SAS Code for Accelerometer Data Cleaning and Management

Version 1.3

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Table of contents

Summary

The SAS code for accelerometer data cleaning and management builds upon available resources to provide researchers with flexible and easily accessible code for the analysis of Actical accelerometer data. The code is based on the Accel+ framework and allows the users to restrict their analysis to particular times and days of the week.

Introduction

There is considerable information in the physical activity literature on accelerometer data reduction, analytical procedures, and intensity cut-points. However, researchers who want to analyze their own accelerometer data face considerable challenges given a general lack of standardized information on how to proceed. Some accelerometer device makers have developed software to ease the data management process. These nevertheless come at a considerable cost and with some limitations with regards to the flexibility of how data can be cleaned, modified, and exported.

In the context of the Canadian Health Measures Survey (CHMS), Statistics Canada developed Accel+, which is a SAS-based syntax enabling researchers to analyze their own accelerometer data (developed for Actical accelerometers) in a way that is harmonized with the CHMS. Accel+ provides the annotated SAS code required to convert raw count and step data from the Actical accelerometer into physical activity and sedentary behaviour derived variables.

The SAS code for accelerometer data cleaning and management presented here adapts the Accel+ framework for the Healthy Start / Départ Santé (HSDS) project, and adds flexibility and ease of access for use in other contexts. HSDS is a health promotion initiative aimed at increasing healthy eating and physical activity opportunities in early learning environments. Due to the nature of these environments and the target population, there is an interest to restrict analyses to particular hours during weekdays and to record data in epochs of various lengths. The SAS code for accelerometer data cleaning and management allows this flexibility, and reduces the burden of learning SAS syntax.

In addition, this series of codes allows the researcher to restrict their analyses to a specific interval of the day, and to use epochs (units of time over which data are recorded) of less than 60 seconds while still expressing the final output in minutes. It also lessens the burden of knowing SAS syntax, but does not eliminate the need to understand and make decisions about data reduction techniques.

Data reduction decisions and implications

Despite simplifying the analysis, the SAS code for accelerometer data cleaning and management does not eliminate the need to understand and make decisions about data reduction techniques. Users should be aware that alterations to the data reduction steps can markedly affect the derived variables. Researchers using these codes are encouraged to gain a solid understanding of the implications of changing the data reduction steps and to clearly outline their methods in their documentation. Decisions related to data reduction may affect:

Epoch length: An epoch is a unit of time of a given length on which observations are based. For example, an epoch length of 15 seconds would produce 4 observations every minute. To avoid considerable bias, the lengths of the epochs should be shorter than the duration of the phenomenon being measured. Note that shorter epochs may improve accuracy, at the cost of a potentially higher variability. Other factors, such as available memory for storing observations and duration of the study may also affect the choice of the epoch length.

Wear time: The wear time is the total number of hours in a day minus the amount of non-wear time. The non-wear time is defined as the sum of the intervals of length equal or greater than the wear time interruption period, over which only near zero counts are observed. Note that the length of the wear time interruption period may influence whether observations are considered sedentary behaviour or non-wear time.

Valid Days: To be considered valid, a day must meet or exceed the minimum wear time. Observations from invalid days are not considered in the analysis. The HSDS project uses a minimum wear time of 10 hours.

Active Days: To be considered active, valid days must meet or exceed the daily physical activity criteria. The HSDS project considers two physical activity criteria: one for children under the age of 5, and another for children 5 and up. See (SECTION) for details.

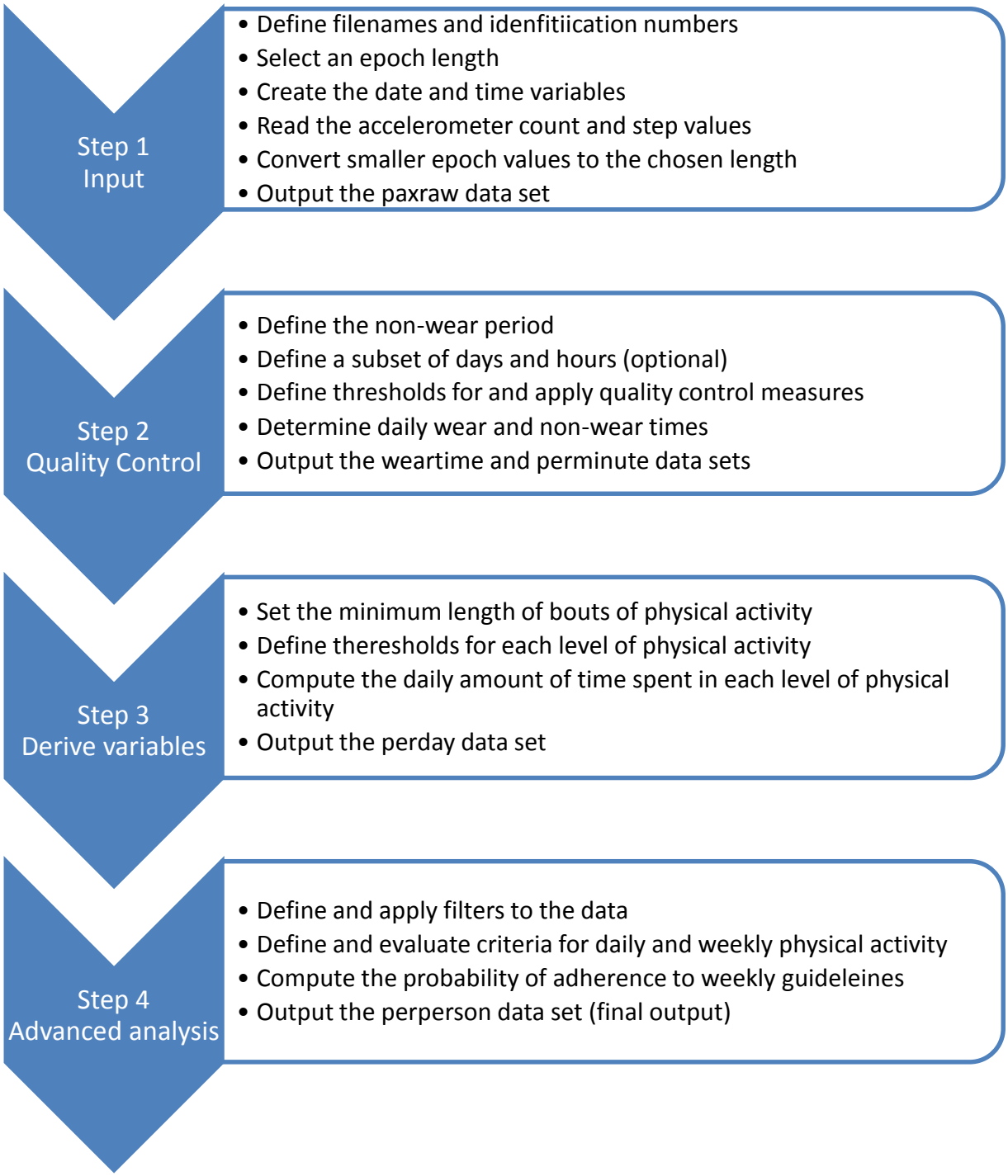
Subset Intervals (Daycare Hours): The HSDS project makes use of a user defined time interval, termed “daycare hours” for which a separate analysis is conducted. This interval is useful for analyzing continuous intervals, such as between 8:30 am and 4:30 pm. Another analysis is also conducted for observations not included in the interval, termed “non-daycare hours”.

Intensity Cut-points: The intensity cut-points are the threshold count values used for each level of physical activity. Some intensity cut-points are presented it Table 1, but many other cut-points have been proposed in published literature.

Table 1: Physical activity intensity cut-points		
Intensity	Adults (20-79 years)	Children (6-19 years)
Sedentary	0	0
Light	100	100
Moderate	1535	1500
Vigorous	3962	6500
Source: Accel+ manual (Colley, 2014)		

Overview

The SAS Code for accelerometer data cleaning and management processes data in four steps:



Procedure

The following is a more detailed description of the four step procedure used by the SAS code for accelerometer data cleaning and management to process raw Actical data and produce.

Step 1 - Input

Input: Multiple .awc files.

Output: paxraw

Description: The first step in the SAS code for accelerometer data cleaning and management is to extract the subject identification number, the starting time, the length of epochs, and the raw count and step values from the accelerometer (.awc) files. As each epoch is read from the accelerometer data file, it is assigned a sequential observation number and a date-time value based on the epoch length and starting time. Observations are discarded until the first occurrence of midnight is encountered (00:00:00), after which values are stored sequentially in the paxraw data set until the end of the accelerometer data file or the maximum number of days is attained. If the raw values were recorded in epochs of shorter length than that specified by the user, they are transformed via summing to the appropriate length. A report is then produced, informing the user about the number of observations extracted from each data file.

Step 2 – Quality Control

Input: paxraw

Output: perminute, weartime

Description: The second step in the SAS code for accelerometer data cleaning and management is to load the paxraw data set from Step 1, compute wear times and to apply quality control measures. The user may also specify days and an interval of time during those days that is of particular interest[1]. Epochs are classified as included or excluded from this subset based on their date-time values (see Step 2.5). Subsequently, the data is subjected to quality control measures. Count and step values exceeding their respective thresholds are labeled as spurious. If the number of spurious observations exceeds the predefined tolerable number, processing of the data is halted and an error is output to the log. Otherwise, spurious values are replaced with the average of neighbouring values and execution of the code continues normally. Optionally, the data may be verified for calibration errors, where a non-zero value is encountered a disproportionally large number of times (see Step 2.7). Data screened in this manner are identified or deleted if the frequency of a non-zero value exceeds a given threshold. Wear and non-wear times are then computed for the entire data set, for observations belonging to the user

[1] For the HSDS project, the subset of interest was used to limit the analysis to “daycare hours”, thus the terms have been used synonymously throughout the code and the current document.

defined subset, and for observations not included in the subset. Finally, the wear time and cleaned epoch data are output to the weartime and perminute data sets respectively.

Step 3 – Derive Variables

Input: perminute, weartime

Output: perday

Description: The third step of the SAS code for accelerometer data cleaning and management reads the weartime and perminute data sets from Step 2 and outputs daily values. User defined physical activity thresholds are applied to the epoch data. Bouts, groups of a certain number of epochs (generally 1), and bout intervals, groups of consecutive epochs for which at least a certain number are spent in a specific level of physical activity (usually 8 out of 10 minutes), are established and summed to produce the daily amount of time spent in each level of physical activity. The results are output in the in perday data set.

Step 4 – Advanced Analysis

Input: perday

Output: perperson

Description: The fourth step of the SAS code for accelerometer data cleaning and management reads the perday data set from Step 3, and outputs daily average values and weekly summaries. The user first establishes daily and weekly physical activity and step criteria, and determines whether these should be evaluated using the entire data set, only the subset of interest (daycare hours), or only the values outside of the subset (non-daycare hours). Days that meet the minimum number of wear time hours are declared valid, while invalid days are dropped from the analysis. Among the valid days, those that meet the physical activity and step criteria are declared active. Using the number of active and valid days, as well as the daily physical activity criterion, a probability of adhering to the daily guidelines is established[2].

[2] The probability of adhering to the daily guidelines is approximated by a beta distribution, and should not be considered reliable when the number of valid days is small.

Output

At the end of each step, the SAS code for accelerometer data cleaning and management produces one or more data sets, for which a brief description is provided below. The variables contained in each data set are detailed in the next section.

Paxraw

The paxraw data set contains the count, step and date-time values for the epoch data. Each entry is uniquely identified by combining the participant's identification number and the observation number, which is attributed to epochs sequentially upon extraction from the accelerometer data file.

Perminute

The perminute data set, contrary to its name, stores cleaned epoch count, step and date-time values. The epoch data is divided into wear and non-wear time, and is identified as included or excluded from a user defined interval (daycare hours), based on day of the week and time of day.

Weartime

The weartime data set contains the total wear and non-wear time for each day, for each day during daycare hours only, and for each day during non-daycare hours only. This data set is used primarily to pass values from Step 2 to Step 3.

Perday

The perday data set presents the daily time spent in each level of physical activity in bouts and bout intervals. Values are presented for the entire day, for daycare hours only, and for non-daycare hours only.

Perperson

The perperson data set displays the daily average time spent in each level of physical activity for the entire day, for daycare hours only, and for non-daycare hours only. It also shows the number of valid and active days, attainment of the weekly physical activity and criteria, and probability of adhering to the weekly guidelines (only valid for individuals with 4 or more valid days).

Variable Dictionary

The following is a list of the variables, with brief descriptions, that may be found in the data sets output by the SAS code for accelerometer data cleaning and management:

File	Variable Name	Variable Description
paxraw (Step 1)	seqn	Respondent identification number that was entered during Actical initialization process
	am_identify_no	Respondent identification number that was assigned to the Actical file name
	am_strt_date	Start date that was entered during Actical initialization process
	date	New SAS date variable created from am_strt_date
	am_strt_time	Start date that was entered during Actical initialization process
	am_epoch	Epoch length that was entered during Actical initialization process (0, 1, 2, or 4 for respectively 1, 15, 30, or 60 second epochs)
	am_serial_no	Actical serial number
	paxn	Observation number (i.e., 1 through 10,080 in a 7-day file with epoch set at 60-sec)
	paxinten	Accelerometer count value
	paxstep	Accelerometer step value
	day	Sequential day (1-7)
	paxhour	Hour of day (0-23)
	paxminut	Minute of hour (0-59)
	paxsec	Second of minute (0-59)
	paxday	Day of the week (i.e., Sunday (1) through Saturday (7))
perminute (Step 2)	clinicid	Renamed “seqn”
	am_identify_no	Respondent identification number that was assigned to the Actical file name
	amcount	Renamed “paxinten”
	amstep	Renamed “paxstep”
	dayworn	Renamed “day”
	hour	Renamed “paxhour”
	minute	Renamed “paxminut”
	sec	Renamed “paxsec”
	dayofweek_worn	Renamed “paxday”
	obsn	Renamed “paxn”
	nonwear	Non-wear indicator
	DCHOURS	Subset indicator
weartime (Step 2)	clinicid	Renamed “seqn”
	dayworn	Renamed “day”
	tot_cnt_wr	Total intensity counts from wear time in a day
	tot_min	Number of valid minutes in a day
	tot_dur_nw	Number of non-wear hours in a day

File	Variable Name	Variable Description
	tot_min_wr	Number of wear minutes in a day
	wear_hr	Number of wear hours in a day
	tot_cnt_wr_dc	Total intensity counts from wear time in a day during daycare hours only
	tot_min_dc	Number of valid minutes in a day during daycare hours only
	tot_dur_nw_dc	Number of non-wear hours in a day during daycare hours only
	tot_min_wr_dc	Number of wear minutes in a day during daycare hours only
	wear_hr_dc	Number of wear time hours in a day during daycare hours only
	tot_cnt_wr_ndc	Total intensity counts from wear time in a day during non-daycare hours only
	tot_min_ndc	Number of valid minutes in a day during non-daycare hours only
	tot_dur_nw_ndc	Number of non-wear hours in a day during non-daycare hours only
	tot_min_wr_ndc	Number of wear minutes in a day during non-daycare hours only
	wear_hr_ndc	Number of wear time hours in a day during non-daycare hours only
perday (Step 3)	am_identify_no	Respondent identification number that was assigned to the Actical file name
	clinicid	Renamed “seqn”
	dayworn	Renamed “day”
	dayofweek_worn	Renamed “paxday”
	tot_cnt_wr	Total intensity counts from wear time in a day
	wear_hr	Number of wear hours in a day
	tot_dur_pa1	Number of minutes of light, moderate, or vigorous activity in a day
	tot_dur_mv1	Number of minutes moderate or vigorous activity in a day
	tot_dur_v1	Number of minutes vigorous activity in a day
	tot_dur_m1	Number of minutes of moderate activity in a day
	tot_dur_lt1	Number of minutes of light activity in a day
	tot_dur_sed1	Number of minutes of sedentary activity in a day
	tot_dur_pa	Number of minutes in bouts of light, moderate, or vigorous activity in a day
	tot_dur_mv	Number of minutes in bouts of moderate or vigorous activity in a day
	tot_dur_v	Number of minutes in bouts of vigorous activity in a day
	tot_dur_m	Number of minutes in bouts of moderate activity in a day
	tot_dur_lt	Number of minutes in bouts of light activity in a day
	tot_dur_sed	Number of minutes in bouts of sedentary activity in a day
	amstep	Number of steps in a day

File	Variable Name	Variable Description
	tot_cnt_wr_dc	Total intensity counts from wear time in a day during daycare hours only
	wear_hr_dc	Number of wear hours in a day during daycare hours only
	tot_dur_pa1_dc	Number of minutes of light, moderate, or vigorous activity in a day during daycare hours only
	tot_dur_mv1_dc	Number of minutes moderate or vigorous activity in a day during daycare hours only
	tot_dur_v1_dc	Number of minutes vigorous activity in a day during daycare hours only
	tot_dur_m1_dc	Number of minutes of moderate activity in a day during daycare hours only
	tot_dur_lt1_dc	Number of minutes of light activity in a day during daycare hours only
	tot_dur_sed1_dc	Number of minutes of sedentary activity in a day during daycare hours only
	tot_dur_pa_dc	Number of minutes in bouts of light, moderate, or vigorous activity in a day during daycare hours only
	tot_dur_mv_dc	Number of minutes in bouts of moderate or vigorous activity in a day during daycare hours only
	tot_dur_v_dc	Number of minutes in bouts of vigorous activity in a day during daycare hours only
	tot_dur_m_dc	Number of minutes in bouts of moderate activity in a day during daycare hours only
	tot_dur_lt_dc	Number of minutes in bouts of light activity in a day during daycare hours only
	tot_dur_sed_dc	Number of minutes in bouts of sedentary activity in a day during daycare hours only
	amstep_dc	Number of steps in a day during daycare hours only
	tot_cnt_wr_ndc	Total intensity counts from wear time in a day during non-daycare hours only
	wear_hr_ndc	Number of wear hours in a day during non-daycare hours only
	tot_dur_pa1_ndc	Number of minutes of light, moderate, or vigorous activity in a day during non-daycare hours only
	tot_dur_mv1_ndc	Number of minutes moderate or vigorous activity in a day during non-daycare hours only
	tot_dur_v1_ndc	Number of minutes vigorous activity in a day during non-daycare hours only
	tot_dur_m1_ndc	Number of minutes of moderate activity in a day during non-daycare hours only
	tot_dur_lt1_ndc	Number of minutes of light activity in a day
	tot_dur_sed1_ndc	Number of minutes of sedentary activity in a day during non-daycare hours only
	tot_dur_pa_ndc	Number of minutes in bouts of light, moderate, or vigorous activity in a day

File	Variable Name	Variable Description
	tot_dur_mv_ndc	Number of minutes in bouts of moderate or vigorous activity in a day during non-daycare hours only
	tot_dur_v_ndc	Number of minutes in bouts of vigorous activity in a day during non-daycare hours only
	tot_dur_m_ndc	Number of minutes in bouts of moderate activity in a day during non-daycare hours only
	tot_dur_lt_ndc	Number of minutes in bouts of light activity in a day during non-daycare hours only
	tot_dur_sed_ndc	Number of minutes in bouts of sedentary activity in a day during non-daycare hours only
	amstep_ndc	Number of steps in a day during non-daycare hours only
perperson (Step 4)	clinicid	Renamed "seqn"
	wear_hr_avg	Average wear hours on valid days
	cpm_avg	Average counts per minute on valid days
	pa_min_avg	Average minutes of light, moderate, or vigorous physical activity on valid days
	mvpa_min_avg	Average minutes of moderate or vigorous physical activity on valid days
	vigorous_min_avg	Average minutes of vigorous physical activity on valid days
	moderate_min_avg	Average minutes of moderate physical activity on valid days
	light_min_avg	Average minutes of light physical activity on valid days
	sedentary_min_avg	Average minutes of sedentary physical activity on valid days
	pa_bouts_avg	Average minutes in bouts of light, moderate, or vigorous physical activity on valid days
	mvpa_bouts_avg	Average minutes in bouts of moderate or vigorous physical activity on valid days
	vigorous_bouts_avg	Average minutes in bouts of vigorous physical activity on valid days
	moderate_bouts_avg	Average minutes in bouts of moderate physical activity on valid days
	light_bouts_avg	Average minutes in bouts of light physical activity on valid days
	sedentary_bouts_avg	Average minutes in bouts of sedentary physical activity on valid days
	step_count_avg	Average steps on valid days
	wear_hr_avg_dc	Average wear hours on valid days during daycare hours only
	cpm_avg_dc	Average counts per minute on valid days during daycare hours only
	pa_min_avg_dc	Average minutes of light, moderate, or vigorous physical activity on valid days during daycare hours only
	mvpa_min_avg_dc	Average minutes of moderate or vigorous physical activity on valid days during daycare hours only

File	Variable Name	Variable Description
	vigorous_min_avg_dc	Average minutes of vigorous physical activity on valid days during daycare hours only
	moderate_min_avg_dc	Average minutes of moderate physical activity on valid days during daycare hours only
	light_min_avg_dc	Average minutes of light physical activity on valid days during daycare hours only
	sedentary_min_avg_dc	Average minutes of sedentary physical activity on valid days during daycare hours only
	pa_bouts_avg_dc	Average minutes in bouts of light, moderate, or vigorous physical activity on valid days during daycare hours only
	mvpa_bouts_avg_dc	Average minutes in bouts of moderate or vigorous physical activity on valid days during daycare hours only
	vigorous_bouts_avg_dc	Average minutes in bouts of vigorous physical activity on valid days during daycare hours only
	moderate_bouts_avg_dc	Average minutes in bouts of moderate physical activity on valid days during daycare hours only
	light_bouts_avg_dc	Average minutes in bouts of light physical activity on valid days during daycare hours only
	sedendatry_bouts_avg_dc	Average minutes in bouts of sedentary physical activity on valid days during daycare hours only
	step_count_avg_dc	Average steps on valid days during daycare hours only
	wear_hr_avg_ndc	Average wear hours on valid days during non-daycare hours only
	cpm_avg_ndc	Average counts per minute on valid days during non-daycare hours only
	pa_min_avg_ndc	Average minutes of light, moderate, or vigorous physical activity on valid days during non-daycare hours only
	mvpa_min_avg_ndc	Average minutes of moderate or vigorous physical activity on valid days during non-daycare hours only
	vigorous_min_avg_ndc	Average minutes of vigorous physical activity on valid days during non-daycare hours only
	moderate_min_avg_ndc	Average minutes of moderate physical activity on valid days during non-daycare hours only
	light_min_avg_ndc	Average minutes of light physical activity on valid days during non-daycare hours only
	sedentary_min_avg_ndc	Average minutes of sedentary physical activity on valid days during non-daycare hours only
	pa_bouts_avg_ndc	Average minutes in bouts of light, moderate, or vigorous physical activity on valid days during non-daycare hours only
	mvpa_bouts_avg_ndc	Average minutes in bouts of moderate or vigorous physical activity on valid days during non-daycare hours only
	vigorous_bouts_avg_ndc	Average minutes in bouts of vigorous physical activity on valid days during non-daycare hours only
	moderate_bouts_avg_ndc	Average minutes in bouts of moderate physical activity on valid days during non-daycare hours only

File	Variable Name	Variable Description
	light_bouts_avg_ndc	Average minutes in bouts of light physical activity on valid days during non-daycare hours only
	sedendatry_bouts_avg_ndc	Average minutes in bouts of sedentary physical activity on valid days during non-daycare hours only
	step_count_avg_ndc	Average steps on valid days during non-daycare hours only
	n_valid	Number of valid days
	n_active_1	Number of active days according to the daily criteria for ages under 5
	n_active_2	Number of active days according to the daily criteria for ages 5 and up
	week_criteria_1	Follows the weekly guideline criteria for ages under 5
	week_criteria_2	Follows the weekly guideline criteria for ages 5 and up
	prob_day_criteria_1	Probability of adherence to the daily guideline criteria for ages under 5
	prob_day_criteria_2	Probability of adherence to the daily guideline criteria for ages 5 and up
	step_criteria	Follows the weekly step count criteria

Steps requiring user input

At each step, the SAS code for accelerometer data cleaning and management requires certain inputs from the user. The sections requiring inputs, and their default values, are:

Code File	Step Number	Description
Step 1	1.1	Define the path for the folder containing the data file: %LET pi_path1 = C:\Users\Example\SAS Data;
		Define the path for the output directory: %LET po_path1 = C:\Users\Example\SAS Output;
		Define the path for the report directory: %LET po_path2 = &po_path1.\Reports;
	1.2	Set the length of the identification number established during the Actical initialization process: %LET id_length = 4;
		Set the length of the accelerometer data file names (excluding the .AWC extension): %LET file_length = 4;
		Set the length of the accelerometer's serial number: %LET serial_length = 7;
	1.3	Define the length of the epochs in seconds. Valid options include 1, 15, 30, and 60 second epochs: %LET epoch_length = 15;
Step 2	2.1	Define the path for the output directory (must match Step 1.1): %LET po_path1 = C:\Users\Example\SAS Output;
	2.2	Define the path for the optional Excel output of the summary data set: %LET xls_path = &po_path1.\WearTimes.xls;
	2.3	Determine the wear time interruption period (in minutes): %LET nw_period = 60;
	2.4	Define the length of the epochs in seconds. Valid options include 1, 15, 30, and 60 second epochs (must match Step 1.3): %LET epoch_length = 15;

Code File	Step Number	Description
	2.5	Determine the days of the week on which to perform the analysis (valid options are Sunday (1), Monday (2), Tuesday (3), Wednesday (4), Thursday (5), Friday (6), and Saturday (7)): %LET Days = 2, 3, 4, 5, 6; Note: The default value excludes weekends.
		Set the starting hour for the time interval of interest (0 to 23): %LET DC_Time_Strt_hr = 8;
		Set the starting minute for the time interval of interest (0 to 59): %LET DC_Time_Strt_min = 30;
		Set the ending hour for the time interval of interest (0 to 23): %LET DC_Time_End_hr = 16;
		Set the ending minute for the interval of interest (0 to 59): %LET DC_Time_End_min = 30;
	2.6	Set the spurious count threshold (values above this level are considered erroneous): %LET spur_cpm = 20000;
		Set the spurious step threshold (values above this level are considered erroneous): %LET spur_step = 253;
		Set the maximum number of tolerable spurious counts: %LET max_spur_cnt = 15;
		Set the maximum number of tolerable spurious steps: %LET max_step_cnt = 15;
	2.7	Determine if the data should be verified for miscalibrations: %LET percent_skip = 1;
		Set the threshold for detecting miscalibrations: %LET percent_level = 0.4;
		Define the action to perform when a miscalibration is detected: %LET percent_action = 0;
Step 3	3.1	Define the path for the output directory (must match Step 1.1): %LET po_path1 = C:\Users\Example\SAS Output;
	3.2	Define the path for the Excel output of the physical activity data set: %LET xls_path = &po_path1.\PATimes.xls;

Code File	Step Number	Description
	3.3	Specify the threshold for light physical activity: %LET light = 100;
		Specify the threshold for moderate physical activity: %LET moderate = 1500;
		Specify the threshold for vigorous physical activity: %LET vigorous = 6500;
	3.4	Set the label to add to values for epochs contained within the interval specified in Step 2.5: %LET dc_text = Daycare Hours Only;
		Set the label to add to values for epochs not contained within the interval specified in Step 2.5: %LET ndc_text = Non-daycare Hours Only;
	3.5	Define the length of the epoch in seconds. Valid options include 1, 15, 30, and 60 second epochs (must match Step 1.3): %LET epoch_length = 15;
	3.6	Set the number of epochs contained in each bout (unit) of physical activity: %LET bout_lgth = 1;
	3.7	Set the minimum number of minutes in each bout interval of physical activity: %LET bout_time = 10;
		Set the minimum number of minutes of each bout interval that must be spent in the specified level of physical activity: %LET bout_min = 8;
Step 4	4.1	Define the path for the output directory (must match Step 1.1): %LET po_path1 = C:\Users\Example\SAS Output;
	4.2	Define the path for the Excel output of the physical activity data set: %LET xls_path = &po_path1.\AvgPATimes.xls;
	4.3	Set the label to add to values for epochs contained within the interval specified in Step 2.5: %LET dc_text = Daycare Hours Only;
		Set the label to add to values for epochs not contained within the interval specified in Step 2.5: %LET ndc_text = Non-daycare Hours Only;

Code File	Step Number	Description
	4.4	Set the number of epochs contained in each bout (unit) of physical activity (must be the same as in Step 3.6): %LET bout_lgth = 1;
	4.5	Determine if the entire dataset (blank), the interval defined in Step 2.5 (_dc), or the values not included in the interval defined in Step 2.5 (_ndc) should be used to evaluate the wear time criterion: %LET HOURS_FLG = ;
		Set the minimum number of wear time hours required for the day to be valid: %LET valid_wear = 10;
	4.6	Determine if the entire dataset (blank), the interval defined in Step 2.5 (_dc), or the values not included in the interval defined in Step 2.5 (_ndc) should be used to evaluate the physical activity criteria: %LET DAY_HOURS_FLG = ;
		Determine if bouts or bout intervals should be used to evaluate the physical activity criteria: %LET DAY_CRITERIA_BOUTS = ;
		Set the number of active days required for an individual to be considered active: %LET N_DAY_ACTIVE_CRITERIA = 5;
		Set the type of physical activity used to evaluate the first physical activity criterion (all =_pa, moderate or vigorous = _mv, vigorous = _v, moderate = _m, light = _lt, sedentary = _sed): %LET DAY_FLG_TYPE_1 = _pa;
		Set the type of physical activity used to evaluate the second physical activity criterion (all =_pa, moderate or vigorous = _mv, vigorous = _v, moderate = _m, light = _lt, sedentary = _sed): %LET DAY_FLG_TYPE_2 = _mv;
		Define the minimum number of minutes spent doing physical activity of the specified level required to make that day active based on the first physical activity criterion: %LET DAY_CRITERIA_1 = 180;
		Define the minimum number of minutes spent doing physical activity of the specified level required to make that day active based on the second physical activity criterion: %LET DAY_CRITERIA_2 = 180;

Code File	Step Number	Description
	4.7	Determine if the entire dataset (blank), the interval defined in Step 2.5 (_dc), or the values not included in the interval defined in Step 2.5 (_ndc) should be used to evaluate the weekly physical activity criteria: %LET WEEK_HOURS_FLG = ;
		Determine if bouts or bout intervals should be used to evaluate the weekly physical activity criteria: %LET WEEK_CRITERIA_BOUTS = ;
		Set the type of physical activity used to evaluate the first weekly physical activity criterion (all =_pa, moderate or vigorous = _mv, vigorous = _v, moderate = _m, light = _lt, sedentary = _sed). The default value is the level set in Step 4.6: %LET WEEK_FLG_TYPE_1 = &DAY_FLG_TYPE_1.;
		Set the type of physical activity used to evaluate the second weekly physical activity criterion (all =_pa, moderate or vigorous = _mv, vigorous = _v, moderate = _m, light = _lt, sedentary = _sed). The default value is the level set in Step 4.6: %LET WEEK_FLG_TYPE_2 = &DAY_FLG_TYPE_2.;
		Define the minimum daily average number of minutes spent doing physical activity of the specified level required to make the week active based on the first weekly physical activity criterion. The default value is based on the first daily physical activity criterion set in Step 4.6: %LET WEEK_CRITERIA_1 = %EVAL(&DAY_CRITERIA_1. * &N_DAY_ACTIVE_CRITERIA./7);
		Define the minimum daily average number of minutes spent doing physical activity of the specified level required to make the week active based on the second weekly physical activity criterion. The default value is based on the second daily physical activity criterion set in Step 4.6: %LET WEEK_CRITERIA_2 = %EVAL(&DAY_CRITERIA_2. * &N_DAY_ACTIVE_CRITERIA./7);
	4.8	Determine if the entire dataset (blank), the interval defined in Step 2.5 (_dc), or the values not included in the interval defined in Step 2.5 (_ndc) should be used to evaluate the weekly step criteria: %LET STEP_HOURS_FLG = ;
		Define the daily average number of steps required to make the week active: %LET STEP_CRITERIA = 10000;

References

Colley, RC. Actical Accelerometer Data Analysis Support Tool: Harmonizing with the Canadian Health Measures Survey (Accel+). Available at: www.haloresearch.ca/accel. Accessed: February 27, 2014.