Scatterplot Recording

Data Collection Overview

It is often easy for educators to recognize when a student's behavior is happening and how it is impacting the classroom. However, without data, educators might make incorrect assumptions about how frequently a behavior occurs or how long it lasts based on opinions, feelings, inaccurate recollections, or incomplete information. A systematic process for collecting and analyzing behavioral data in a consistent and accurate manner reduces this subjectivity. Additionally, it helps educators:

- Identify patterns related to when, where, and how behavior occurs
- Make informed decisions about how to address behavior
- Determine if behavioral supports and interventions have been effective
- Decide if an intervention should be continued, adapted, or stopped
- Monitor student progress over time
- Communicate behavioral progress to students, parents, and other school professionals

Operationally Defining a Behavior

To facilitate consistent and accurate data collection, educators must first develop an *operational definition* of the behavior—a clear and specific description of the behavior to be measured. Educators might collect data on the student's engagement in a *target behavior, replacement behavior,* or both.

An operational definition should begin with a broad statement describing the behavior in terms that are:

Terms to Know

target behavior—the specific behavior in need of change

replacement behavior—an appropriate alternative behavior that serves the same function as the target behavior

- **Observable**—details what the behavior looks and sounds like, not what the student might be thinking or feeling
- **Measurable**—describes the behavior in such a way that it can be counted or timed
- **Actively stated**—specifies what the student does rather than what they fail to do

When operationally defining a behavior, it is also helpful to include specific examples and non-examples of the behavior. These additional details help clarify the definition by illustrating what constitutes a behavior

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when collecting data. Below are examples of operational definitions for a student's target and replacement behaviors.

Example Definition: Target Behavior

During instructional time, Aiden calls out or verbally responds to the teacher or another student without being called on or given permission to speak.

Examples

- Shouting the answer to a question when not called on
- Making a comment while the teacher or a peer is speaking
- Asking a question without permission

Non-Examples

- Answering a question when called on
- Sharing ideas with a peer during paired discussion time
- Raising a hand and waiting to be called on before asking a question

Example Definition: Replacement Behavior

When Aiden has a question, answer, comment, or needs teacher assistance during instruction, he will raise his hand and wait to be called on before speaking.

Examples

- When the teacher asks a question, raising his hand and waiting to be called on before answering
- When he has a question, raising his hand and waiting quietly until the teacher acknowledges him
- When wanting to share a comment, raising his hand and waiting for permission to speak

Non-Examples

- Raising his hand but speaking before the teacher calls on him
- He says, "I know!" or "Pick me!" without being called on
- He talks to a peer while waiting to be called on

Scatterplot Recording

Educators can use a variety of methods to collect behavioral data in a systematic and consistent manner. One such method is *scatterplot recording*—a visual method used to analyze behavioral patterns over time. In this approach, the school day is divided into equal time intervals, and the educator records whether a given target or replacement behavior occurred during each interval. This can help reveal relationships between a behavior and a time of day, an activity, a social grouping, a physical environment, the presence of certain people, or a combination of such variables. By identifying relationships, educators can proactively adjust factors to support behavioral change. Scatterplot recording is most practical for easily observable, high-intensity behaviors (e.g., loud vocalizations, property destruction) that occur sporadically throughout the school day, and it is especially useful when a behavior's cause is not immediately obvious through informal observation.

Time	M	T	W	Th	F
9:00-9:20	X		X		X
9:20-9:40		X			
9:40-10:00					
10:00-10:20			X		
10:20-10:40				X	
10:40-11:00	X		X		
11:00-11:20		X	X	X	X
11:20-11:40	X	X	X		X
11:40-12:00		X	X	X	X

Steps for Implementation

After identifying and operationally defining the behavior to be measured, use the steps outlined below to collect scatterplot data.

1. **Create an observation schedule**: Divide the school day into consistent intervals of time (e.g., 15 minutes, 30 minutes). It is often beneficial to align these intervals with the instructional schedule, which allows recording to occur during natural transitions.
   - Use shorter intervals for behaviors that occur frequently.
   - Use longer intervals for behaviors that occur less often but are intense or dangerous (e.g., running out of the room, meltdowns).
2. **Select or develop a recording form**: Recording forms are typically set up as a grid with columns representing days of the week and rows representing time intervals. Be sure to include a key to indicate whether and how often the behavior was observed, as illustrated in the sample scatterplot form below.
3. **Conduct observations**: Throughout the school day, monitor the student's defined behavior while continuing usual teaching activities.
4. **Record the behavior's occurrence**: At the end of each time interval, mark whether the behavior occurred on the recording form created in Step 2. Data can be marked on paper forms, computerized systems, or mobile apps. Although recording takes only a few seconds, be sure to constantly attend to the student's behavior throughout the full interval to capture the data accurately.
5. **Organize the data**: Organize the data in a way that supports interpretation and decision-making. The visual recording sheets often make it easy to see patterns that reflect when the behavior does and does not occur.

FYI

- Educators can collect scatterplot data while they are teaching, without disrupting classroom routines.
- Interval lengths should be practical to manage but precise enough to show how the behavior changes across different daily contexts. Using time intervals that are too short can make recording overly time-consuming for educators. However, using time intervals that are too long can cause scatterplots to overestimate how often a behavior occurs.

Tips for Implementation

- For more detailed data, consider using a key to further clarify the behavior's frequency. For example, you might use a slash mark to indicate that the behavior occurred once during an interval but mark an X if it happened two or more times.
- To avoid confusion, clearly mark intervals in which the student was not observed and differentiate it from intervals when the behavior did not occur.
- Set a timer for the interval length or an alarm for the ending time of each interval as a reminder to mark the recording sheet.
- To summarize the data, calculate the percentage of intervals during which the behavior was observed for each day of the week or across a full week. For example:
  - On Monday, the behavior occurred in 8 out of 12, or 67%, of intervals.
  - Across a week, the behavior occurred in the 9:30 a.m.–10:00 a.m. interval on 3 out of 5, or 60%, of the days.
- Once a reliable pattern has emerged in the scatterplot data, consider recording more detailed antecedent-behavior-consequence (ABC) data during the times of day the behavior is most likely to occur. ABC data can help educators more fully understand what antecedent might be triggering and what consequence might be reinforcing the behavior.

Sample Scatterplot Form

Scatterplot Recording Form

Directions

1. Complete the information for the student and target behavior. Also, fill in the table with the time intervals, activities, and dates.
2. At the end of each time interval, use the key to mark the behavior's occurrence in the table.
3. Calculate the percentage of days and intervals in which the behavior occurred.

Student: Taylor

Date: September 30 - October 4, 20XX

Target Behavior: Taylor produces one or more unprompted vocalizations louder than conversation level (e.g., shouting, shrieking) for any length of time.

Time	Activity	Mon	Tues	Wed	Thurs	Fri	% of Days
8:20-8:40	Arrival				NO*		0%
8:40-9:00	Morning work	■		/	NO*	/	75%
9:00-9:20	Reading whole group					/	20%
9:20-9:40	Reading whole group		/	/			40%
9:40-10:00	Reading small group						0%
10:00-10:20	Reading small group						0%
10:20-10:40	Reading independent			/			20%
11:20-11:40	Math whole group	/	■	■	/	■	100%
11:40-12:00	Math small group	■	/		■	■	80%
12:00-12:20	Math independent	■	■	/	/	/	100%
12:20-12:40	Lunch	/	■	■	/		80%
12:40-1:00	Lunch			/	/		40%
1:00-1:20	Electives			/			20%
1:20-1:40	Electives			■			20%
1:40-2:00	Science instruction		/		/	/	60%
2:00-2:20	Science activity						0%
2:20-2:40	Writing				/		20%
2:40-3:00	Snack						0%
3:00-3:20	Independent work		/				20%
3:20-3:40	Dismissal	■	■	■	■	■	100%
% of Intervals		30%	40%	50%	44%	35%	

Key:		Did Not Occur	/	Occurred 1 Time		Occurred 2 or More Times	NO	Not observed

**Periods where the student is not observed are not included in the summarized data. For example, the student was observed four out of five days from 8:40 to 9:00, so the calculation is based on the behavior occurring three out of four days (75%) as opposed to three out of five days (60%).*

This template was adapted from Alberto et al. (2022) and Walker and Barry (2022).

For information about other data collection methods as well as graphing data, visit the following IRIS Case Study:

Measuring Behavior

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