



# THE IRIS CENTER

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## CASE STUDY UNIT

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# MEASURING BEHAVIOR

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The IRIS Center

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## INTRODUCTION

### MEASURING BEHAVIOR

Data collection is an objective method of measurement that can be used to shape and guide professional judgment. It enables teachers to verify that their behavior management plans or instructional methods are producing the desired outcomes and can also be used to identify and end the use of ineffective teaching practices based on current fads or ideologies rather than on evidence. Teachers who do not use frequent measurement are vulnerable to two types of preventable errors:

1. Continuing an ineffective behavioral or academic intervention when no real improvement in performance has occurred
2. Discontinuing an effective behavioral or academic intervention based on a subjective evaluation

#### Operational definitions of behavior

Prior to data collection, educators should define the problem behavior (also known as the *target behavior*) and the desired behavior (also known as the *replacement behavior*).

When a problem behavior is to be decreased, it is a good idea to select an incompatible replacement behavior. For example, consider a case where a student's problem behavior involves cursing when the teacher asks him a question during class. The replacement behavior could be that the student will use appropriate language when responding to a question during class.

Educators must operationally define the target and the replacement behaviors—this is, they must state them precisely in observable and measurable terms. When a behavior is described in observable terms, it can be easily seen and documented. When it is stated in measurable terms, the behavior can be quantified in some way (e.g., counted, timed). Examples of good and poor operational definitions can be found in the table below.

Behavior	Observable?	Measurable?
<i>Target behavior:</i> Anna is not prepared when class begins.	✗	✗
<i>Replacement behavior:</i> Anna will be prepared when she comes to class.	✗	✗
<i>Target behavior:</i> Anna waits until after the bell rings to place her pencil and notebook on her desk.	✓	✓
<i>Replacement behavior:</i> Anna will have her pencil and notebook on her desk when the bell rings.	✓	✓

INTRODUCTION  
MEASURING BEHAVIOR**FYI**

After several observations it is easy to drift from the operational definition. To reduce the likelihood of *observer drift*, educators should review the operational definition frequently. When observing a student's behavior, the educator should record only what is directly observed instead of interpreting the meaning or intent of the behavior.

**RESOURCES...**

Baer, D. M., Harrison, R., Fradenburg, L., Petersen, D., & Milla, S. (2005). Some pragmatics in the valid and reliable recording of directly observed behavior. *Research on Social Work Practice, 15*(6), 440–451.

Bushell, Jr., D. & Baer, D. M. (1994). Measurably superior instruction means close continual contact with the relevant outcome data Revolutionary! In R. Gardener, III, D. M. Sainato, J. O., Cooper, T. E. Heron, W. Heward, J. W. Eshleman, & T. A. Grossi, (Eds.), *Behavior analysis in education: Focus on measurably superior instruction* (pp. 3–11). Pacific Grove, CA: Brooks/ Cole.

Heward, W. L. (2003). Ten faulty notions about teaching and learning that hinder the effectiveness of special education. *Journal of Special Education, 36*(4), 186–205.

## BACKGROUND

Student: Mark

Age: 12

Grade: 6th

## SCENARIO

Mark has been diagnosed with a learning disability. He reads at a second-grade level and his math performance is deficient. He is outgoing and is often described as the class clown. Mark has many friends but often makes them the butt of his jokes. Recently, during reading class, Mark said to Felecia, “Do you think old man McGreevy changed his underwear today?” Two other friends of Mark heard him and started laughing. Felecia laughed, too, but felt kind of uncomfortable. Mr. McGreevy heard the laughter and asked the class to quiet down. A few minutes later when Mr. McGreevy was attending to other students, Mark made a loud noise simulating flatulence. The class burst out laughing. Mr. McGreevy looked at Mark, but Mark said, “I didn’t do anything.” Mr. McGreevy warned Mark that any further interruptions would lead to his being sent to in-school suspension for the rest of the class. Mark feigned indignation and got back to work, but failed to finish his assignment.

The next day, when Mr. McGreevy stepped out of the classroom for a moment, Mark put on eyeglasses and imitated the teacher’s manner. Everyone began to laugh and talk very loudly. Encouraged, Mark continued to cause a commotion. By the time Mr. McGreevy returned, a full-scale ruckus had broken out. Mr. McGreevy sent Mark to the office, the twelfth time he had done so in that school year, and it was only November.

Mr. McGreevy is worried that Mark’s inappropriate behavior will escalate as the winter holidays draw closer. He needs to determine a method that will help him collect information on Mark’s disruptive comments.

## POSSIBLE STRATEGIES

- Event recording
- Interval recording



## ASSIGNMENT

1. Read the STAR Sheet Overview and the STAR Sheets for the two strategies listed above.
2. Define each strategy.
3. Describe why each strategy is an appropriate way to measure Mark’s disruptive comments.

## BACKGROUND

Student: Theresa

Age: 10

Grade: 4th

## SCENARIO

Theresa rarely finishes her class work. How could she? She's up, she's down, she's wandering all around. Her teacher, Ms. Lowe, seems always to be asking her to return to her desk and begin working. Theresa almost never has her book or her pencil out, and during class transitions she is the last to be ready. Ms. Lowe believes that Theresa's out-of-seat behavior and procrastination are contributing to her poor grades. She needs to assess the situation and determine which of these behaviors is the most problematic.

## POSSIBLE STRATEGIES

- Duration recording
- Interval recording
- Latency recording



## ASSIGNMENT

1. Read the STAR Sheet Overview and the STAR Sheets for the three strategies listed above.
2. Define each strategy.
3. Describe why each strategy is or is not appropriate to measure Theresa's out-of-seat behavior.
4. Describe why each strategy is or is not appropriate to measure Theresa's procrastinating behavior.

## BACKGROUND

Student: Johnny

Age: 6

Grade: Kindergarten

## SCENARIO

Johnny is a young boy with autism who receives most of his education in an inclusive classroom. He speaks in one- and two-word utterances and can say, “book,” “food,” “more,” “hi,” and “drink.” However, his main mode of communication is a picture-exchange system.

Although Johnny has demonstrated that he really enjoys group activities, he has lately begun biting his fellow students. He seems to pick on Stephen the most. As if this weren’t enough, Johnny has begun pinching his teacher during one-on-one instruction. After he engages in one of these behaviors, he yells, “It hurts!” and starts laughing.

A behavior analyst has conducted a structured interview as part of a functional behavior assessment. The teacher and parents’ responses indicate that the function of Johnny’s aggressive behaviors is to seek attention. However, the analyst needs to directly assess the behavior.

## POSSIBLE STRATEGIES

- Event recording
- Interval recording



## ASSIGNMENT

1. Read the STAR Sheet Overview and the STAR Sheets for the strategies listed above.
2. Operationally define the problem behavior.
3. Select the most appropriate observation method from the possible strategies listed above to measure the behavior.
  - a. Explain why you chose this method.
  - b. Explain how you would use this method to measure the problem behavior.



## BACKGROUND

Student: Alex

Age: 16

Grade: 10th

## SCENARIO

Alex has been diagnosed with a learning disability. He reads at an eighth-grade level. Although he is a star athlete, he is not very popular with his classmates. He does not cause much trouble in class, but he rarely finishes his work or turns in homework. He seems to have the capacity to do the work, but gets by with C's. Mr. Cashman, Alex's math teacher, spoke to Alex one day about these concerns, to which Alex responded, "I don't need to work hard. In a few years, I'll be set because I'm going to be a pro baseball or basketball player."

Mr. Cashman often lets students work together to finish assignments. During math instruction, Alex works with another student on independent seat-work. One day, Alex looked at *Sports Illustrated* for thirteen minutes instead of helping with the assignment. When his partner asked him to lend a hand, Alex said, "Man, I don't get this stuff. Just help me out." The student continued working. When Mr. Cashman noticed what was going on, he told Alex to put the magazine away and to get to work. Alex complied, but five minutes later he got out the magazine again. On another day, Alex fell asleep and had to be woken up by his partner. Alex frequently asks to go to the bathroom. Each time Mr. Cashman lets him go.

Mr. Cashman needs to determine the amount of time that Alex spends off-task during class.

## POSSIBLE STRATEGIES

- Duration recording
- Interval recording



## ASSIGNMENT

1. Read the STAR Sheet Overview and the STAR Sheets for the strategies listed above.
2. Operationally define the target behavior.
3. Operationally define a replacement behavior.
4. Select the most appropriate observation method from the possible strategies listed above to measure the behaviors.
  - a. Explain why you chose this method.
  - b. Explain how you would use this method to measure the problem behavior.

## BACKGROUND

Student: Howard

Age: 8

Grade: 3rd

## SCENARIO

Howard is showing significant signs of reading and math difficulty. Ms. Anderson—a first-year teacher—has referred him to the office six times in four months for “insubordination.”

When the bell rings, Ms. Anderson instructs the class to begin working on the math problems on the chalkboard. Instead, Howard begins to talk loudly about the rims on his dad’s car. Another student, Davis, comments, “Aw, your daddy has a hooptie and those rims are wack.” Howard responds, “Well, at least *we have* a car. I saw you waiting for the bus.” Other students begin to laugh, and Davis tells Howard to shut up. At this time Ms. Anderson intervenes, telling the students to quiet down. She reprimands Howard and Davis, tells them to go sit down, and reminds them of their assignment. She then returns to her desk. Howard and Davis continue to discuss their parents’ cars. After a moment, Ms. Anderson again reprimands them for talking. Howard then sharpens his pencil, gets a new piece of paper, and walks back to his seat using the longest route possible. After about fifteen minutes, the students appear to have finished their math problems and Ms. Anderson begins class. After class, Ms. Anderson looks at Howard’s paper and realizes that he only completed a few questions.

Howard has several behaviors that Ms. Anderson feels are contributing to his incomplete work, but she is most concerned about him starting his assignments when told to do so. So, the next week, Ms. Anderson collects event data on Howard’s appropriate and inappropriate comments and latency data on how long it takes him to begin his work each day (see next page).



## ASSIGNMENT

1. Do you agree with Ms. Anderson’s data collection choices? Explain your answers.
2. Complete the forms below by calculating the latency and frequency of Howard’s behaviors. Next, analyze Howard’s data.
  - a. Are Ms. Anderson’s concerns about Howard’s latency behavior justified? Why or why not?
  - b. Are Ms. Anderson’s concerns about Howard’s inappropriate comments justified? Why or why not?
3. Based on the scenario above, do you think there is other information that Ms. Anderson should collect? If so, list the behaviors that she might want to measure and explain possible data collection methods.

**Latency Recording Form**

Student: *Howard*

Date: *12/1/xx - 12/5/xx*

Class/ Teacher: *Math/ Ms. Anderson*

Observer: *Ms. Anderson*

Target behavior: *After the class is told to begin solving the math problems on the board, Howard delays beginning his assignment for 60 seconds or longer.*

Replacement behavior: *After the class is told to begin solving the math problems on the board, Howard will start his assignment within 60 seconds.*

Date	Time Howard was instructed to begin work	Time behavior was initiated	Latency
<i>12/1/xx</i>	<i>8:35:00 am</i>	<i>8:35:33 am</i>	
<i>12/2/xx</i>	<i>8:35:09 am</i>	<i>8:37:14 am</i>	
<i>12/3/xx</i>	<i>8:36:01 am</i>	<i>8:36:29 am</i>	
<i>12/4/xx</i>	<i>8:35:02 am</i>	<i>8:36:33 am</i>	
<i>12/5/xx</i>	<i>8:36:30 am</i>	<i>8:37:14 am</i>	
		Average	

**Event Recording Form**

Student: *Howard*

Date: *12/1/xx - 12/5/xx*

Class/ Teacher: *Math/ Ms. Anderson*

Observer: *Ms. Anderson*

Target behavior: *After the class is told to begin solving the math problems on the board, Howard talks with his peers about topics other than the lesson.*

Replacement behavior: *After the class is told to begin solving the math problems on the board, Howard will work quietly and make only lesson-appropriate comments.*

Date	Time	Tally (Appropriate Comments)	Total	Rate	Tally (Inappropriate Comments)	Total	Rate
<i>12/1/xx</i>	<i>8:35- 8:50</i>	<i>/</i>			<i>### ///</i>		
<i>12/2/xx</i>	<i>8:35- 8:50</i>				<i>### ### //</i>		
<i>12/3/xx</i>	<i>8:35- 8:50</i>	<i>//</i>			<i>### //</i>		
<i>12/4/xx</i>	<i>8:35- 8:50</i>	<i>/</i>			<i>### ////</i>		
<i>12/5/xx</i>	<i>8:35- 8:50</i>				<i>///</i>		
		<b>Average</b>			<b>Average</b>		

## BACKGROUND

Student: Rachel

Age: 17

Grade: 11th

## SCENARIO

Mr. Smith co-teaches an inclusive biology course at Hamilton High School with Mrs. Patel, a special education teacher. Because the students have a wide range of reading abilities, one of the teachers frequently reads a paragraph from the text aloud and then asks listening comprehension questions. During this question-and-answer period, students are required to raise their hands and wait to be called on.

Rachel, a new transfer student, frequently talks to peers and writes notes to friends during this activity. When she does respond to questions, she blurts out the answer without waiting to be called on. Though her answers are always correct, the teachers are frustrated with her behavior. Mr. Smith reprimands her several times before sending her to the office. Upon being sent to the office for the fourth time, Rachel complained, “You’re always picking on me!” Mr. Smith spent the next two minutes explaining how fair he is with his students. Concerned about this pattern of behavior, Mrs. Patel has collected the following data (see next page).



## ASSIGNMENT

1. Do you agree with Mrs. Patel’s data collection choices for each target behavior? Explain your answers.
2. Complete the forms below by calculating Rachel’s rate of calling out and her occurrences of off-task behavior. Analyze Rachel’s data.
  - a. Are the teachers’ concerns about Rachel’s calling-out behavior justified? Why or why not?
  - b. Are the teachers’ concerns about Rachel’s off-task behavior justified? Why or why not?
3. For each behavior listed below, identify an alternate method of data collection and explain how Mrs. Patel would collect the data.
  - a. Calling-out behavior
  - b. Off-task behavior

## Event Recording Form

Student: *Rachel*Date: *2/11/xx - 2/15/xx*Class/ Teacher: *Biology 7<sup>th</sup> period/ Smith, Patel*Observer: *Mrs. Patel*

Target behavior: *During reading and comprehension activities, Rachel blurts out answers to questions without waiting to be called on.*

Replacement behavior: *During reading and comprehension activities, Rachel will wait to be called on before answering a question.*

Date	Time	Tally (Blurting out)	Total	Rate	Tally (Waiting to be called on)	Total	Rate
<i>2/11/xx</i>	<i>2:15- 2:25</i>	<i>///</i>			<i>/</i>		
<i>2/12/xx</i>	<i>2:16- 2:26</i>	<i>###</i>			<i>//</i>		
<i>2/13/xx</i>	<i>2:16- 2:26</i>	<i>//</i>					
<i>2/14/xx</i>	<i>2:15- 2:25</i>	<i>### /</i>			<i>//</i>		
<i>2/15/xx</i>	<i>2:17- 2:27</i>	<i>////</i>			<i>/</i>		
		<b>Average</b>			<b>Average</b>		

**MEASURING BEHAVIOR  
LEVEL C • CASE 2**

**Interval Recording Form**

Student: *Rachel*

Date: *2/11/xx*

Class/ Teacher: *Biology 7<sup>th</sup> period Smith/Patel* Observer: *Mrs. Patel*

Time/ length of observation: *2:15-2:25 pm* Length of interval: *10 seconds*

**Problem behavior:** *Rachel is talking to friends and writing notes during reading and comprehension activities.*

**Desired behavior:** *During reading and comprehension activities, Rachel will look at assignments, write class notes (when necessary) and make appropriate comments (questions and answers) related to topic, use the assigned materials, and follow teacher directions.*

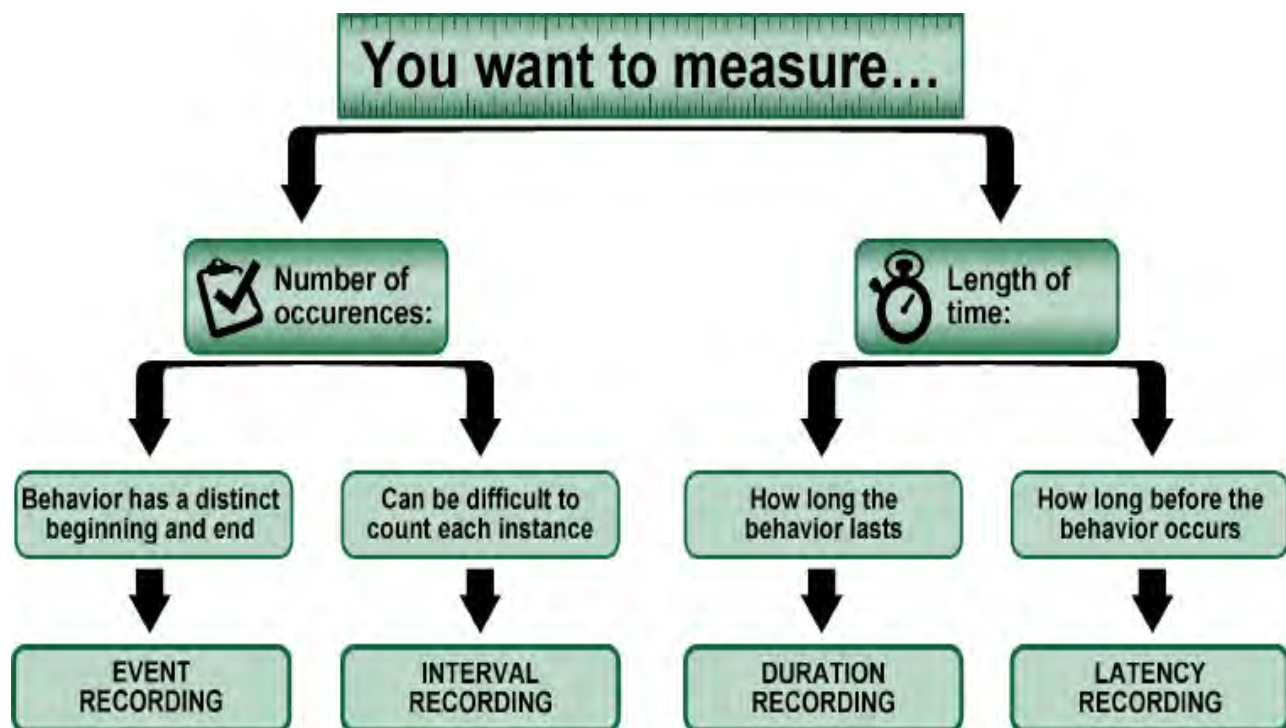
**Codes:** *+ problem behavior did occur during some portion of the interval (off-task-talking to friends, writing notes)*

*- problem behavior did not occur (listening, answering when called on, etc.)*

*Note: Used partial interval recording*

Interval	Behavior	Interval	Behavior	Interval	Behavior	Interval	Behavior	
1	+	16	+	31	-	46	+	
2	+	17	+	32	-	47	+	
3	+	18	+	33	-	48	-	
4	+	19	+	34	-	49	-	
5	+	20	+	35	-	50	-	
6	-	21	+	36	-	51	+	
7	+	22	+	37	-	52	+	
8	+	23	-	38	+	53	+	
9	+	24	-	39	-	54	+	
10	-	25	-	40	+	55	+	
11	-	26	-	41	-	56	+	
12	-	27	+	42	+	57	+	
13	+	28	+	43	+	58	+	
14	+	29	+	44	+	59	+	
15	+	30	+	45	+	60	+	
							<b>TOTAL/ % occurrences</b>	
							<b>TOTAL/ % nonoccurrences</b>	

Data collection can serve as a way to gather evidence to help improve student behavior. Teachers should choose a data collection method that provides the most accurate picture of student performance in the classroom. When they select a data collection method, teachers can refer to the flowchart below:



Regardless of the data collection system implemented, students sometimes behave differently if they know they are being observed or when a new person is in the classroom. Some ways to reduce this reactivity are to observe other students as well so that the target student does not feel like he or she is being singled out, to practice observing a few times so that the student gets used to the observer before official data collection begins, and to try to be discrete to reduce the likelihood that the student will notice that he or she is being observed.



**MEASURING BEHAVIOR  
FREQUENCY/ EVENT RECORDING****★ WHAT A STAR SHEET IS...**

A STAR (STrategies And Resources) Sheet provides you with a description of a well-researched strategy that can help you solve the case studies in this unit.

**WHAT IT IS**

*Frequency or event recording* is a way to measure the number of times a behavior occurs within a given period.

**WHAT THE RESEARCH AND RESOURCES SAY**

- Event recording can be used if the goal is to increase or decrease how often the behavior(s) occur (Special Connections, n.d.).
- Event recording is best for behaviors with a distinct beginning and end (Cooper, Heron, & Heward, 2007).
- Event recording has been used in classrooms to measure behaviors such as:
  - o Task initiations and protests to task demands (Dibley & Lim, 1999)
  - o Inappropriate sitting and littering (Wheatley et al, 2009)
  - o Correct and incorrect academic responses (Heckaman, Alber, Hooper & Heward, 1998)
  - o Tardiness (Johnson-Gros, Lyons, & Griffin, 2008)
- Teachers have used event recording to measure their own behaviors, such as:
  - o Praise statements (Kalis, Vannest, & Parker, 2007)
  - o Response opportunities provided to students (Moore, Partin, Robertson, Maggin, Oliver, & Wehby, 2010)
- Event recording is best for behaviors that occur with enough time in between to distinguish between the end of one response and the onset of another (Cooper, Heron, & Heward, 2007).

**TIPS FOR IMPLEMENTATION**

- Comparing event or frequency data across observations allows teachers to determine whether the behavior is increasing, decreasing, or showing no change. For this reason, it is helpful if the observation periods are the same length.

**MEASURING BEHAVIOR  
FREQUENCY/ EVENT RECORDING**

- To discretely document the number of times a behavior occurs (i.e., the frequency), try one of the following procedures:
  - o Place tally marks on paper.
  - o Put a piece of masking tape on your arm and place tally marks on the tape.
  - o Purchase a small, inexpensive handheld tally counter.
  - o Put a handful of small items such as pennies or paperclips in one pocket and move one item to the other pocket each time the behavior occurs. Add the items to determine how many times the behavior occurred.
  
- When it is not possible to observe the student's behavior for the same length of time for each observation period, calculate the rate of the behavior for each observation and compare across observations. To calculate the rate of a behavior, use the following steps.
  1. Note the time the observation begins.
  2. Record each occurrence of the behavior.
  3. Note the time the observation ends.
  4. Calculate the length of time for the observation.
  5. Calculate the rate by counting the total number of times the behavior occurred and dividing by the length of the observation.

MEASURING BEHAVIOR  
FREQUENCY/ EVENT RECORDING

Event Recording Form

Student: \_\_\_\_\_  
 Class/ Teacher: \_\_\_\_\_ Observer: \_\_\_\_\_  
 Time/ Length of Observation: \_\_\_\_\_  
 Behavior: \_\_\_\_\_

**Instructions:** Make a mark each time the behavior occurs. To calculate rate<sup>1</sup>, divide the total number of occurrences by the length of the observation.

Date	Time started	Time ended	Total time	Tally	Total occurrences	Rate
11/14	Ex.: 8:30 am	Ex.: 8:45 am	15 min.	### ### ### ///	18	18/15 min. = 1.2/min.

Additional comments:

<sup>1</sup> If the observation periods are the same length, rate calculations might not be necessary.



**MEASURING BEHAVIOR  
FREQUENCY/ EVENT RECORDING**

- When using event recording for academic skills, count both correct and incorrect responses for a more complete evaluation of learning. Evaluating only correct responses can be misleading, especially if incorrect responses increase over time or are more frequent than correct responses.

**KEEP IN MIND**

- The teacher's actions might influence a student's behavior. For example, if a teacher asks a student to respond ten times during one lesson, but only three times during another, the frequency data will reflect that action rather than the student's behaviors.
- It may be appropriate to count the subcomponents of a complex task instead of the completion of the task itself. For example, if the desired behavior is to complete ten double-digit multiplication problems during independent seat-work, the teacher might give each problem three tally marks—one for completing the ones digit column, one for completing the tens digit column, and one for completing the problem.
- Event recording provides more accurate information than does interval recording (described on Page 18).

**RESOURCES**

Bicard, D. F., Horan, J., Plank E., & Covington T. (2010). May I take a message? Using general case programming to teach students with disabilities to take and give phone messages. *Preventing School Failure, 54*(3), 179–189.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Prentice Hall: Upper Saddle River, NJ.

Dibley, S., & Lim, L. (1999). Providing choice making opportunities between and within daily school routines. *Journal of Behavioral Education, 9*(2), 117–132.

Heckaman, K. A., Alber, S., Hooper, S., & Heward, W. L. (1998). A comparison of least-to-most prompts and progressive time delay on the disruptive behavior of students with autism. *Journal of Behavioral Education, 8*(2), 171–201.

Johnson-Gros, K. N., Lyons, E. A., & Griffin, J. R. (2008). Active supervision: An intervention to reduce high school tardiness. *Education and Treatment of Children, 31*(1), 39–53.

Kalis, T. M., Vannest, K. J., & Parker, R. (2007). Praise counts: Using self-monitoring to increase effective teaching practices. *Preventing School Failure, 51*(3), 20–27.

**MEASURING BEHAVIOR  
FREQUENCY/ EVENT RECORDING**

Moore Partin, T. C., Robertson, R. E., Maggin, D. M., Oliver, R. M., & Wehby, J. H. (2010). Using teacher praise and opportunities to respond to promote appropriate student behavior. *Preventing School Failure, 54*(3), 172–178.

Special Connections (n.d.). *Event recording*. Retrieved December 1, 2009, from <http://www.specialconnections.ku.edu/cgi-bin/cgiwrap/speconn/main.php?cat=assessment&section=main&subsection=ddm/event>

Wheatley, R. K., West, R. P., Charlton, C. T., Sanders, R. B., Smith, T. G., & Taylor, M. J. (2009). Improving behavior through differential reinforcement: A praise note system for elementary school students. *Education and Treatment of Children, 32*(4), 551–571.



MEASURING BEHAVIOR  
INTERVAL RECORDING

## ★ WHAT A STAR SHEET IS...

A STAR (STrategies And Resources) Sheet provides you with a description of a well-researched strategy that can help you solve the case studies in this unit.

## WHAT IT IS

*Interval recording* is a method of documenting whether a behavior occurred during a brief time periods (e.g., 10 seconds), referred to as intervals. At the end of each of these intervals, the observer records whether or not a behavior has occurred. There are two types of interval recording:

- *Whole-interval recording* – yields data on the total duration of the behavior. When utilizing whole-interval recording, an observer indicates whether the behavior occurred for the entire interval.

*Example:* A student worked on an assignment for an entire thirty-second interval.

- *Partial-interval recording* – yields data on the proportion of the observation period that the behavior occurred. When utilizing partial-interval recording, an observer indicates whether the behavior occurred at any point during the time interval.

*Example:* A student worked on an assignment for fifteen seconds of a thirty-second interval.

## WHAT THE RESEARCH AND RESOURCES SAY

- Interval recording is used for continuous behaviors or for those behaviors whose onset and end are difficult to distinguish because the behaviors occur at such high rates (Cooper, Heron, & Heward, 2007; Special Connections, n.d.).

## MEASURING BEHAVIOR INTERVAL RECORDING

The table below highlights research using both whole- and partial-interval recording.

Behavior Studied	Type of Data Measurement	Interval Length	Citation
On task: Sitting at desk, working on assignment quietly, asking for help appropriately	Whole interval	30 second	Wood, Umbreit, Liaupsin, & Gresham, 2007
Appropriate play with computers, books, toys; passivity; stereotypical behaviors	Whole interval	5 second	Longano & Greer, 2006
Off-task behavior	Partial interval	5 second	Tincani, Ernsbarger, Harrison, & Heward, 2005
Problem behaviors: Verbal refusal statements, aggression, destruction	Partial interval	10 second	Peterson, Frieder, Smith, Quigley, & Van Norman, 2009
On task: Sitting in seat; eye contact while talking to teacher	Partial interval	10 second	Haydon, Mancil, & Van Loan, 2009
Teacher behaviors: Disciplinary actions	Partial interval	10 second	Grskovic, Hall, Montgomery, Vargas, Zentall, & Belfiore 2004

### TIPS FOR IMPLEMENTATION

- Consider using a prompt to signal the beginning and end of intervals, such as:
  - Audio recording with beeps (headphones should be used!)
  - Electronic device that vibrates
  - Cellphone apps
- To use the interval recording method, use the steps outlined below:
  1. Schedule the observation period at times during which the behavior is most likely to occur. Typically, observations last between ten minutes and an hour, although it is more accurate and less burdensome to use shorter periods.
  2. Divide the observation period into equal intervals. These intervals are usually between five and fifteen seconds long.
    - a. Whole interval: Record with an “x,” plus sign, or check-mark if the behavior occurred throughout the duration of the interval (e.g., if using ten-second intervals, the behavior must last the entire ten seconds). If the behavior did not occur for the entire interval, then record the nonoccurrence of the behavior with a minus sign or 0.

**MEASURING BEHAVIOR  
INTERVAL RECORDING**

- b. Partial interval: Record with an “x,” plus sign, or check-mark if the behavior occurred at any point during the interval (e.g., if using ten-second intervals, the behavior must occur at least once during that particular interval). If the behavior did not occur during the interval, record the nonoccurrence of the behavior with a minus sign or 0.
3. Count the number of intervals during which the behavior occurred. Divide this number by the total number of intervals and multiply by 100 to determine the percentage of intervals during which the behavior occurred.



MEASURING BEHAVIOR  
INTERVAL RECORDING

Interval Recording Form

Student: *Merrit*

Date: *9/26/XX*

Class/ Teacher: *Ms. Knowles*

Observer: *Mr. Fisk*

Time/ Length of Observation: *10 mins.*

Length of Interval: *10 secs.*

Target Behavior: *Merrit engages in off-task behavior (e.g., daydreaming, walks around classroom during independent seatwork)*

Codes: *Example: ✓ or + for occurrence of behavior; 0 or - for non-occurrence of behavior*

Interval	Behavior	Interval	Behavior	Interval	Behavior	Interval	Behavior
1	✓	16	✓	31	0	46	✓
2	✓	17	✓	32	0	47	0
3	0	18	0	33	✓	48	✓
4	0	19	0	34	✓	49	✓
5	✓	20	✓	35	0	50	✓
6	0	21	0	36	✓	51	0
7	✓	22	✓	37	✓	52	0
8	0	23	✓	38	0	53	✓
9	✓	24	✓	39	0	54	✓
10	✓	25	0	40	✓	55	0
11	0	26	0	41	0	56	0
12	0	27	✓	42	0	57	0
13	✓	28	✓	43	0	58	0
14	0	29	✓	44	✓	59	✓
15	0	30	0	45	✓	60	0
<b>TOTAL</b>							30
<b>%</b>							50

$$60 \overline{) 30} \times \frac{100}{50}$$

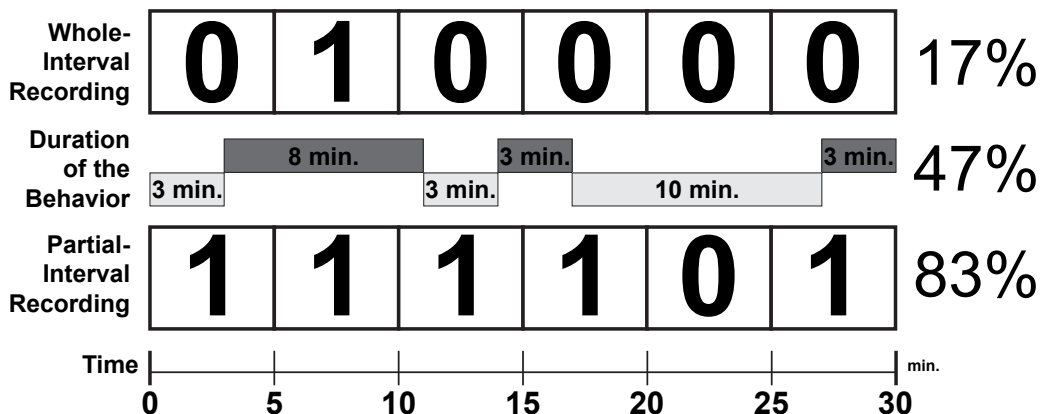
## MEASURING BEHAVIOR INTERVAL RECORDING

- Only one behavior at a time should be observed when using whole-interval recording, due to the necessity of observing during the entire interval. Multiple behaviors can be observed during partial-interval recording because an observer only has to document whether a behavior occurred at all during an interval.
- If an observer is not sure whether the behavior occurred (e.g., a student walks behind a bookshelf or room divider where he or she cannot be seen), the inability to observe should be documented on the observation form, rather than attempting to guess what is occurring.
- Because whole-interval recording requires the observer's constant attention, it can be difficult to observe and record simultaneously. When using whole-interval recording, you might need to alternate intervals during which you observe and record (e.g., observe for ten seconds, record for five second, observe for ten seconds, record for five seconds). This gives you time to record your observation before the next observation interval. (Note: Whole-interval recording is not practical if the teacher is the observer.

### KEEP IN MIND

- Interval recording provides an estimate of behavior.
  - Whole-interval recording typically *underestimates* the overall duration of the behavior because if a behavior occurs—but not for the entire interval—it is not recorded or documented as occurring.
  - Partial-interval recording typically *overestimates* the overall duration and *underestimates* the rate of the behavior because if a behavior occurs multiple times during an interval, it is still documented as occurring only once.

The graphic below illustrates this tendency.



- If you need an accurate measure of the rate of behavior, event recording should be used. Interval recording does not provide this type of data.

**MEASURING BEHAVIOR  
INTERVAL RECORDING**

- The shorter the intervals, the more accurate the recording.

**RESOURCES**

- Alberto, P. A., & Troutman, A. C. (2006). *Applied behavior analysis for teachers* (7th ed.). Upper Saddle River, NJ: Pearson.
- Baer, D. M., Harrison, R., Fradenburg, L., Petersen, D., & Milla, S. (2005). Some pragmatics in the valid and reliable recording of directly observed behavior. *Research on Social Work Practice, 15*(6), 440-451.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Prentice Hall: Upper Saddle River, NJ.
- Grskovic, J., Hall, A. M., Montgomery, D. J., Vargas, A. U., Zentall, S. S., & Belfiore, P. J. (2004). Reducing time-out assignments for students with emotional/behavioral disorders in a self-contained classroom. *Journal of Behavioral Education, 13*(1), 25-36.
- Haydon, T., Mancil, G. R., & Van Loan, C. (2009). Using opportunities to respond in a general education classroom: A case study. *Education and Treatment of Children, 32*(2), 267-278.
- Longano, J. M., & Greer, R. D. (2006). The effects of stimulus-stimulus pairing procedure on acquisition of conditioned reinforcement on observing and manipulating stimuli by young children with autism. *Journal of Early and Intensive Behavior Intervention, 3*(1), 62-80.
- Peterson, S. M., Frieder, J. E., Smith, S. L., Quigley, S. P., & Van Norman, R. K. (2009). The effects of varying quality and duration of reinforcement on mands to work, mands for break, and problem behavior. *Education and Treatment of Children, 32*(4), 605-630.
- Special Connections. (n.d.). *Partial interval recording*. Retrieved December 1, 2009, from <http://www.special-connections.ku.edu/cgi-bin/cgiwrap/speconn/main.php?cat=assessment&section=main&subsection=ddm/partial>.
- Special Connections. (n.d.). *Whole interval recording*. Retrieved December 1, 2009, from <http://www.special-connections.ku.edu/cgi-bin/cgiwrap/speconn/main.php?cat=assessment&section=main&subsection=ddm/whole>
- Tincani, M., Ernsbarger, S. C., Harrison, T. J., & Heward, W. L. (2005). The effects of fast and slow-paced teaching on participation, accuracy, and off-task behavior of children in the Language for Learning program. *Journal of Direct Instruction, 5*, 97-109.
- Wood, B. K., Umbreit, J., Liaupsin, C. J., & Gresham, F. M. (2007). A treatment integrity analysis of function-based intervention. *Education and Treatment of Children, 30*(4), 105-120.

MEASURING BEHAVIOR  
DURATION RECORDING

## ★ WHAT A STAR SHEET IS...

A STAR (STrategies And Resources) Sheet provides you with a description of a well-researched strategy that can help you solve the case studies in this unit.

## WHAT IT IS

*Duration recording* is a method of documenting how long a student engages in a specified behavior.

## WHAT THE RESEARCH AND RESOURCES SAY

- Duration recording is appropriate for behaviors that have a distinct beginning and end or for those that occur at such high rates that it would be difficult to get an accurate frequency count (e.g., number of taps during pencil-, finger- or toe-tapping) (Alberto & Troutman, 2006; Cooper, Heron, & Heward, 2007).
- The table below highlights research using duration recording.

Behavior Studied	Citation
On-task: Looking at the assignment, writing and asking questions related to the topic, using assigned materials, and following teacher directions	Ramsey, Jolivette, Patterson, & Kennedy, 2010
Compliance to task demands	Wehby & Hollahan, 2000
Academic writing tasks	Athens, Vollmer, & St. Peter Pipkin, 2007

## TIPS FOR IMPLEMENTATION

- Consider using a digital stopwatch to increase the accuracy of duration recording. A wall clock or wristwatch can be used but may not be as accurate.
- To use the duration-recording method, follow the steps below:
  1. When the behavior begins, start the stopwatch.
  2. When the behavior ends, stop the stopwatch.
  3. Record the length of time that the behavior occurred.
  4. Repeat the above steps until the end of the observation period.
  5. Calculate the total duration by adding the duration of each episode during the observation period. (*Note:* Some digital stopwatches will automatically calculate the total time.)

MEASURING BEHAVIOR  
DURATION RECORDING

STAR Strategy  
Duration Recording Form

Student: \_\_\_\_\_ Date: \_\_\_\_\_  
 Class/ Teacher: \_\_\_\_\_ Observer: \_\_\_\_\_  
 Time/ Length of Observation: \_\_\_\_\_  
 Behavior: \_\_\_\_\_

Time Start	Time End	Duration
<i>Example (digital stopwatch) 00:00</i>	<i>04:27</i>	<i>4 minutes, 27 seconds</i>
<i>Example (wall clock) 8:30</i>	<i>08:57</i>	<i>7 minutes</i>
<b>TOTAL/ AVERAGE</b>		

Additional comments:



MEASURING BEHAVIOR  
DURATION RECORDING

- Video or audio recordings may be used to collect duration data—and viewed or listened to later—if it is impractical to collect duration data during class.
- Consider collecting frequency data for the target behavior in combination with duration data to provide a more accurate picture of the student's behavior. It is quite different for a student to engage in five episodes of screaming that last ten minutes each than to engage in one episode that lasts fifty-five minutes.

## KEEP IN MIND

- You might also want to report duration data in terms of the average duration per observation period (total duration / number of occurrences) if the observation period is consistent. For example, the student has five minutes at the end of a class each day to work on his homework. The student works on his homework for a total of fifteen minutes across five days. To calculate the average duration the student worked on his homework, divide fifteen minutes by five days. The average is three minutes.
- If the observation periods vary in length (e.g., the class has twenty minutes in the library the first week of the month and fifteen minutes the second week of the month), the percentage of time the student engaged in the behavior can be calculated by dividing the total minutes of the behavior's duration (e.g., 20 minutes) by the number of minutes in the observation period (e.g., 60 minutes) and multiplying by 100.

$$\frac{\text{Total minutes engaged in behavior}}{\text{Total minutes observed}}$$

$$\frac{20}{60} = .333 \times 100 = 33\%$$

33% of time engaged in target behavior

MEASURING BEHAVIOR  
DURATION RECORDING

## RESOURCES

- Alberto, P. A., & Troutman, A. C. (2006). *Applied behavior analysis for teachers* (7th ed.). Upper Saddle River, NJ: Pearson.
- Athens, E. S., Vollmer, T. R., & St. Peter Pipkin, C. C. (2007). Shaping academic task engagement with percentile schedules. *Journal of Applied Behavior Analysis*, 40, 475–488.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Prentice Hall: Upper Saddle River, NJ.
- Special Connections. (n.d.). *Duration recording*. Retrieved December 1, 2009, from <http://www.specialconnections.ku.edu/cgi-bin/cgiwrap/speconn/main.php?cat=assessment&section=main&subsection=ddm/duration>
- Ramsey, M. L., Jolivette, K., Patterson, D. P., & Kennedy, C. (2010). Using choice to increase time on task, task completion, and accuracy for students with emotional/ behavior disorders in a residential facility. *Education and Treatment of Children*, 33(1), 1–21.
- Watson, T. S., & Steege, M. W. (2003). *Conducting school-based functional behavior assessments: A practitioner's guide*. Guilford Press: NY.
- Wehby, J. H., & Hollahan, M. S. (2000). Effects of high-probability requests on the latency to initiate academic tasks. *Journal of Applied Behavior Analysis*, 33, 259–262.

MEASURING BEHAVIOR  
LATENCY RECORDING

## ★ WHAT A STAR SHEET IS...

A STAR (STrategies And Resources) Sheet provides you with a description of a well-researched strategy that can help you solve the case studies in this unit.

## WHAT IT IS

*Latency recording* is a method of documenting the time between when a direction is given and when the student complies.

## WHAT THE RESEARCH AND RESOURCES SAY

- Latency recording is appropriate when the teacher wants to measure how much time passes between when an instruction, cue, or prompt is provided and the behavior begins or ends (Cooper, Heron, & Heward, 2007; Special Connections, n.d.).
- The table below highlights research using latency recording.

Behavior studied	Citation
Time delay between a statement/ question and the student's attempt to communicate	Mancil, Conroy, Nakao, & Alter, 2006
Lapse between instructions and compliance with task	Lee et al., 2006
Time delay between being shown a word and pronouncing it	Bosman, Gompel, Vervloed, & Van Bon, 2006

## TIPS FOR IMPLEMENTATION

- Consider using a digital stopwatch to increase the accuracy of latency recording. A wall clock or wrist watch can be used if a digital stopwatch is unavailable.
- To use the latency recording method, follow the steps below:
  1. Start the stopwatch when the prompt, directive, or instruction is provided.
  2. Stop the stopwatch when student complies.
  3. Record the number of seconds or minutes that elapsed between the end of the direction and the onset of the compliance.
  4. Repeat the above steps until the end of the observation period.
  5. Calculate the average latency of the behavior by dividing the total latency (e.g., 60 seconds) by the number of occurrences (e.g., 3 directions).



MEASURING BEHAVIOR  
LATENCY RECORDING

Latency Recording Form

Student: \_\_\_\_\_ Date: \_\_\_\_\_

Class/ Teacher: \_\_\_\_\_ Observer: \_\_\_\_\_

Time/ Length of Observation: \_\_\_\_\_

Behavior: \_\_\_\_\_

Time of request or cue	Time behavior was initiated	Latency
<i>Examples (regular clock) 11: 30 am (digital stopwatch) 00:00</i>	<i>11:35 am 05:49</i>	<i>5 minutes 5 minutes, 49 seconds</i>
<b>TOTAL/AVERAGE</b>		

*Total Latency*  


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*Number of Occurrences*

*60*  


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*3* = 20

*Average latency is 20 secs.*



**MEASURING BEHAVIOR  
LATENCY RECORDING****KEEP IN MIND**

- When calculating average latency, it is easier to convert minutes to seconds. After you've performed your calculations, you can convert the data back into minutes if you prefer.

**RESOURCES**

Bosman, A., Gompel, M., Vervloed, M., & Van Bon, W. (2006). Low vision affects the reading process quantitatively but not qualitatively. *Journal of Special Education, 39*(4), 208–219.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Prentice Hall: Upper Saddle River, NJ.

Lee, D. L., Belfiore, P. J., Ferko, D., Hua, Y., Carranza, M., & Hildebrand, K. (2006). Using pre and post low-p latency to assess behavioral momentum: A preliminary investigation. *Journal of Behavioral Education, 15*, 203–214.

Mancil, G. R., Conroy, M. A., Nakao, T., & Alter, P. J. (2006). Functional communication training in the natural environment: A pilot investigation with a young child with autism spectrum disorder. *Education and Treatment of Children, 29*(4), 615–633.

Special Connections. (n.d.). *Latency recording*. Retrieved December 1, 2009, from <http://www.specialconnections.ku.edu/cgi-bin/cgiwrap/speconn/main.php?cat=assessment&section=main&subsection=ddm/latency>