



CLOUDEE:

Child Leadership Observation for
Understanding Developmental
Episodes and Engagement

Version 2.0 Manual and Example Protocol

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I. CLOUDEE THEORETICAL BACKGROUND

Organizational Developmental Settings as an Eco-behavioral System

Organizational developmental settings are the places children spend their time throughout the day. These settings include home, childcare, school, after school programs, youth clubs, and youth sport, as well as other places that children go on a regular basis. We use the term developmental settings because child development is the result of a child interacting with his or her environment over time in a place. As children interact with their environments, the result of their interaction is both immediate behavior and longer term development. Children develop or change over time and these developmental changes are largely the result of sustained interaction within developmental settings on a weekly basis. These developmental settings have also been described as delivery settings, because settings provide the social structure and context for planning, implementing, and evaluating interventions (Green et al., 1999).

To measure the natural eco-behavioral system, the goal of the investigator is to transduce the activity into a record of the natural ecological system (Dzewaltowski et al. in preparation; Barker, 1968; Gump, 1967; 1974). Placement of behavior into investigator defined categories may lose the structure of the eco-behavioral system. To define the natural eco-behavioral system, the investigator goal is to identify the boundaries of the system in terms of physical location and time. The boundary is naturally self-generated; it changes as the system changes. The people within the eco-behavioral unit are to a degree interchangeable and replaceable. Teachers come and go. Students come and go. However, the same eco-behavioral system continues to function because reproduced social practices create an interdependence of parts within the system.

CLOUDEE (Child Leadership Observation for Understanding Development Episodes and Engagement) is a complete tool for assessing child organizational development settings by providing a comprehensive collection of data regarding students' activity levels based on the social conditions with which they interact. Each day a child passes through various organizational delivery settings, or locations for physical activity promotion that includes the target audience. These delivery settings can be further broken down by organizational routines into a hierarchy of components. **Figure 1** depicts how within a delivery setting there can be multiple behavior settings. For example, within a school there is classrooms, a playground, and a lunch room. An organizational behavior setting has nested behavior setting time segments (class sessions); and lastly, behavior setting has smaller time segments, episodes, that make up a behavior setting time segment. **Table 1** provides definitions of each level of the hierarchy.

Table 1 - Variable and definition of different levels of the behavioral eco-system		
Variable	Definition	Citation
Delivery setting	A location for physical activity promotion that includes the target audience and is bounded in space and time to provide the social structure and context for planning, implementing, and evaluating interventions (Green et al., 1999)	Dzewaltowski (2008)
Behavior setting	A behavior setting is an eco-behavioral unit of the synchrony among social and physical environment where youth behavior occurs (Barker, 1968). It is a natural unit of organized action. The behavior setting is characterized by a standing pattern of behavior anchored to a physical environment, a degree of interdependence among the parts, and degree of independence from the behavior settings that are external to it.	Dzewaltowski (2008)
Behavior setting segment	A part of the start and stop time of a behavior setting. Not an eco-behavioral unit. This could be a 10 min or 30 min observation period, before lunch, recess, after lunch. The segment groups the episodes for convenience. Note, this definition is not consistent with Gump's use of the term segment.	Dzewaltowski et al. (under development)

Behavior setting episode	A smaller eco-behavioral unit nested within a behavior setting that has a location and clearly defined naturally occurring <i>start</i> and <i>stop</i> point. A change in episode occurs if there is a change in the location, the physical environment or objects, the format of the standard pattern of behavior or program of action, the concern, or the population distribution of participants.	Dzewaltowski et al. (under development)
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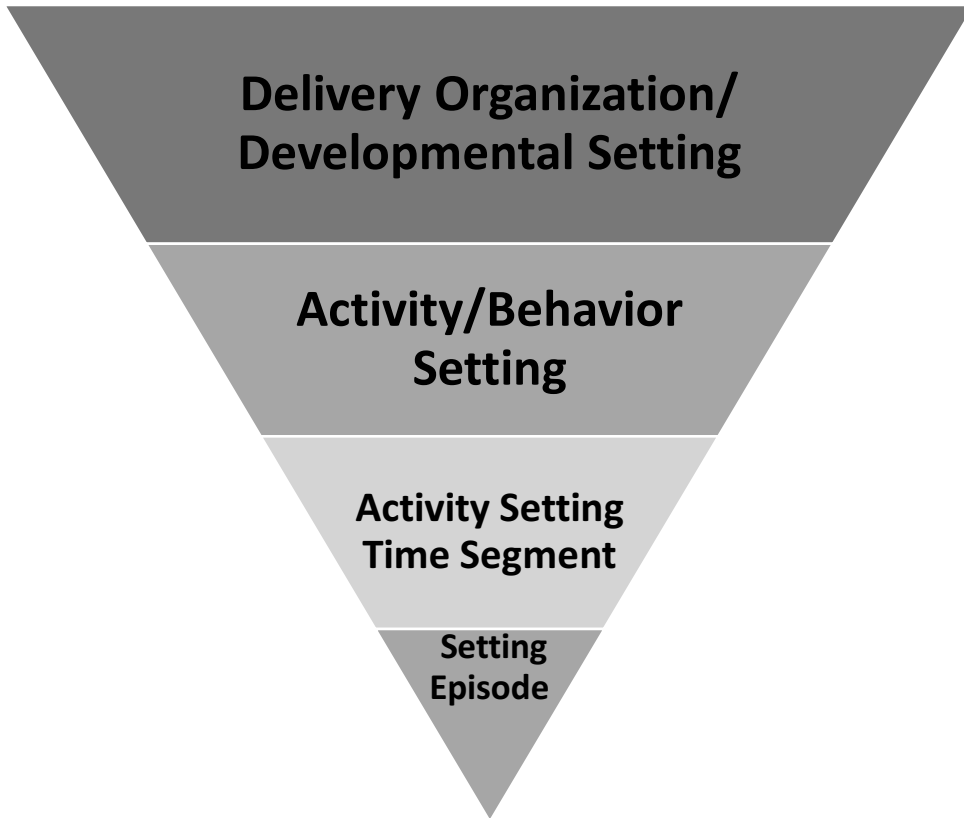


Figure 1: The hierarchy of organization of the developmental settings in which children spend their time throughout the day.

II. OBSERVATION OF THE ECO-BEHAVIORAL SYSTEM AS EXPERIMENTAL UNITS

Behavioral Settings (Classroom level of analysis)

We distinguish a delivery setting from a behavior setting. The term behavior setting has been used for any type of setting in some of the literature. A behavior setting is an eco-behavioral unit of the synchrony among social and physical environment where youth behavior occurs (Barker, 1968). It is a natural unit of organized action. The behavior setting is characterized by a standing pattern of behavior anchored to a physical environment, a degree of interdependence among the parts, and degree of independence from the behavior settings that are external to it. Within an organization delivery setting, there may be many behavior settings.

A behavior setting must include one or more standing patterns of behavior. The behavior setting consists of standard patterns of behavior-and-physical milieu (natural and built environments and objects). The physical milieu surrounds the standard pattern of behavior without temporal break (doors open at 8:00 and close at 6:00). The physical milieu is synomorphic to the behavior (e.g. the boundary of a football field is the boundary of the game). The physical milieu also fits with the behavior and is not independently arranged. The parts of a behavior setting (physical milieu and behavior) are called synomorphs. A synomorph is a phenomenon with

both behavior-and-circumjacent physical milieu. The synomorph (standing pattern of behavior in physical environment) have a degree of interdependence with other synomorph (e.g. gym physical activity and snack cannot exist in the same space and time). Lastly, the synomorphs have greater degree of interdependence among themselves than with parts of other behavior settings. For example, a childcare delivery setting may not be a behavior setting because the activity of separate classrooms are so independent in their functioning that, by the criteria used, they are discrete behavior settings. There is also an external dynamic criterion. That is that if changes to one behavior setting are influencing a change in another setting, dynamically they are not independent.

Tests for Defining a Behavior Setting (Barker, 1968)

- 1) Structural test
 - a) Is there a standing pattern of behavior anchored to a specific physical milieu (natural and built environment and objects)?
 - b) Are the parts of the behavior-physical milieu synomorph?
 - i) The criterion serves to exclude as behavior settings such discriminable features such as social norms, customs, social classes, ethnicity, geographical areas, legal codes, educational systems.
- 2) Internal dynamic test
 - a) Does the behavior-milieu have a degree of interdependence?
 - i) If any of the parts are too independent, then it constitutes separate behavior settings. The child development organization delivery settings (e.g., after-school programs, youth clubs, youth sport) often have behavior-milieu structure with multiple behavior settings (synomorphs).
- 3) External dynamic test
 - a) Does the behavior-milieu have a degree of independence or dynamic separation from behavior settings that are structurally external to it?
 - i) This test is applied to settings that meet 1 and 2. That is a classroom behavior setting may include a group time area, a dramatic play area, a snack area, and a recreation area.
 - b) Are these separate behavior settings or independent behavior settings?
 - i) It may be that these areas are so structurally interdependent that they should be considered one behavior setting. It is likely that the playground, for example, is a separate behavior setting.

Behavior Setting Time Segment

A behavior setting time segment is part of the start and stop time of a behavior setting and not an eco-behavioral unit. For example, this could be 10 seconds, 10 minutes or 30 minutes of an observation period, before lunch, recess, or after lunch. The segment groups behavior for convenience of the investigator.

Behavior Setting Episode Boundaries

Setting episodes are smaller eco-behavioral units nested within behavior settings. Gump (1967; 1974) labeled these units segments. We have adopted the term episode to recognize the self-contained nature of the eco-behavioral unit. It is not a part or a segment of the larger behavior setting. It is nested within or an episode of the behavior setting. Furthermore, classroom episodes occur in sequence and sometimes parallel to each other throughout the day (Gump, 1982).

Below is an example of a youth sport practice with 7 children. (See Figure 2). The practice was segmented by observation following the CLOUDE coding rules. The time period is a natural system where the conditions for human behavior are consistent. The time period is a patch of stable environmental conditions. The organization behavioral setting dynamically changes through a period of time moving through differ types of patches of environmental conditions we call episodes. Throughout practice children wore accelerometers and the counts from the accelerometers is displayed over time. An episode is a segmented time period that can be defined, labeled according to environmental conditions, modeled as an experimental unit with an estimate for outcomes such as youth physical activity mean and variance.

Figure 2: Youth Sport (YS) Episode Example (Data from Schlechter et al., 2016)

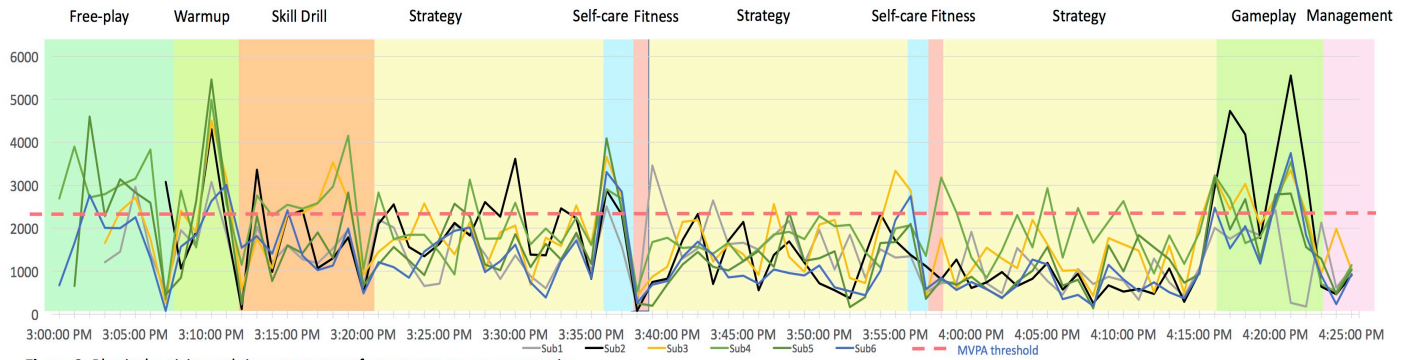


Figure 2: Physical activity and time segments of one team across one practice.

III. CLOUDEE Observation Rules: Youth Sport

- The CLOUDEE Observation system uses continuous sampling to segment time based on changes in microsystem drivers. Each time segment has a natural *start* and *stop* point based on the decision rules described below. For example, when the task of practice changes from warm-up to management, the time point at which the task changes is considered the stop point of one time segment, and the start of the next time segment.

Example CLOUDEE YS Episode Decision Rules

A change in any of the three categories of task, member arrangement, setting demand, indicates an episode change. Table 2 lists the three categories and provides operational definitions for the codes that will be used in the Observer XT CLOUDEE coding scheme for youth sport.

- Tests for an episode change
 - Task change
 - Characterized by a change in content of focus
 - EXAMPLE: Practice moves from a skill drill to game-play. This change indicates a change in episode.
 - Member arrangement change
 - Characterized by a change in how participants are arranged.
 - EXAMPLE: Practice moves from all kids doing a layup drill at one basket, to a layup drill where kids are split into multiple small groups where they do layup drills at multiple baskets. This change indicates a change in episode.
 - Setting demand change
 - Characterized by a change in the distribution of participants in the population.
 - EXAMPLE: Within a dynamic warmup, all kids do a series of exercises the same time. Then, the warm-up switches so that only 2 kids at a time do the exercise. This change indicates a change in episode.

Table 2: Coding scheme, definitions, and examples for each contextual variable.

Code	Definition	Example
Task	The purpose of the segment.	
Warm-up	Time devoted to a routine execution of physical activity with a purpose to prepare the individual for engaging in further activity, but not designed to alter the skill or fitness of the individual on a long-term basis. Usually occurs in the beginning of practice (McKenzie et al., 2002)	At the beginning of practice the coach has kids do a series of dynamic warm-ups and stretches as a group (high knees, lunges, butt kicks, etc.)
Free play	Time during which adult influence of task choice is not intended (McKenzie et al., 2002)	The coach has footballs for the kids to play with at the beginning of practice but does not tell the kids what activities to do or not to do.

Fitness	Time where major purpose is to alter the physical state in terms of cardiovascular endurance, strength or flexibility (McKenzie et al., 2002; Doyle, 1986)	Running sprints
Sport Skill	Adult-led activity time devoted to practice of skills with the primary goal of skill development (Cohen et al., 2013; Doyle et al., 1986; Parker, 1989)	Passing drills, flag grabbing drills
Game play	Adult-led time devoted to playground games where skills are not directly applicable to a competitive sport game and there is little to no adult instruction or feedback (Cohen et al., 2013; Doyle et al., 1986; Parker, 1989)	Tag, sharks and minnows
Scrimmage	Adult-led activity time devoted to the refinement and extension of skills in a sport game where two opposing teams are created within a team. Minimal interference from the coach (Cohen et al., 2013; Doyle et al., 1986; Parker, 1989)	Within a team, the kids are playing a mock football game
Strategy	Time devoted to transmitting information related to rules and strategy of the sport (Doyle et al., 1986; Parker, 1989)	Putting in or practicing an offensive play, defensive system, etc.
Management	Time allocated to managerial and organization activities, time devoted to team business that is unrelated to instructional activity (Doyle et al., 1986; Parker, 1989)	Time out, opening huddle, closing huddle
Self-care	Time devoted to washing, using the rest room, or drinking water	Water break
Member Arrangement	The arrangement of the setting members within an segment.	
Solitary	Child is doing activity alone (Cohen et al., 2013; Doyle et al., 1986; Parker, 1989)	During a dribbling drill, the child is practice by him or her self.
One v One	Child is doing activity with only one additional participant (Cohen et al., 2013)	During a blocking drill, each child has a partner and they take turn blocking.
Small group	Child is performing an activity with greater than one other child, but less than the full team (Cohen et al., 2013)	During a receiving drill, the full team is split into two groups. Each group has their own drill to complete, and the groups are not working together.
Whole group	All children are participating in an activity (Cohen et al., 2013; Doyle et al., 1986; Parker, 1989)	All kids go to water break at the same time.
Setting Demand	Population distribution that influences the system	
Optimal	Time period when there are an equal number of opportunities to participate as children to participate (i.e., fosters participation) (Barker & Gump, 1964).	During tag all 7 kids are playing at the same time, during warm-up all the kids are on the line at the same time
Disadvantaged	Time period when there are a fewer number of opportunities to participate than children available to participate (i.e., fosters exclusion) (Barker & Gump, 1964).	During tag, if you get tagged you have to sit on the sideline until all of the children are out. During a passing drill, only 1 child is receiving the pass at a time, the rest are waiting in line behind him.

IV. EXAMPLE DATA COLLECTION PROTOCOL

Before data collection begins develop a protocol to follow for all portions of data collection. This can ensure uniformity among multiple research assistants and save time during the data analysis process. The examples provided in this document were used in the CLOUDEE Observation studies under review.

Youth Sport Observation Protocol

1. Selection of teams into study
 - a. 15 1st/2nd and 3rd/4th grade flag football teams
2. Obtain consent from Parks and Recreation Department
 - a. Meeting with Parks and Rec Director
3. Obtain consent and survey from volunteer coaches
 - a. Attend Parks and Recreation flag football coaches meeting
 - b. Email coaches (12 agreed from 1st email, coach that was added late agreed after 1st phone call)
 - c. Call coaches-2 agreed out of 5 called
 - d. Each team will receive a \$50 incentive. The incentive will be in Little Apple Dollars. Each coach must complete a 'gift card form' before the incentive can be distributed.
4. Obtain consent and survey from parents
 - a. Obtain team roster from Parks and Rec
 - b. Attend practice/parent meeting for each consenting team and collect consent forms and demographic survey
 - i. Describe study, show parents and children the accelerometer
 - c. Leave envelope with extra consent and survey forms for coaches to distribute/collect
 - d. Collect remaining consent and survey forms at first observation
5. Schedule team observation
 - a. Obtain each team's practice schedule
 - b. Work directly with coaches to schedule each practice
6. Practice Observation
 - a. Select two days
 - i. 1st one after the 1st game (1st half of season)
 - ii. 2nd one after October 5th (2nd half of season)
 - b. Tripod camera
 - i. Position so whole practice field is visible
 - ii. Record exact time video is started (using synced clock) be as precise as possible (Video log sheet)
 - iii. Begin recording 10 minutes before practice is scheduled to start (or upon arrival)
 - iv. Stop recording upon practice completion (kids begin to leave) and record exact time video stopped (Video log sheet)
 - c. Accelerometer
 - i. Put accelerometer on all kids with parental consent as soon as they arrive
 - ii. If parent hasn't signed consent yet, try to get them to do so as they drop off their child
 - iii. Put accelerometer on the right hip, with the number on the bottom side
 1. If the team is practicing with flags, make sure the belt is put on underneath the shirt as to not get in way of the flags
 - iv. For each child record on 'Accelerometer Log'
 1. Name
 2. Accelerometer number
 3. Exact time the accelerometer was put on—be as precise as possible (using synced clock)
 4. Any comments regarding the child (Ex. Did not want to wear it)
 5. Exact time the accelerometer was taken off—be as precise as possible (using synced clock)

- v. Upon practice completion, take the accelerometer off each child and record the exact time off
 - 1. Do NOT let any children take the accelerometer home
- d. Belt Camera
 - i. Turn on iPod, attach wide angle lens and put into tune belt
 - ii. Give to head coach 5 minutes before practice is scheduled to start
 - 1. Make sure to record the exact time you start recording
 - iii. Upon practice completion retrieve the belt from the head coach.
 - 1. Make sure to record exact time belt stops recording
- e. Data Management
 - i. Upon practice completion, bring all supplies back to the office
 - ii. Download all videos onto computer
 - 1. Label the camera, team, and date
 - iii. After video is downloaded, record time that video camera was turned on and the duration of the video (video log sheet)
 - 1. Right click on the video
 - 2. Click 'properties'
 - 3. Record time in HH:MM:SS
 - iv. Put video into appropriate folder on the server (Flag Football→Grade→Team→Practice 1/2)
 - v. Download accelerometer data and place into the appropriate folder (Flag Football→Grade→Team→Practice 1/2→Accelerometer)

Assembly and Placement of Video

Tune Belt iPod

1. Remove tune belt, wide angle lens, and iPod 1 from Kit 1.
2. Locate iPod settings and turn all settings (including WiFi) off and set display screen brightness to “Low” to save battery life.
3. Wipe iPod camera lens clean.
4. Assemble wide angle lens (smaller lens) as illustrated below (see Figure 1).

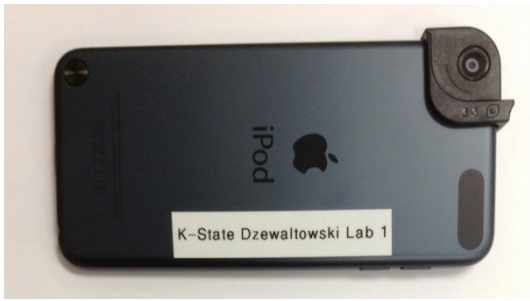
a. Be sure that the lens is screwed on tightly and that corner piece is secure.

5. Open iPod camera app.
6. Change from camera mode to video mode by swiping right
7. Hold iPod in **landscape mode** with screen facing in, camera in top left corner.
8. Push “record” and insert iPod 1 into tune belt (see Figure 1).
9. Wipe the wide angle lens clean to make sure there are no smudges.
10. After iPod is inserted, check to make sure the video is still recording.
11. Place tune belt around the waist and fasten. **Tighten belt.** Camera should be facing forwards and should be level – as perpendicular to the ground as possible.
12. Upon practice completion collect tune belt from the head coach, stop recording, and document exact time recording stops.

Swivl Outdoor Tripod (EVE)

1. Place Swivl in a location which captures the entire practice field.
2. Remove iPod 3 and wide angle lens from Kit 2.
3. Turn all settings (including WiFi) off and display screen brightness to “Low” to save battery life.
4. Wipe iPod camera clean.
5. Assemble wide angle lens as pictured in Figure 1.
6. Wipe wide angle lens clean to make sure there are no smudges.
7. Open iPod camera app.
8. Change from camera mode to video mode by swiping right
9. Hold iPod in **landscape mode** with screen facing in, camera in top left corner and push ‘record’
10. Record exact time recording begins
11. Put iPod into Swivl tripod stand
12. Upon practice completion (kids begin leaving), stop recording and document the time recording was stopped

Figure 1:



CLOUDEE Video Observation Training Checklist

Complete the following checklist items

What is direct observation?

- SOFIT training (found online with iTunesU, or cd copy)

What is CLOUDEE?

- Read the CLOUDEE protocol and manual

How do you define an episode?

- Complete the CLOUDEE episode training powerpoint

How do you define a youth sport time segment?

- Read the CLOUDEE Youth Sport coding rubric
- Watch the video examples of YS time segments

How do you work the Observer XT?

- Read the Observer XT training manual

Practice videos

- Practice defining episodes and episode characteristics within the Observer XT
- Complete training video and check results
- Complete training video and check results
- Complete training video and check results

Reliability

- (check once reliability is reached)

V. DATA REDUCTION

After video has been collected, begin analyzing data by utilizing the CLOUDEE coding scheme in the Noldus Observer XT 11.5 Software. The Observer XT software was developed to collect and analyze observational data. It allows the user to qualitatively and quantitatively describe behavior from video observation.

