System for Observing Play and Leisure Activity in Youth (SOPLAY)

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SOPLAY
(System for Observing Play and Leisure Activity in Youth)

RATIONALE

Investigations of physical activity have been hampered by the lack of an objective tool for quantifying physical activity in "open" environments, such as recreational and leisure settings. Measuring activity in these environments is complicated because both the number of participants and their activity levels change frequently.

SUMMARY

The System for Observing Play and Leisure Activity in Youth (SOPLAY) is based on momentary time sampling techniques in which systematic and periodic scans of individuals and contextual factors within pre-determined target areas are made. During a scan the activity of each individual is mechanically or electronically coded as Sedentary (lying down, sitting, or standing), Walking, or Very Active. Separate scans are made for females and males, and simultaneous entries are also made for time of day, temperature, area accessibility, area usability, presence of supervision, presence and classification of organized activity, and equipment availability. Summary counts describe the number of males and females in any given setting and their activity levels. The instrument permits physical activity level comparisons to be made among different environments or within the same environment over different time periods. Energy expenditure rates (Kcal/kg/min) can also be calculated based on previously validated constants for each level of activity.

PURPOSE

SOPLAY was designed to obtain observational data on the number of students and their physical activity levels during play and leisure opportunities in a specified activity area.

During the M-SPAN study, SOPLAY observations were be made before school (BS), during each lunch period (L), and after school (AS).

VALIDITY & RELIABILITY

Validity

Although no field-based validity study of the SOPLAY measure has been conducted, validity of the activity codes used by SOPLAY have been established through heart rate monitoring (McKenzie et al., 1991; Rowe, Schuldheism, & van der Mars, 1997). These provide support for the initial construct validity of SOPLAY. Providing measures of persistent behaviors (i.e., physical activity) are taken frequently and at random, momentary time sampling techniques have shown to yield valid behavioral samples (Ref). Because only brief episodes are recorded, response and recording occur simultaneously with observations occurring at an approximate rate of one child per second.

Reliability

Reliability data for SOPLAY were collected during 14 days of field assessment. A pair of assessors would simultaneously and independently make counts of boys and girls in each

activity category in selected target areas. Activity counts from a total of 186 target areas were used in the reliability analysis. Interobserver agreements for the five contextual variables were 95%, 97%, 93%, 96%, and 88%, for area accessibility, usability, presence of supervision, presence of organized activity, and provision of equipment, respectively. To examine the reliability of activity counts made by different assessors, a series of intraclass correlations were computed. Correlations were high for sedentary girls (R=.98) and walking girls (.95), although lower for counts of very active girls (.76). For boys, correlations were high for sedentary (.98), walking (.98), and very active (.97) behavior. It was concluded that all interobserver agreements and intraclass correlations met acceptable criteria (IOA=80%, R=.75) for reliable assessment.

OBSERVATION AREAS

1. Direct observations will be made in designated Target Areas that represent all standard locations likely to provide opportunities for students to be physically active. These Areas will be predetermined and identified for observations prior to baseline assessments. A map will be provided to identify areas and a standard observation order established for each school. Additional target areas may be added by observers on site and then documented.

2. During occasions of high student density, Target Areas will be subdivided into smaller Scan Spaces so that accurate measures can be obtained. Observers will use standard court or field markings to determine appropriate Scan Spaces within each Target Area. Data from these smaller spaces will be summed to provide an overall measure for each Target Area.

   NOTE: A decision to subdivide a Target Area depends upon the (1) number of students in the area and (2) the type of student activity. Fast moving activities with students clustered together and moving in diverse directions (e.g., during soccer and basketball), require smaller scan spaces.

OBSERVATION PREPARATION

1. Prior to leaving for the school, prepare observation materials including: synchronized wristwatch, counter, clipboard, sufficient SOPLAY recording forms, and pencils.
2. Arrive at the school site at least 60 minutes prior to the official start of school. Review the sequence for observing Target Areas. Visit each Target Area in order and plan how to sub-divided it into Scan Spaces if necessary. Prepare mentally by scanning each area a few times.

SOPLAY CODES and RECORDING

Reliability   Circle 'NO" unless you are the second observer and your data will serve as a reliability measure.

Temp.   Enter Fahrenheit temperature at the start of the observation period.

Period   Circle a number to designate whether observations were made before school (BS), at lunch time (L), or after school (AS).

Start time   Enter the start time (2400 hours) of the sweep for that designated area.

Area   Refers to the number of a previously designated School Target Area (see school map). If necessary, add an additional area, describe it, and give it a new number.

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Condition   Circle N or Y to describe specific conditions for each designated observation area. If a Target Area is inaccessible (A=N), do not code the other four conditions.

    A = Area is accessible (e.g., not locked or rented to others)

    U = Area is usable for physical activity (e.g., is not excessively wet or windy).

    S = Area is supervised by designated school or adjunct (e.g., YMCA) personnel (e.g., teachers, playground supervisors, volunteers). The supervisor must be in or adjacent to that specific area (i.e., available to direct students and respond to emergencies), but does not have to be instructing, officiating, or organizing activities.

    O = Organized physical activity (i.e., scheduled, with leadership by school or agency personnel apparent) is occurring in the area (e.g., intramurals, interscholastic practices, fitness stations).

    E = Equipment provided by the school or other agency is present (e.g., balls, jump ropes). Do not code 'YES' if the only equipment is permanent (e.g., basketball hoops) or is owned by students themselves.

S W V   S = Sedentary; W = Walking; V = Very Active

Act.   Enter the activity code (or name) for the most prominent physical activity that girls and boys are participating in within designated area.

Physical activity codes:

#		#	
0.	no specific activity (sit, stand, walk)		
1.	aerobics (dance, step aerobics)	8.	racquet sports (tennis, badminton)
2.	baseball/softball	9.	soccer
3.	basketball	10.	swimming
4.	dance (ballet, country, line)	11.	volleyball
5.	football	12.	weight training/lifting
6.	gymnastics	13.	playground games (e.g., tetherball, 4-square)
7.	martial arts (judo, karate)	14.	none of the activities above (e.g., track)

Comments. Describe any events or features that may help explain any of the above data.

RECORDING PROCEDURES

1. On the observation form, enter the **School ID**, the **Date**, **Observer ID**, if it was a **Reliability** assessment, the **Temperature**, and the **Period** of assessment. Enter the **Start Time** for each **Area** scan (or scan space).

2. Record the contextual variables for each area (see SOPLAY codes).

3. Scan each entire target area for **Girls**, using the mechanical counter to record the number of **Sedentary**, **Walking**, and **Very Active** observations. Classify the predominant type of

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Activity occurring using the codes at the bottom of the SOPLAY Observation Form. Transfer these data to the SOPLAY Observation Form and <u>reset the counter</u>. Repeat for Boys. Record empty Target Areas by entering 0 (zero) into the SAV columns.

4. Always scan from LEFT to RIGHT. Observe each student in the area once. If an observed student reappears in the scan area, do not record a second time. Do not back-track to count new children entering the scan area.

BEFORE SCHOOL OBSERVATIONS

The objective is to obtain an accurate measure of the number of students engaged in physical activity before school starts. The last scan should begin 15 minutes before the school starts. Begin at School Start minus 40 minutes (with 6 Target Areas), minus 30 minutes (with 4 Target Areas), or minus 25 minutes (with 3 Target Areas).

LUNCHTIME OBSERVATIONS

The objective is to obtain an accurate measure of the number of students engaged in physical activity at lunchtime (outside of required physical education). There are <u>two</u> complete rotations of scans during lunchtime. The first rotation begins at Lunch Start plus 15 minutes. Always begin at Area 1 at start time. If a physical education class is occurring in a target area, record the area "accessible=No." The second rotation of scans begins at Lunch Start plus 25 minutes.

AFTER SCHOOL OBSERVATIONS

The objective is to obtain an accurate measure of the number of students engaged in physical activity beginning at School End plus 15, 45, and 75 minutes. Start at Area 1 at specified start time; then walk directly to subsequent Areas in designated rotation.

<u>Sample Schedule</u> (9:00 School Start; 4 target areas; 3 lunch periods)

8:00-8:20am	check Target areas, prepare data forms
8:25 am	initiate SCAN in Target Area 1 (following established sequence)
8:30 am	initiate SCAN in Target Area 2 (continue established sequence)
8:55 am	first school (warning) bell rings
9:00 am	school start
11:30	Lunch one (initiate SCAN 1 in Target Area 1 at 11:45)
	(initiate SCAN 2 in Target Area 1 at 11:55)
12:00	Lunch two (initiate SCAN in Target Area 1 at 12:15)
	(initiate SCAN 2 in Target Area 1 at 12:25)
12:30	Lunch three (initiate SCAN in Target Area 1 at 12:45)
	(initiate SCAN 2 in Target Area 1 at 12:55)
15:00	School Ends
15:15	initiate SCAN in Target Area 1, continue
15:45	initiate SCAN in Target Area 1, continue
16:15	initiate SCAN in Target Area 1, continue

SCORING

1. Depending on the unit of analysis (gender, area, period, school, etc.), raw counts in each activity level are aggregated (sums or means) according to the variables of interest.

Example: To calculate the most active areas for boys and girls at a school during a given day

Steps:

a. Reduce lunchtime data. Calculate mean activity counts from the double-scan data to provide a single count for each activity level of boys and girls for each lunch period. For multiple lunches, sum these counts across periods to compute a single lunch count for boys and girls for each level of student activity.

b. Sum across school day. Aggregating by area, calculate a mean for each activity level (boys and girls separately) across all periods observed (i.e., before school, lunchtime, after school) to arrive at single counts for boys and girls at each level of activity in each area.

c. Calculate energy expenditure rates. To estimate kilocalories/kg expended, the number of children counted in the sedentary, walking, and very active categories are multiplied by the constants .051kcal/kg/min, .096kcal/kg/min, and .144kcal/kg/min, respectively. Kilocalories/kg from each category can be summed to provide a measure of the total kilocalories/kg expended by children in a given area. These values can be interpreted as the number of kilocalories per kg of body weight per minute expended in each area during the school day. These energy expenditure rates are dependent on the number of children observed. Arrange means in descending order.

KEY WORDS

Target Area - A predetermined observation area in which students may potentially engage in physical activity. A number of Target Areas will be established for each school.

Scan Space - A subdivision of a Target Area in which the assessor makes an observation scan. Target Areas are subdivided into Scan Spaces when the number of students is large and they are engaged actively.

Scan - A single observation movement from left to right across a Target Area or Scan space. During a sweep, each individual student in the area is counted and coded as being Sedentary (S), Walking (W), or Very Active (V).

REFERENCES

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