg_p0a
T1	12.312	64.438	140.033	497.212	34.072	20.446	30.437

Weighted avg

ID	ACC_day_total_IN_mg_w0a	ACC_day_total_LIG_mg_w0a	ACC_day_total_MOD_mg_w0a	ACC_day_total_VIG_mg_w0a	ACC_day_mg_w0a	ACC_spt_mg_w0a	ACC_day_spt_mg_w0a
T1	12.224	64.535	139.877	495.554	34.114	20.101	30.366

Weekend avg

week_weekend_aggregate_parts = TRUE

ID	ACC_day_total_IN_mg_WE	ACC_day_total_LIG_mg_WE	ACC_day_total_MOD_mg_WE	ACC_day_total_VIG_mg_WE	ACC_day_mg_WE	ACC_spt_mg_WE	ACC_day_spt_mg_WE
T1	11.694	65.119	138.941	485.61	34.365	18.034	29.945

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Output from Part 5

Other variables

NIGHTTIME	DAYTIME	FULL WINDOW
N..atleast5minwakenight	Nbouts	quantile_mostactive60min_mg_pla
Nblocks	Nblocks	quantile_mostactive30min_mg_pla
dur_spt_wake_IN_min		L5VALUE_pla
dur_spt_wake_LIG_min		M5VALUE_pla
dur_spt_wake_MOD_min		L5TIME_num_pla
dur_spt_wake_VIG_min		M5TIME_num_pla
		ig_gradient_pla
		ig_intercept_pla
		ig_rsquared_pla
		Fragmentation metrics

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Output from Part 5

Other variables

NIGHTTIME	DAYTIME	FULL WINDOW
N..atleast5minwakenight	Nbouts	quantile_mostactive60min_mg_pla
Nblocks	Nblocks	quantile_mostactive30min_mg_pla
dur_spt_wake_IN_min		L5VALUE_pla
dur_spt_wake_LIG_min		M5VALUE_pla
dur_spt_wake_MOD_min		L5TIME_num_pla
dur_spt_wake_VIG_min		M5TIME_num_pla
		ig_gradient_pla
		ig_intercept_pla
		ig_rsquared_pla
		Fragmentation metrics

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Output from Part 5

Other variables

NIGHTTIME	DAYTIME	FULL WINDOW
N..atleast5minwakenight	Nbouts	quantile_mostactive60min_mg
Nblocks	Nblocks	quantile_mostactive30min_mg
dur_spt_wake_IN_min		L5VALUE
dur_spt_wake_LIG_min		M5VALUE
dur_spt_wake_MOD_min		L5TIME_num
dur_spt_wake_VIG_min		M5TIME_num
		ig_gradient
		ig_intercept
		ig_rsquared
		Fragmentation metrics

Fragmentation metrics → frag.metrics="all"

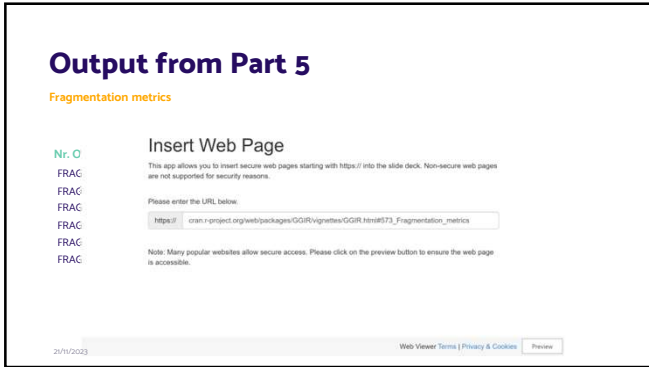
74

Output from Part 5

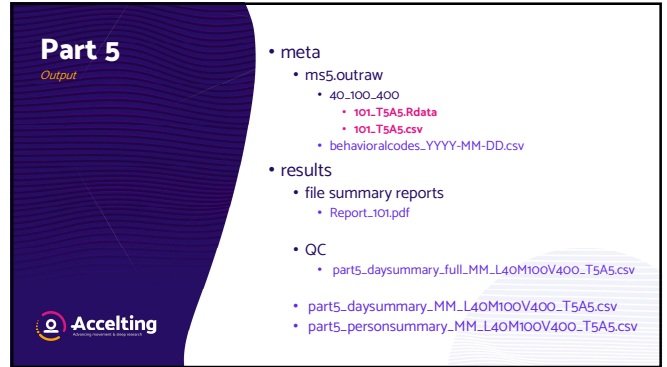
Fragmentation metrics

Nr. Of fragments	Transition probability	Mean duration	Indices
FRAG_Nfrag_IN_day	FRAG_TP_PA2IN_day	FRAG_mean_dur_IN_day	Gini
FRAG_Nfrag_LIPA_day	FRAG_TP_IN2PA_day	FRAG_mean_dur_LIPA_day	CoV
FRAG_Nfrag_MVPA_day	FRAG_TP_IN2LIPA_day	FRAG_mean_dur_MVPA_day	Alpha
FRAG_Nfrag_PA_day	FRAG_TP_IN2MVPA_day	FRAG_mean_dur_PA_day	-
FRAG_Nfrag_IN2LIPA_day			
FRAG_Nfrag_IN2MVPA_day			

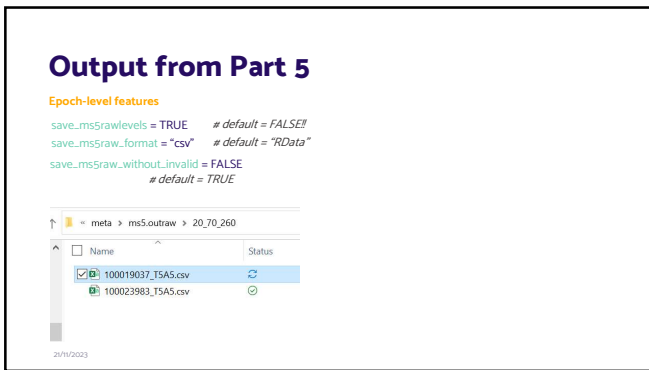
75



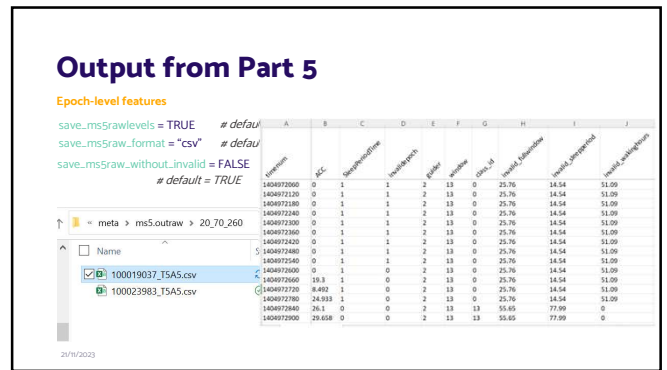
76



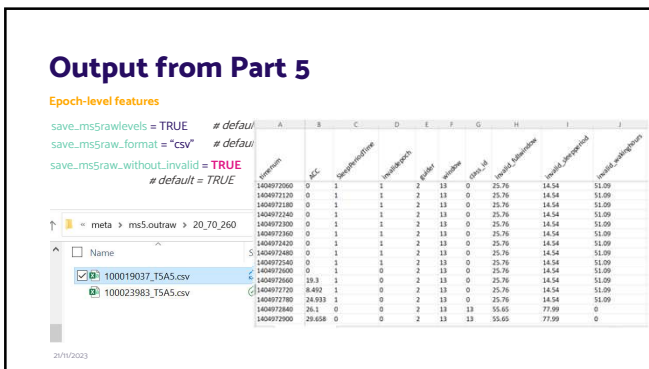
77



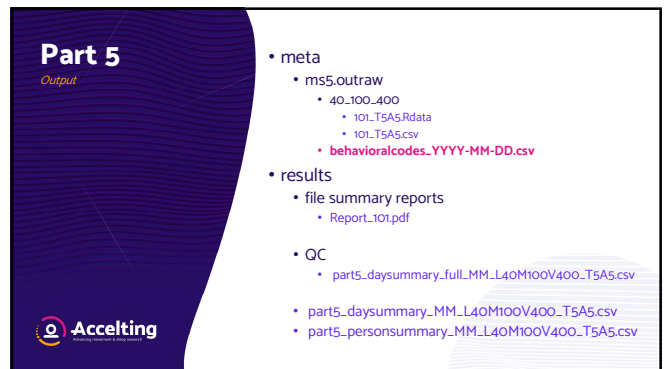
78



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Output from Part 5

Epoch-level features

```
save_msrawlevels = TRUE # default = FALSE
save_msraw_format = "csv" # default = "RData"
save_msraw_without_invalid = TRUE
```

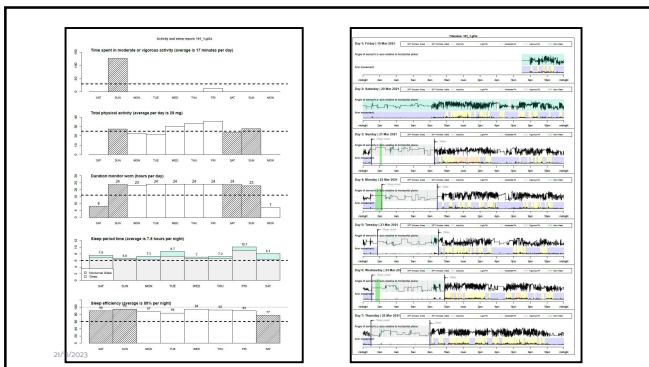
A	B
class_name	class_id
spt_sleep	0
spt_wake_IN	1
spt_wake_LIG	2
spt_wake_MOD	3
spt_wake_VIG	4
day_IN_unbt	5
day_LIG_unbt	6
day_MOD_unbt	7
day_VIG_unbt	8
day_MVPA_bts_10	9
day_MVPA_bts_5_10	10
day_IN_bts_60	11
day_IN_bts_30_60	12
day_LIG_bts_30	13
day_LIG_bts_10_30	14

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Part 5 Output

- meta
 - ms5.outraw
 - 40_100_400
 - 101_T5A5Rdata
 - 101_T5A5csv
 - behavioralcodes.YYYY-MM-DD.csv
- results
 - file summary reports
 - Report_101.pdf
- QC
 - part5_daysummary_full_MM.L40M100V400_T5A5.csv
 - part5_daysummary_MM.L40M100V400_T5A5.csv
 - part5_personsummary_MM.L40M100V400_T5A5.csv

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How many csv reports (datasets) do we expect from part 5? *(Single choice)*

- One per configuration selected, including thresholds, sustained inactivity bout, and window definition
- Two per configuration selected, including thresholds, sustained inactivity bout, and window definition
- Three per configuration selected, including thresholds, sustained inactivity bout, and window definition

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How many csv reports (datasets) do we expect from part 5? *(Single choice)*


- One per configuration selected, including thresholds, sustained inactivity bout, and window definition
- Two per configuration selected, including thresholds, sustained inactivity bout, and window definition
- Three per configuration selected, including thresholds, sustained inactivity bout, and window definition

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What does “_wei” mean at the end of the variable names in part 5 personsummary reports? *(Single choice)*

- Weekend average.
- Weekly average
- Weekday and weekend day weighted average.

87



What does “_wei” mean at the end of the variable names in part 5 personsummary reports? *(Single choice)*

- Weekend average.
- Weekly average
- Weekday and weekend day weighted average.

88

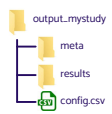


GGIR config file

www.accelting.com

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The GGIR pipeline (output folder)

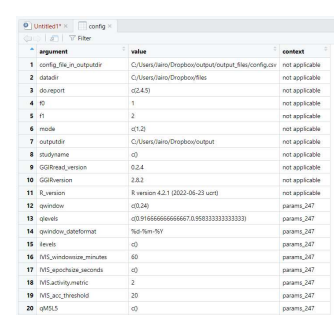


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config.csv file

- Modifiable csv file
- Define arguments used
- Can be called in GGIR to process new files



argument	value	context
1 config_dir_outputdir	C:\Users\Name\Desktop\output\output_files\config.csv	not applicable
2 gdata_dir	C:\Users\Name\Desktop\files	not applicable
3 id_report	02.45	not applicable
4 id	1	not applicable
5 id	2	not applicable
6 mode	0%20	not applicable
7 output_dir	C:\Users\Name\Desktop\output	not applicable
8 studyname	01	not applicable
9 GGIR_read_version	0.2.4	not applicable
10 GGIR_version	2.8.2	not applicable
11 R_version	R version 4.2.1 (2022-06-23 ucrt)	not applicable
12 qwindow	00:30	params_247
13 @levels	{0,9166666666666667,0.9999999999999999}	params_247
14 qwindow_dateformat	%p-%m-%Y	params_247
15 levels	00	params_247
16 MV_window_size_minutes	60	params_247
17 MV_epoch_size_seconds	00	params_247
18 MV_activity_metric	2	params_247
19 MV_acc_threshold	20	params_247
20 @M5L	00	params_247

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The GGIR()

Processing with config file

```
GGIR(
  # Processing with config file
  datadir = "C:/mystudy/files/",
  outputdir = "C:/mystudy/",
  configfile = "C:/mystudy/output_mystudy/config.csv")
```



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Need help?

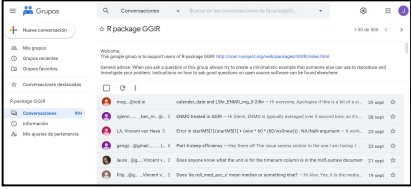
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Where and How to find help

- GGIR function documentation
- GGIR vignettes
- Google group

<https://groups.google.com/g/RpackageGGIR>

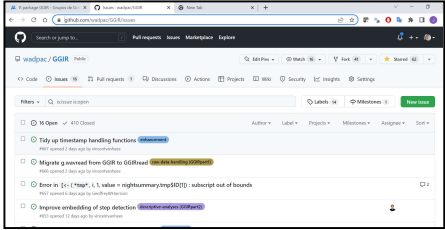


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Where and How to find help

- GGIR function documentation
- GGIR vignettes
- Google group
- Github issues

<https://github.com/wadpac/GGIR/issues>



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What entails a good question?

Describe the bug
A short, clear and concise description of what the bug is.

To Reproduce
Steps to reproduce the behavior.

1. Sensor brand:"..."
2. Data format:"..."
3. Approximate recording duration:"..." days
4. Are you using a sleep diary to guide the sleep detection? YES / NO
5. Copy of R command used:"..."
6. Have you tried processing your data based on GGIR's default argument values? Does the issue you report still appear? YES / NO

Expected behavior
A clear and concise description of what you expected to happen.

Screenshots
If applicable, add screenshots to help explain your problem. Note that usually we are not only interested in see the error message in red, but all GGIR output to the console.

Desktop:

- OS (e.g. iOS)
- GGIR Version (e.g. 2.2-0)

Additional context
Add any other context about the problem here.

Before submitting

- Have you tried the steps to reproduce? Do they include all relevant data and configuration? Does the issue you report still appear there?*
- Have you tried this on the latest 'master' branch from GitHub?

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More information (paper/s)



GGIR: A Research Community-Driven Open Source R Package for Generating Physical Activity and Sleep Outcomes From Multi-Day Raw Accelerometer Data

Jairo H. Miguelés, Alex V. Rowlands, Florian Huber, Séverine Sabia, Vincent T. van Hees

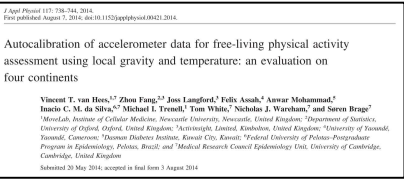
PROFITH Research Group, University of Granada; University of Leicester and NIHR Biomedical Research Centre; Netherlands eScience Center; Inseem, University College London; Netherlands eScience Center

Please cite when you use GGIR in your research:
doi: 10.1123/jmpb.2018-0063

21/11/2023

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More information (paper/s)



Autocalibration of accelerometer data for free-living physical activity assessment using local gravity and temperature: an evaluation on four continents

Vincent T. van Hees^{1,2}, Zhan Fang^{3,4}, Ross Langford⁵, Fadi Assaf⁶, Awwar Muhammad⁷, Isaac C. M. de Silva^{8,9}, Michael S. Tremblé¹⁰, Tom White¹¹, Nicholas J. Wareham¹², and Søren Brage¹³

¹MovLab, Institute of Cellular Medicine, Newcastle University, Newcastle, United Kingdom; ²Department of Statistics, University of Oxford, Oxford, United Kingdom; ³University of Oxford, Oxford, United Kingdom; ⁴Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ⁵Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ⁶Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ⁷Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ⁸Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ⁹Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ¹⁰Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ¹¹Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ¹²Department of Statistics, University of Cambridge, Cambridge, United Kingdom; ¹³Department of Statistics, University of Cambridge, Cambridge, United Kingdom

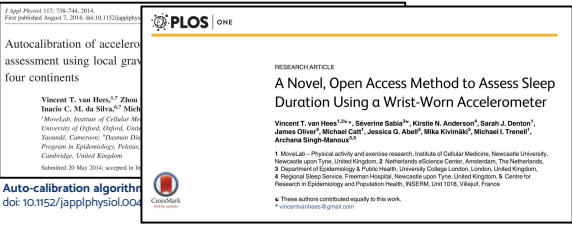
Submitted 20 May 2014; accepted in final form 3 August 2014

Auto-calibration algorithm:
doi: 10.1152/jappphysiol.00421.2014

21/11/2023

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More information (paper/s)



A Novel, Open Access Method to Assess Sleep Duration Using a Wrist-Worn Accelerometer

Vincent T. van Hees^{1,2*}, Séverine Sabia^{3*}, Kirstie M. Anderson⁴, Sarah J. Denton⁵, James Oliver⁶, Michael Cain⁷, Jessica G. Abel⁸, Mika Kivimäki⁹, Michael T. Tremblé¹⁰, Archa Singh-Manoux¹¹

¹MovLab - Physical activity and exercise research, Institute of Cellular Medicine, Newcastle University, Newcastle upon Tyne, United Kingdom; ²Netherlands eScience Center, Amsterdam, The Netherlands; ³Department of Epidemiology & Public Health, University College London, London, United Kingdom; ⁴Regional Sleep Service, Hadden Hospital, Wakefield Sleep Centre, United Kingdom; ⁵Centre for Research in Epidemiology and Population Health, INSERM, UMR 1074, Villejuif, France

Submitted 20 May 2014; accepted in final form 3 August 2014

Auto-calibration algorithm:
doi: 10.1152/jappphysiol.00421.2014

Sleep algorithm:
doi: 10.1371/journal.pone.0142533

21/11/2023

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Contribute by...

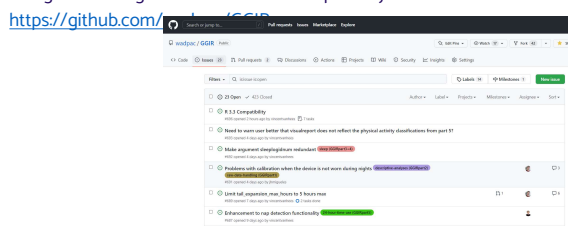
Doing research on algorithms or evaluating GGIR functionalities

1. Help improve imputation methods for epoch-level data
2. Optimize and evaluate:
 1. HorAngle algorithm for sleep period time definition
 2. Sleep detection in children and preschoolers
 3. Implementation of the Sadeh and the Cole-Kripke sleep algorithms
3. Help develop new functionality

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Contribute by...

Posting/addressing issues in the Github repository



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I got an error in GGIR that I am not able to resolve, so, how do I proceed? *(Single choice)*

- If I've got some coding skills, I try to fix that problem in my local version of GGIR, so that I can go ahead with myproject bothering anyone else
- I post the error to the google group or as an issue in the GitHub repository, and wait for help
- I e-mail Vincent, Jairo, or someone else with experience with GGIR and hope that they can help me.
- I create a detailed, reproducible description of the error and what I have tried to solve it. Here, I try to make it as easy as possible for others to help me. Next I post this in the GGIR Google group

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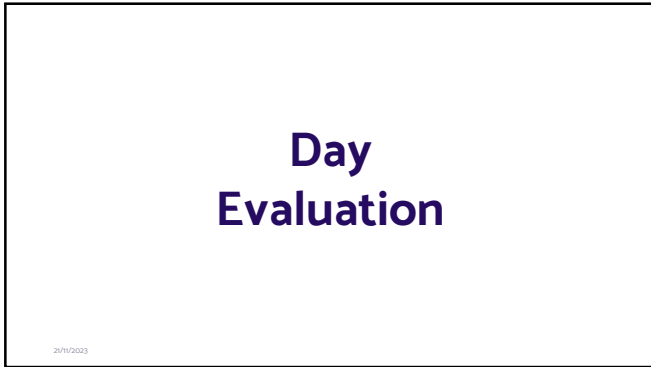
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Assignment 4 (build on assignment 3 script)

Download sleeplog: <https://bit.ly/3gluxDF>

1. Run GGIR parts 3 and 4 again using:
 - Reported sleeplog information:
 - Download sleeplog: <https://github.com/Accelting/trainingmaterials/tree/main/sleeplog>
 - Tip 1: make sure the ID in the sleeplog matches the ID in the GGIR output datasets
 - Tip 2: have a look at the idloc argument to facilitate the matching
 - Tip 3: do you already have part 3 and 4 data from a previous run? You might need to overwrite your milestone data

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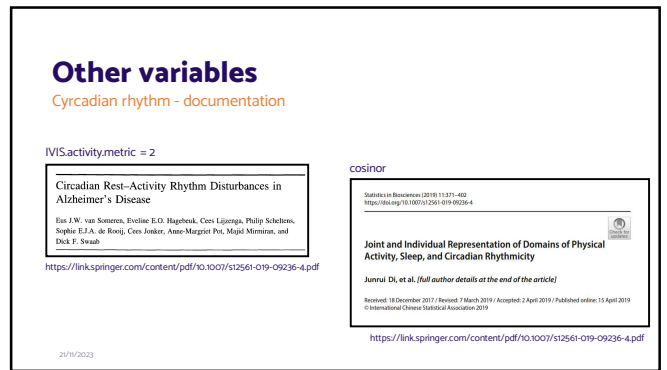
111



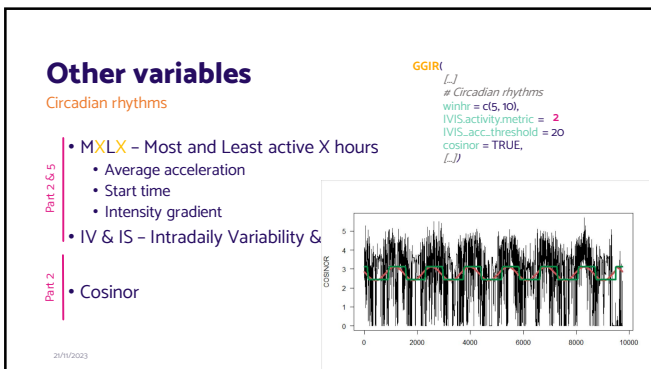
112



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