

# Types of Data Collection and Measurement

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## WHAT'S COVERED

This lesson will explore different types of data collection and measurement by defining and discussing the following:

1. Frequency and Rate
2. Duration
3. Response Latency
4. Inter-Response Time
5. Percent of Occurrence
6. Interval Recording
7. Permanent Product Recording

## 1. Frequency and Rate

You are responsible for collecting data on problem behavior throughout your sessions. In the behavior intervention plan (BIP), the BCBA will mark which type of measurement you should be using. First, let's look at frequency and rate.

**Frequency** is the number of times the behavior is observed – a simple tally of each occurrence of behavior per observation period.

🔗 **EXAMPLE** If Deion engaged in throwing 15 times during a therapy session, the frequency would be 15 instances of throwing.

It is important to note that some people will use frequency interchangeably with rate (the next term that we will discuss) to mean count per unit of time, rather than simply the total count.

🔗 **EXAMPLE** Five occurrences per hour (rate) vs. 5 occurrences (count).

### Video Transcription

Let's look at an example of how to take count data. In the following video clip, we see a student engaging in a form of vocal stereotypy while she plays with a puzzle. Her vocal stereotypy is defined as

blowing air between her lips and making a raspberry sound. And each episode is separated by five seconds or more of nonoccurrence. In order to measure the count of her behavior, we mark down every time she engages in the behavior according to the definition.

[BLOWS]

[BLOWS]

We can do it with these.

Here.

You did an awesome job matching. Ooh, I like how you looked at that one.

There's the picture.

[BLOWS]

We're matching the pictures. Good job. We got one more. One more.

At the end of the therapy session, the total number of occurrences are added up and reported as the cumulative number of times that she engaged in the vocal stereotypy behavior. This number would then be logged within her data.

**Rate** is the number of times a behavior occurs in a specified amount of time. We can convert frequency to rate of problem behavior during a time period (for example, rate per minute or rate per hour) by dividing by the length of the observation in minutes, hours, etc.

🔗 **EXAMPLE** If Xixi engaged in 15 instances of throwing during a three-hour session, then the hourly rate of throwing would be five times per hour.

## Video Transcription

Let's look at an example of calculating rate data. Similar to count, we take note of the number of times the individual engages in the target behavior. Here, the behavior we are measuring are independent Mands or requests emitted by the learner.

We play with [INAUDIBLE].

Can I please-- can I please get-- go get a [iNAUDIBLE]?

Sure. Thanks for asking.

Can I please borrow--

Each time he engages in an independent mand, it is marked down. At the end of the therapy session, all

of his independent mands are added up and divided by the total amount of time of the therapy session, in this case, two hours. The resulting number is reported as a certain number of independent mands emitter per hour.



For frequency or rate data collection, you may use a counter or clicker, tally marks on paper, etc.



### Frequency

The number of times the behavior is observed

### Rate

The number of times a behavior occurs in a specified amount of time

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## 2. Duration

**Duration** refers to the amount of time a particular behavior lasts from beginning to end.

Record the length of each episode of the problem behavior from start to finish on the behavior management data sheet.

🔗 **EXAMPLE** If Latanya started to engage in a tantrum at 12:05 pm and stopped engaging in the tantrum at 12:45 pm, then the duration of the tantrum was 40 minutes.

We might also look at the total duration per session. For this, we would add the different durations together.

🔗 **EXAMPLE** If Latanya started to engage in a tantrum at 12:05 pm and stopped engaging in the tantrum at 12:10 pm (duration five minutes), started to engage in a tantrum at 12:21 pm and stopped engaging in the tantrum at 12:28 pm (seven minutes), and started to engage in the tantrum at 12:35 pm and stopped engaging in the tantrum at 12:44 pm (nine minutes), then the total duration was 21 minutes.

We might also look at the mean duration. For this, we would take the total time and divide it by the total number of instances of the behavior.

🔗 **EXAMPLE** The total amount of time that Latanya engaged in the tantrum was 21 minutes, divided by the number of tantrums, three, would be a mean of seven minutes per tantrum.



For duration data collection, you might use a clock, timer, stopwatch, etc.

### Video Transcription

[CRYING] Sit down.

[CRYING]

Now sit down.

OK. OK. You can go. You can go. Thanks for sitting. That was good sitting. Thank you.

Uh-huh.

Oh, OK, sit down though. Thanks.



#### TERM TO KNOW

#### Duration

The total amount of time the behavior lasts from start to finish

## 3. Response Latency

**Response latency** measures the time it takes between an event and the time the patient begins responding.

Start recording when the stimulus has been presented and stop recording when the patient starts to engage in the behavior.

🔗 **EXAMPLE** Maksim takes a long time to come to the dinner table when called by his caregiver. If his caregiver calls him over at 6:05 pm and he does not start walking over to the table until 6:13 pm, then the response latency would be eight minutes.



#### HINT

For response latency data collection, you might use a clock, timer, stopwatch, etc.



#### TERM TO KNOW

#### Response Latency

Measure of elapsed time between the onset of a stimulus and the initiation of a response

## 4. Inter-Response Time

**Inter-response time (IRT)** measures the time between two separate, sequential occurrences of a particular behavior.

Start timing at the end of one behavior and stop at the beginning of the next behavior.

🔗 **EXAMPLE** If Lucia engages in an instance of verbal aggression at 1:50 pm and again at 1:53 pm, then the IRT is three minutes.



#### HINT

For IRT data, you might use a clock, timer, stopwatch, etc.



#### TERM TO KNOW

### Inter-Response Time (IRT)

Amount of time that elapses between two consecutive instances of a response class

## 5. Percent of Occurrence

**Percent of occurrence** is the number of times a particular behavior occurs out of all possible opportunities for the behavior to occur. This is a proportion, or ratio, that is typically expressed as a part per 100.

It is calculated by dividing the number of times the behavior occurred by the total number of opportunities for the behavior to occur.



**EXAMPLE** If 20 items were presented to Francesco, and he threw five of those items, then he threw items in 25% of the opportunities. Francesco engaged appropriately with materials in 75% of the opportunities.



#### TERM TO KNOW

### Percent of Occurrence

The number of times a particular behavior occurs out of all possible opportunities for the behavior to occur

## 6. Interval Recording

**Interval recording** refers to recording whether a behavior occurred within some interval of time. We will discuss these three types of interval data:

- whole interval recording
- partial interval recording
- momentary time sampling

All of these are discontinuous measures, meaning you are not counting each individual instance of a behavior. Rather, you are dividing the observation period into intervals and recording whether the behavior occurred during that range of time.

With **whole interval recording**, the interval is recorded as a “yes, the behavior occurred” interval if the behavior occurs at any time during the interval. Calculate by dividing the number of “yes” intervals by the total number of intervals.

### Video Transcription

Let's now demonstrate whole interval recording, which is slightly different from partial interval. In this recording procedure, we are looking at determining if the behavior happened during the entire interval. So in order for me to mark that that behavior occurred, it has to be present during the entire interval.

If, at any point during that interval, the behavior stops occurring or does not occur, then that is marked as a non-occurrence, and I will mark it as a minus. So again, I'm going to be using a 10-second interval,

and the behavior that I'm going to be recording of Cecilia's is whether she stayed in her seat.

And so every 10 seconds, I'm going to be marking off, did she stay in her seat the entire 10 seconds-- and if so, giving her a plus. If she did not stay in her seat during the entire 10 seconds, that I'm going to give her a minus for that interval. OK, let's go ahead and get started. OK, so for the first interval, she stayed in her seat, so I'm going to be giving her a plus.

OK, so we can see that there was a moment where she stopped engaging in that behavior, so for that interval, I can give her a minus. OK, again, she remained in her seat the entire time, so she gets a plus. OK, so she got out of her seat. I'm going to give her a minus. And I would redirect her back to her chair, so come on back over.

OK, and she stayed in her seat for that last interval, so she gets a plus. Thank you, Cecilia. So again, if we're calculating our data, out of five intervals, we can see that she remained in her seat without interruption for three of those intervals. So again, three intervals out of the total five that were recorded, gives me a percentage of 60%, meaning that Cecilia stayed in her seat during 60% of the intervals that were observed. OK.

With **partial interval recording**, the interval is recorded as a “yes, the behavior occurred” interval if it occurred at any point during the interval. Calculate by dividing the number of “yes” intervals by the total number of intervals.

🔗 **EXAMPLE** If there are five minute intervals for a total of 20 minutes (four total intervals) and Aliyah engages in the behavior in two of the four intervals, the percent of intervals in which Aliyah engaged in the behavior would be 50%.

## Video Transcription

So we're going to demonstrate how to take partial interval data using Cecilia as our student. And so what we're going to do is we're going to observe her as she's doing an independent task. And we are going to be recording whether she is engaging in a stereotypic behavior, pen flicking, during her independent activity.

And so every 10 seconds-- that's the length of our interval-- I'm going to be recording if that behavior of pen flicking happened at any time during that 10-second interval. If it happened at any time during that interval, then I'm going to indicate a plus within my first interval box. If the behavior did not occur at all during that interval, then I'm going to indicate a minus. OK?

So let's go ahead, and I'm going to observe her in 10-second intervals and take the data accordingly. OK? Let's get started. And go.

OK. So our first 10-second interval occurred. The behavior did not happen, so I'm going to put a minus in the box indicating that the behavior did not occur. Let's do the next 10-second interval.

OK. So we can see right away that the behavior did happen during that 10-second interval. And I go ahead and give her a plus. And as soon as that 10 seconds is up, I move on to the next interval.

OK. So at the end of that interval, the behavior occurred again, so I'm going to give her another plus. OK. So the behavior did not occur during that 10-second interval. I'm giving her a minus.

And the behavior did occur. OK. Thank you for demonstrating. So if we were to then look at calculating this into data that maybe has a little bit more meaning, out of our five intervals, Cecilia engaged in the behavior in three of those intervals. So in three of the total intervals out of the five, she engaged in that behavior.

If I were to convert that into a percentage, again, I want to convert the number of intervals that it happened over the total number of intervals or opportunities, which is  $3/5$ . And if I calculate that into a percentage, that is basically 60%. So I can say that Cecilia engaged in pen flicking during 60% of the observed intervals. OK?

**Momentary time sampling** means that at the end of a set interval, a “yes, the behavior occurred” is recorded if the behavior is occurring at the moment the interval ends. Calculate by dividing the number of “yes” intervals by the total number of intervals.

➦ **EXAMPLE** A technician sets a timer for five minutes. When the timer beeps, the technician records whether the behavior is occurring at that exact moment.



#### TERMS TO KNOW

#### Interval Recording

Record whether a behavior occurred within some interval of time.

#### Whole Interval Recording

The interval is recorded as a “yes, the behavior occurred” interval if the behavior occurs throughout the entire interval.

#### Partial Interval Recording

The interval is recorded as a “yes, the behavior occurred” interval if it occurred at any point during the interval.

#### Momentary Time Sampling

At the end of a set interval, a “yes, the behavior occurred” is recorded if the behavior is occurring at the moment the interval ends.

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## 7. Permanent Product Recording

Permanent products are concrete results of a behavior that can be counted or measured. **Permanent product recording** is defined as the physical or tangible outcomes of a behavior, calculated by counting the number of items produced following behavior.

➦ **EXAMPLE**

- Gio completed 15 math problems.
- Gio threw away five worksheets.
- Gio wrote three sentences.



## TERM TO KNOW

### Permanent Product Recording

The physical or tangible outcomes of a behavior



## SUMMARY

In sessions with your patients, you are responsible for collecting data on problem behavior. In this lesson, you learned about different types of data collection and measurement. You learned about measuring **frequency**, the number of times the behavior is observed; **rate**, the number of times a behavior occurs in a specified amount of time; and **duration**, the total amount of time the behavior lasts from start to finish. You learned that **response latency** measures the time it takes between an event and the time the patient begins responding, **inter-response time (IRT)** measures the time between two separate, sequential occurrences of a particular behavior, and **percent of occurrence** is the number of times a particular behavior occurs out of all possible opportunities for the behavior to occur. You covered the three types of **interval recording** – referring to whether a behavior occurred within some interval of time – including whole interval, partial interval, and momentary time sampling. Lastly, you explored **permanent product recording**, referring to the physical or tangible outcomes of a behavior.



## TERMS TO KNOW

### Duration

The total amount of time the behavior lasts from start to finish.

### Frequency

The number of times the behavior is observed.

### Inter-Response Time (IRT)

Amount of time that elapses between two consecutive instances of a response class.

### Interval Recording

Record whether or not a behavior occurred within some interval of time.

### Momentary Time Sampling

At the end of a set interval, a “yes, the behavior occurred” is recorded if the behavior is occurring at the moment the interval ends.

### Partial Interval Recording

The interval is recorded as a “yes, the behavior occurred” interval if it occurred at any point during the interval.

### Percent of Occurrence

The number of times a particular behavior occurs out of all possible opportunities for the behavior to occur.

### Permanent Product Recording

The physical or tangible outcomes of a behavior.



**Rate**

The number of times a behavior occurs in a specified amount of time.

**Response Latency**

Measure of elapsed time between the onset of a stimulus and the initiation of a response.

**Whole Interval Recording**

The interval is recorded as a “yes, the behavior occurred” interval if the behavior occurs throughout the whole entire interval.