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Chapter 2: Realistic Goals and Systematic Observations

Setting Goals

Before any professional meeting begins, it is important to have goals. Goals keep meeting members focused and prevent digressions which waste the team's time. There need to be goals for the meeting itself and goals for the child and teacher who are being assisted.

The meeting goals are actually set beforehand by the team coordinator when that person helps the teacher fill out the *Request for Meeting* form (see Chap. ??). As will be shown when the format of the meeting itself is discussed, it is important to quickly review these meeting goals at the start of the meeting so that both team members and the visiting teacher understand where the meeting is headed.

The goals for the teacher and student, however, are not as easy to set. They require that all team members consider a collection of data which realistically portray the current performance of the student and the likelihood that gains can be achieved. For the meeting to lead to meaningful goals, everyone must have a sense of the baseline, i.e. *Where is the student now?*

This chapter will display a number of strategies for assessing the academic and social performance of students so that realistic goals can be set. The relative strengths and weaknesses of each of these strategies will be discussed, and it will be shown that each can be used effectively in any classroom by virtually any teacher.

Portfolio Assessment

One of the most straightforward and common-sense procedures for

assessing a student's current academic performance is the analysis of a systematic collection of classroom work papers and assignments, which is often known as *portfolio assessment* (Wolf, 1989; Flood & Lapp, 1989). Students in all classes typically produce a rich collection of work samples which can be viewed or heard by each member of the team. When these samples - math worksheets, compositions, homework essays, maps, drawings, etc. - are systematically collected and displayed, they can be used to ascertain current student performance *relative to the curriculum being used in that classroom*.

This is a major advantage over standardized tests, which fail to account for what is actually expected of students on a day-to-day basis. Portfolios contain samples of what students do relative to what is expected of them, rather than what they do compared to an abstract set of norms.

But as straightforward and appealing and as this may sound, portfolios are not just random collections of paper which can be easily tossed together by any teacher. Instead, they are systematic collections which are meant to display the performance of a skill over time. The portfolios which are likely to be of greatest value to the team will display at least two of the following:

- *typical performance on the task* - Over time (perhaps two or three weeks), how the student normally performs on the task (e.g. math problems) can be seen by viewing his daily output on worksheets.

- *best performance on the task* - What is the best this student could do on these day-to-day assignments? Sometimes this is shown via a related assignment (e.g. a quiz or the output of a computer assisted instruction program) which requires that the student display the same skill under different conditions.

- *common errors on the task* - Those worksheets which seem to highlight the errors which the student normally makes or which are samples of worst performance can also be enlightening.

In addition, we will want to know something about the frequency with

which the student displays each of the above. That is, how often does he display what is shown as "typical performance"? Has he been correctly completing only 30 % of the problems on the math workbook pages just about every day, or has this "typical" 30% performance been seen on about half of the days, while either "best" performance or "worst" performance is seen on the other half of the days. This is important because when we set goals we'll want to know whether the student can perform at a higher level without much difficulty or whether he rarely is able to exceed his typical performance, indicating that we should not be too ambitious in setting goals.

Figure 2-1 shows a portfolio of worksheets which exemplify the characteristics discussed above. Note that the work samples were taken daily over a two week period. *Typical performance* for this student is approximately 40% of these two-place addition problems completed correctly, and this occurs about 60% of the time. *Best performance* was at the 80% level, and this was seen twice, or 20% of the time. One page (the third day) was particularly revealing of the student's difficulty (*common errors*).

**Figure 2-1: Portfolio Collection of Math Worksheets
Completed by Albert Over Ten Day Period**

CAI Math		Set 3-4		CAI Math		Set 3-5	
$\begin{array}{r} 16 \\ +13 \\ \hline 29 \end{array}$	$\begin{array}{r} 24 \\ +15 \\ \hline 39 \end{array}$	$\begin{array}{r} 17 \\ +16 \\ \hline 23 \end{array}$	$\begin{array}{r} 45 \\ +45 \\ \hline 80 \end{array}$	$\begin{array}{r} 12 \\ +13 \\ \hline 25 \end{array}$	$\begin{array}{r} 22 \\ +28 \\ \hline 40 \end{array}$	$\begin{array}{r} 16 \\ +17 \\ \hline 23 \end{array}$	$\begin{array}{r} 31 \\ +29 \\ \hline 50 \end{array}$
$\begin{array}{r} 26 \\ +14 \\ \hline 30 \end{array}$	$\begin{array}{r} 32 \\ +18 \\ \hline 50 \end{array}$	$\begin{array}{r} 14 \\ +27 \\ \hline 40 \end{array}$	$\begin{array}{r} 34 \\ +37 \\ \hline 61 \end{array}$	$\begin{array}{r} 26 \\ +24 \\ \hline 40 \end{array}$	$\begin{array}{r} 41 \\ +19 \\ \hline 60 \end{array}$	$\begin{array}{r} 14 \\ +16 \\ \hline 30 \end{array}$	$\begin{array}{r} 25 \\ +35 \\ \hline 50 \end{array}$
$\begin{array}{r} 22 \\ +38 \\ \hline 50 \end{array}$	$\begin{array}{r} 24 \\ +15 \\ \hline 39 \end{array}$	<i>Student: Albert</i> <i>Date: 11/02</i> <i>Time: 10:04-10:22</i>		$\begin{array}{r} 33 \\ +37 \\ \hline 60 \end{array}$	$\begin{array}{r} 24 \\ +15 \\ \hline 39 \end{array}$	<i>Student: Albert</i> <i>Date: 11/03</i> <i>Time: 10:10-10:29</i>	

CAI Math		Set 3-6		CAI Math		Set 3-7	
$\begin{array}{r} 26 \\ +14 \\ \hline 30 \end{array}$	$\begin{array}{r} 24 \\ +15 \\ \hline 39 \end{array}$	$\begin{array}{r} 14 \\ +16 \\ \hline 20 \end{array}$	$\begin{array}{r} 55 \\ +45 \\ \hline 90 \end{array}$	$\begin{array}{r} 16 \\ +13 \\ \hline 29 \end{array}$	$\begin{array}{r} 22 \\ +28 \\ \hline 50 \end{array}$	$\begin{array}{r} 19 \\ +12 \\ \hline 31 \end{array}$	$\begin{array}{r} 31 \\ +29 \\ \hline 50 \end{array}$
$\begin{array}{r} 32 \\ +18 \\ \hline 40 \end{array}$	$\begin{array}{r} 33 \\ +18 \\ \hline 41 \end{array}$	$\begin{array}{r} 14 \\ +27 \\ \hline 40 \end{array}$	$\begin{array}{r} 34 \\ +37 \\ \hline 61 \end{array}$	$\begin{array}{r} 33 \\ +77 \\ \hline 1010 \end{array}$	$\begin{array}{r} 44 \\ +16 \\ \hline 60 \end{array}$	$\begin{array}{r} 14 \\ +16 \\ \hline 30 \end{array}$	$\begin{array}{r} 25 \\ +35 \\ \hline 60 \end{array}$
$\begin{array}{r} 24 \\ +15 \\ \hline 39 \end{array}$	$\begin{array}{r} 22 \\ +38 \\ \hline 50 \end{array}$	<i>Student: Albert</i> <i>Date: 11/04</i> <i>Time: 10:00-10:21</i>		$\begin{array}{r} 33 \\ +57 \\ \hline 90 \end{array}$	$\begin{array}{r} 88 \\ +11 \\ \hline 99 \end{array}$	<i>Student: Albert</i> <i>Date: 11/05</i> <i>Time: 10:06-10:28</i>	

Figure 2-1 (continued): Portfolio Collection of Math Worksheets Completed by Albert Over Ten Day Period

<i>CAI Math</i>		<i>Set 3-7</i>	
$\begin{array}{r} 46 \\ +23 \\ \hline 69 \end{array}$	$\begin{array}{r} 34 \\ +37 \\ \hline 61 \end{array}$	$\begin{array}{r} 16 \\ +17 \\ \hline 23 \end{array}$	$\begin{array}{r} 34 \\ +46 \\ \hline 70 \end{array}$
$\begin{array}{r} 14 \\ +16 \\ \hline 30 \end{array}$	$\begin{array}{r} 32 \\ +18 \\ \hline 50 \end{array}$	$\begin{array}{r} 17 \\ +24 \\ \hline 31 \end{array}$	$\begin{array}{r} 34 \\ +37 \\ \hline 61 \end{array}$
$\begin{array}{r} 21 \\ +48 \\ \hline 69 \end{array}$	$\begin{array}{r} 22 \\ +38 \\ \hline 50 \end{array}$	<i>Student: Albert</i> <i>Date: 11/06</i> <i>Time: 10:03-10:27</i>	

<i>CAI Math</i>		<i>Set 3-8</i>	
$\begin{array}{r} 22 \\ +33 \\ \hline 55 \end{array}$	$\begin{array}{r} 82 \\ +11 \\ \hline 93 \end{array}$	$\begin{array}{r} 18 \\ +17 \\ \hline 25 \end{array}$	$\begin{array}{r} 46 \\ +29 \\ \hline 65 \end{array}$
$\begin{array}{r} 25 \\ +15 \\ \hline 30 \end{array}$	$\begin{array}{r} 41 \\ +19 \\ \hline 50 \end{array}$	$\begin{array}{r} 19 \\ +19 \\ \hline 28 \end{array}$	$\begin{array}{r} 25 \\ +35 \\ \hline 50 \end{array}$
$\begin{array}{r} 32 \\ +47 \\ \hline 79 \end{array}$	$\begin{array}{r} 41 \\ +15 \\ \hline 56 \end{array}$	<i>Student: Albert</i> <i>Date: 11/09</i> <i>Time: 10:00-10:21</i>	

<i>CAI Math</i>		<i>Set 3-9</i>	
$\begin{array}{r} 26 \\ +14 \\ \hline 30 \end{array}$	$\begin{array}{r} 24 \\ +15 \\ \hline 39 \end{array}$	$\begin{array}{r} 14 \\ +16 \\ \hline 20 \end{array}$	$\begin{array}{r} 55 \\ +45 \\ \hline 90 \end{array}$
$\begin{array}{r} 32 \\ +18 \\ \hline 40 \end{array}$	$\begin{array}{r} 33 \\ +18 \\ \hline 41 \end{array}$	$\begin{array}{r} 14 \\ +27 \\ \hline 40 \end{array}$	$\begin{array}{r} 34 \\ +37 \\ \hline 61 \end{array}$
$\begin{array}{r} 24 \\ +15 \\ \hline 39 \end{array}$	$\begin{array}{r} 22 \\ +38 \\ \hline 50 \end{array}$	<i>Student: Albert</i> <i>Date: 11/10</i> <i>Time: 9:58-10:20</i>	

<i>CAI Math</i>		<i>Set 3-10</i>	
$\begin{array}{r} 33 \\ +66 \\ \hline 99 \end{array}$	$\begin{array}{r} 24 \\ +15 \\ \hline 39 \end{array}$	$\begin{array}{r} 29 \\ +20 \\ \hline 49 \end{array}$	$\begin{array}{r} 39 \\ +21 \\ \hline 50 \end{array}$
$\begin{array}{r} 43 \\ +47 \\ \hline 80 \end{array}$	$\begin{array}{r} 44 \\ +16 \\ \hline 60 \end{array}$	$\begin{array}{r} 25 \\ +35 \\ \hline 60 \end{array}$	$\begin{array}{r} 36 \\ +34 \\ \hline 70 \end{array}$
$\begin{array}{r} 11 \\ +58 \\ \hline 69 \end{array}$	$\begin{array}{r} 22 \\ +55 \\ \hline 77 \end{array}$	<i>Student: Albert</i> <i>Date: 11/11</i> <i>Time: 10:06-10:27</i>	

Figure 2-1 (continued): Portfolio Collection of Math Worksheets Completed by Albert Over Ten Day Period

CAI Math		Set 3-11		CAI Math		Set 3-12	
41	36	32	44	64	82	17	38
<u>+33</u>	<u>+47</u>	<u>+18</u>	<u>+46</u>	<u>+33</u>	<u>+19</u>	<u>+18</u>	<u>+22</u>
74	73	50	80	97	91	35	50
45	22	19	24	33	53	26	52
<u>+47</u>	<u>+28</u>	<u>+21</u>	<u>+37</u>	<u>+37</u>	<u>+17</u>	<u>+55</u>	<u>+38</u>
82	50	30	51	60	60	71	80
31	38	Student: Albert		44	41	Student: Albert	
<u>+58</u>	<u>+22</u>	Date: 11/12		<u>+47</u>	<u>+15</u>	Date: 11/13	
89	50	Time: 9:59-10:20		81	56	Time: 10:01-10:24	

A portfolio is a collection of permanent products which are available for everyone to see. There are particular advantages to such products when issues of *reliability* and *validity* are questioned.

Reliability and Validity

Reliability refers to the consistency with which measures perform. Reliable thermometers measure temperature in the same way whether they are in (e.g.) refrigerators or in ovens. Reliable tests work the same way each time they are given or on each student to whom they are given. In short, we can *rely* on the instrument to give consistent readings.

Validity, on the other hand, refers to the value of something relative to what we want to do or know. A reliable thermometer has no validity as a measure of weight, but is valid as a measure of temperature. A sight word vocabulary list may be a valid measure of sight word vocabulary, but how valid is it as a measure of overall reading ability?

Measures must be reliable to be valid, but the opposite is not true. There is no need for a measure to be valid to be reliable. That is why the meat scale at your local market must reliably give "honest weight every time" in order to be a valid indicator of the weight of the meat you purchase, but that same reliable meat scale simply is not a good measure of the IQ of the person who buys the meat.

Permanent products such as test papers, workbook pages, or videotapes

of oral presentations allow for all judges to see the same performance and to decide on the validity and reliability of the measure in a consistent manner. Since Charlie's spelling workbook pages consistently display exactly the same performance to every viewer of his workbook, they are highly reliable as a measure of Charlie's performance on spelling workbook pages. How valid they are as a measure of his ability to spell may be questioned, but anyone can look at the pages and compare them to whatever criteria are desired (e.g. the spelling curriculum, written passages, etc.) and they will not change. Compare this collection (portfolio) of workbook pages to a collection of checkmarks made by a teacher each time Charlie has a tantrum in class. If you were a member of a team looking at the sheet of checkmarks, you might have some real questions about the consistency with which the teacher had marked the tantrums (Were they all the same? Would another observer have scored exactly the same number of tantrums?) Even if the teacher had gone to great lengths to assure the reliability of the checkmarks, we have to take that person's word for it since we can't jointly re-observe the behaviors again in the way we can jointly observe the spelling workbook pages. This is one reason why a portfolio of permanent products is probably the most desirable evidence that a teacher can bring to a team.

One last reminder on portfolios: Don't assume that these permanent products must be written. A wealth of information is available via oral recordings, and these are so low-technology that anyone can gather them easily and inexpensively. Simply letting a \$15 audio cassette tape recorder record the oral reading performance of a group of second graders over a two week period can bring a wealth of information to a team. Besides the recording of Diane's difficulties in oral reading, team members can also hear samples of the expected level of oral reading for most kids in that class, as well as the range of what is considered "normal". When it comes to goal setting, that oral permanent product may be far more valuable than other measures.

Practical Techniques for Assembling Portfolio Information for a Team

1. Consider the behavior being measured, and decide on a reasonable time period over which to collect work samples. If the team needs to consider Betsy's spelling difficulties, a 2 week collection of every-other-day spelling worksheets may be fine, but if Tom's difficulties on weekly geometry quizzes make up an important part of the portfolio, the team may need 4 or 5 weeks' worth of quiz papers.

When social or anti-social events are the issue being discussed by the team and for which a goal must be set, permanent products are not likely to be available. Out-of-seat behavior, for example, could be documented by a videotape, but it is highly unlikely that a teacher will make a constant video of a class in session day after day.

Nevertheless, social events make up a large and important class of behaviors to be considered by the team. In the following sections, we will explore a number of ways in which such events can be measured and documented.

Event Recording

Reduced to its simplest form, counting the number of times a behavior occurs is known as *event recording*. Adding one more checkmark to a tally sheet each time an out-of-seat behavior occurs is event recording. Moving another nickel from your left pocket to your right pocket each time Billy uses a "four-letter word" in the classroom is also event recording. At the end of your hour with Billy you simply add up the right-pocket nickels and you have a count of Billy's use of four-letter words that hour.

Event recording is a valuable and often-used measure of social behaviors. Counts of the number of times someone is out-of-seat, the number of requests for help,

the number of fights in which a student is involved, and the number of chalkboard math problems correctly solved are all examples of events which can be easily counted and recorded.

In order for event recording to be reliable and valid, however, certain conditions need to be met. First of all, the event must have a clear beginning and ending. Counting the number of tantrums a fifth grader has in a day might seem fairly straightforward, but even after you define "tantrum" in behavioral terms you'll need to consider whether a student who is calming down and then re-starts his kicking and whining has had one or two tantrums. If the event lacks a clear beginning and end, it might be better to use another measure of the behavior rather than being unreliable in recording events.

Secondly, is the typical number of events in an hour, a morning, a day, or whatever time period during which you choose to record, a reasonable number for counting? If the number of requests for help in an hour science class varies between 4 and 12, that is probably a reasonable number to count. On the other hand, if we're concerned about out-of-seat behaviors when Bob fails to take his medication and that number can be from 60 to 85 times per morning, we'd be much better off using another of the procedures discussed in this chapter.

Finally, how long does the event in question last? Very brief events (e.g. twitches or pencil-taps) are often difficult to count (they can be missed or miscounted) while very long events (e.g. arguments with classmates) may actually be made up of several events.

Some Practical Suggestions Concerning Event Recording

1. Use a pencil & paper tally sheet. Although there is no need for formality in the design of the tally sheet (the author has seen many scraps of paper on which valid tallies have been made) a tally sheet such as that shown in Figure 2-2 captures the key information needed on most event records.

Figure 2-2: Model Event Recording Form

<i>Team Event Recording Form</i>	
Student _____ Teacher _____ Room _____	
Behavior being Charted: _____ _____	
Date _____ Start Time _____ Stop Time _____ Tally _____ Total _____	Date _____ Start Time _____ Stop Time _____ Tally _____ Total _____
Date _____ Start Time _____ Stop Time _____ Tally _____ Total _____	Date _____ Start Time _____ Stop Time _____ Tally _____ Total _____
Date _____ Start Time _____ Stop Time _____ Tally _____ Total _____	Date _____ Start Time _____ Stop Time _____ Tally _____ Total _____
Date _____ Start Time _____ Stop Time _____ Tally _____ Total _____	Date _____ Start Time _____ Stop Time _____ Tally _____ Total _____

2. *Anticipate a few days' worth of artificially high or low numbers when the student discovers that you are counting behaviors. Actually, this applies to all of the kinds of recording being discussed here. Students often change their behavior when they see that you are making a check on a sheet each time they do something. They may suddenly be more conscious of a behavior and either defiantly raise the number of events or fearfully hold the number down for a while, but if the behavior is an important one it will return to its true level within a few days.*

3. *Transfer nickels, wooden chips, matchsticks, or strips of paper from one pocket to another. There is no need to carry a tally sheet and pencil at all times. Especially for behaviors that occur outside the classroom (in corridors, the lunchroom, while boarding busses, etc.) it is far easier to simply transfer from one pocket to another and do the counting later.*

4. *Choose a meaningful period of time during which to record. It may not be necessary to record all instances of a given behavior in a day. For example, counting the number of "immature giggles" during the seatwork part of the morning may be adequate as a measure of a problem behavior even though that behavior also occurs during other activities. If the teacher is concerned about the distractions which the giggling produces during quiet seatwork, then events (giggles) recorded during that time period are the critical ones regardless of the frequency at other times.*

Duration Recording

A variation on event recording which may yield more meaningful information for the teacher and the team is *duration recording* - recording the length of time for which a behavior occurs.

Perhaps Elizabeth's tantrums are not too frequent - only 2 or 3 per week, but once they begin they last for up to 45 minutes before she quiets down. In this case, knowing how often the events occur isn't going to tell us much, but knowing the duration of each event may tell us a lot in terms of setting goals. If the team can come up with a strategy for reducing the duration of Elizabeth's tantrums, real progress may be measured even if she continues to react with tantrums a few times each week.

Like event recording, duration recording is best used when: a) there is a clear beginning and end to the behavior; b) the frequency is reasonable, and c) the duration of the event is appropriate for timing.

If the start of the event is gradual (as it may be in some tantrums where a whining period precedes the explosive phase) duration recording may not be practical. Similarly, if the student calms to a sobbing state which is slowly extinguished, it may not be clear that the event has ended. Both of these conditions might make the recording unreliable.

If the event happens too often in a day, it may be unreasonable to expect a teacher to make accurate recordings of the event each time. For example, a valuable record might be made of the duration of "head-on-the-desk-when-I-don't-know how-to-do-it" behavior, but is it reasonable to expect a teacher to watch a student so often that the duration of each of 15 such events per day would be recorded?

Finally, is the event one which is appropriate for timing? How long it takes to correctly solve a verbal math problem may or may not be important. If speed is the curricular consideration then such a measure may be valuable, but if accuracy is

what is being taught then accuracy should be measured and speed can be looked at later.

Some Practical Suggestions Concerning Duration Recording

1. Use a stopwatch for brief events if at all possible. When events are relatively brief (30-60 seconds), accuracy may become important enough in goal setting to require the use of a stopwatch. Stopwatches also have the advantage of shutting off and keeping you from having to do arithmetic calculations. While they may not seem to be something teachers "naturally" carry around, a surprising number of common wristwatches now have a stopwatch function which people can easily learn to use.

2. Wall clocks or wristwatches with sweep second hands can be used for many tasks. This may require that the recorder be reminded to consistently wear a watch.

3. Record the time as soon as possible following the event. The author has known many well-intentioned recorders who trusted their memories too long. As in duration recording, there is no "best" recording sheet, but the sample shown in Figure 2-3 accounts for typically desired information.

Figure 2-3: Model Duration Recording Form

<p><i>Team Duration Recording Form</i></p> <p>Student _____ Teacher _____</p> <p>Room(s) _____</p>	
<p>Behavior being Charted:</p> 	
<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>	<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>
<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>	<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>
<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>	<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>
<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>	<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>
<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>	<p>Event # _____ Date _____</p> <p>Start Time _____</p> <p>Stop Time _____</p>

Latency Recording

When the issue is, for example, compliance with instructions, answering questions, following directions, or getting to another classroom, latency recording may be the best measurement to use. *Latency recording* is the recording of the time which transpires between two events, the first of which is supposed to trigger the second. In latency recording, the ending of an event which is supposed to trigger another event (e.g. the bell between class periods) is used as a start time, and the beginning of the second event (e.g. being seated in the next classroom) is the stop time.

For latency measurements to be reliable, the distinction between the two events must be clear. Time measurements can be taken via stopwatch, wristwatch, or wall clock, depending on the length of time being measured. The chart shown in Figure 2-4 includes the information which is usually needed to use latency recording successfully.

Time Sampling Procedures

When the team considers using event, duration, or latency recording procedures in a particular situation, team members may recognize that none of these are realistic for the particular classroom or teacher being assisted. Also, certain behaviors do not lend themselves to measurement by these techniques. Consider the following scenario.

John is a student who seems to be continually off-task. Sometimes he just sits and doodles. Sometimes he roams around the room, while at other times he stares out the window while he hums a tune. He is occasionally on-task, of course, but it seems like he is far more distractable than anyone else in the class.

Event recording would not tell us much about his off-task behavior, since it might just be one huge event. Duration recording might tell us something, but it would be unrealistic to constantly watch all of John's off-task events when the teacher is trying to work with 27 other students at the same time. Latency recording doesn't seem to apply to this situation, unless we are concerned with how quickly he returns to task when told to do so.

The measurement solution to a situation such as John's may well be one of the time sampling methods discussed below. Time sampling procedures lighten the teacher's responsibility for constant observation, while still providing a good estimate of the frequency of the behavior.

Whole-interval time sampling

If we divide up a 40 minute morning class into 5 minute segments, we can create a chart such as that shown in Fig. 2-5.

Figure 2-5 Forty Minute Class Divided into 5 Minute Intervals

Time of Day	9:00 - 9:05	9:05- 9:10	9:10- 9:15	9:15- 9:20	9:20- 9:25	9:25- 9:30	9:30- 9:35	9:35- 9:40

When we use whole interval time sampling, we simply observe whether or not the behavior in which we are interested occurs for each complete interval. In the case of John, we might observe whether he is off-task continuously from 9:00 until 9:05. If he is, then we place a check in the box under 9:00 - 9:05. If he is on-task again for at least a few minutes between 9:05 and 9:10, we leave that box blank. We then observe how he is doing from 9:10 - 9:15, make the appropriate check or blank space, and so on.

Whole interval recording is a sampling procedure. When looking at John's data afterwards, we won't actually know how many off-task behaviors were performed, or how long they lasted. What we will know is that some type of off-task behavior was continuously emitted during certain periods of time.

This is actually more valuable than it may seem at first sight. Had we used event recording, we might have had an accurate count of the number of off-task behaviors, but we wouldn't have any sense of when they occurred. Look at John's whole-interval data in Fig. 2-6.

Figure 2-6: Whole-interval Chart for John's Off-Task Behavior

Time	9:00 - 9:05	9:05- 9:10	9:10- 9:15	9:15- 9:20	9:20- 9:25	9:25- 9:30	9:30- 9:35	9:35- 9:40

Not only do we know how many 5 minute intervals were completely spent in off-task behavior; we also know that they tend to happen more often early in the class. If such a pattern held true over the course of a week or so, this might give some clue about what was motivating the behavior. Perhaps the transition from the corridor into the classroom just before 9:00 means putting up with some threats or

engaging in some flirting for John, and he has a hard time re-focusing himself once inside the room.

Partial-interval time sampling

Like whole-interval sampling, partial-interval sampling involves dividing a time period into segments and watching for the occurrence of the behavior in which we are interested during each segment. In this case, however, if the behavior occurs *at all* during a given segment we will place a check in the corresponding box.

Sarah will sometimes mutter under her breath while she is supposed to be working on math problems at her desk. It is difficult to say when she begins to mutter, since her mutterings are sometimes too quiet to hear in the normal classroom noise. For much the same reason, it would be virtually impossible to count the "mutterers". How would the teacher know when one stopped and another started?

Figure 2-7 depicts the partial-interval data on Sarah's muttering for a class period.

Figure 2-7: Partial-interval Chart for Sarah's Muttering Behavior

Time of Day	10:00 - 10:05	10:05- 10:10	10:10- 10:15	10:15- 10:20	10:20- 10:25	10:25- 10:30	10:30- 10:35	10:35- 10:40

Note that, in this case, we don't know for how long Sarah was muttering. It could have been for a few seconds or continuously for 4 or 5 minutes. What we do know is that she muttered during more of the intervals which occurred late in the class than during the beginning. Once again, knowing this might help us to analyze what brings on the muttering behavior. Perhaps Sarah mutters when she becomes very frustrated, or when she is tiring of tasks.

Partial interval time sampling is quite easy to chart, since the teacher doesn't need to constantly observe the student or even observe for extended periods of time. Furthermore, as will be explained a bit later in this chapter, this is an excellent procedure to use when charting is being done on more than one behavior at the same time.

Momentary time sampling

Behaviors that occur at very high rates (e.g. pencil-tapping) and/or which are very sporadic (e.g. a distractable student's on-task behavior) may not easily lend themselves to either of the previous time sampling measures. That is, they may occur at *some* time during virtually every interval (which makes partial interval recording of little value) but almost never for an *entire* interval (which makes whole interval sampling ineffective). Such behaviors may best be measured using momentary time sampling.

For this procedure, the time period is once again divided into reasonable segments, but the key time here is the *exact end of each interval*. Rather than observing

whether the behavior occurs at all during the interval or whether it occurs for the entire interval, we observe whether it occurs only at the end of the interval.

Figure 2-8 shows a time interval chart for Matthew's on-task behavior during his history class immediately following lunch.

Figure 2-8: Momentary Time Sample Chart for Matthew's On-Task Behavior

Time of Day	12:00 - 12:05	12:05- 12:10	12:10- 12:15	12:15- 12:20	12:20- 12:25	12:25- 12:30	12:30- 12:35	12:35- 12:40
Time of Day	12:45 - 12:50	12:55- 1:00	1:00- 1:05	1:05- 1:10	1:10 1:15	1:15 1:20	1:20- 1:25	1:25- 1:30

Collecting the kind of data shown in fig. 2-8 is relatively simple. The teacher glances at Matthew every 5 minutes (which is really fairly easy to accustom yourself to doing) and notes whether he is on-task or not. If he is, a check is placed in the appropriate box. If not, the teacher does nothing and checks again in another 5 minutes.

Some Practical Suggestions Concerning Time Sampling

1. Choose an interval that's valuable, but practical. It doesn't make much sense to divide a three hour morning into 5 minute segments and then expect a teacher to make reliable observations. However, in most cases it's equally inappropriate to divide a 45 minute class into 15 minute intervals, since not enough data would be taken to be worthwhile. The team should help the teacher to realistically evaluate the classroom situation and to choose the time sampling procedure that will provide sufficient data at the lowest cost of observation time.

2. Chart time sampling data immediately. Unlike event recording or duration recording, it

is important to enter the data on a time-sample chart without delay. The sequence of intervals is important, and is easily confused when charting is postponed. The model chart shown in Figure 2-9 can be used for whole interval, partial interval, or momentary time sampling.

3. *If necessary, gather time sampling data on a sample of days.* Sometimes it's impractical for a teacher to observe a student on a daily basis. The number of students may increase on certain designated days (e.g. two science classes are combined for a lab session on Fridays) or an aide or student teacher might be available (thereby making charting possible) on selected days. It is best to gather data on a daily basis whenever possible, but the data collected on 2, 3 or 4 days may also give a good estimate of frequency. It should be noted that in such cases, additional weeks of data collection may be needed in order to gather an adequate sample.

Observing Multiple Behaviors

Some of the procedures discussed in this chapter can be easily adapted for use in situations where data needs to be collected on more than one behavior. For example, a team might decide that it wants to look at Ralph's on-task behavior *and* at his whining behavior. Those two are not necessarily incompatible, since a student can be working while sobbing or making comments like "This is too hard, toooo hard." The team might want to help set goals in both areas, necessitating charting on both behaviors independently.

The time sampling chart that was shown in Fig. 2-9 is set up in such a way that charting multiple behaviors using any of the three procedures (whole-interval, partial interval, momentary) can be accomplished easily, provided that the intervals are identical. Note that any two of the procedures can be used simultaneously as well. For example, in the case of Ralph's whining and on-task behavior, whole interval charting might be used for the constant whining, and momentary time sampling could be used for the on-task behavior. Fig. 2-10 shows a completed chart on these two behaviors.

Observing Multiple Students

In much the same way that more than one behavior can be charted on the same student, the same behavior can be charted on more than one student. If Ted's case is brought to the team for consideration because of his off-task behavior, and the teacher has noted that Ted often talks to Susan when he is off-task, it might be wise to chart the off-task behavior of both. One reason is that looking at the charts on both students may shed some light on the degree to which they influence each other. Another reason is that working on the behavior of one of these two may well have an effect on the other.

Look at the data shown in Fig. 2-11. It suggests (a) that Ted is off-task more often than Susan, and (b) that Susan is only off-task when Ted is also off-task. In terms of goal-setting and strategies, both of these facts are important to know.

Figure 2-11: Time Sample Recording Form for Ted and Susan

<i>Team Time Sample Recording Form</i>			
Student(s) <u>Ted G. = T</u>		Teacher <u>Roberts</u>	
<u>Susan R. = S</u>			
Behavior(s) being Charted:			
#1 Off-task - failing to appropriately working on assigned task			
#2			
Interval Time	Whole	Partial	Momentary
9:00 - 9:15			T S
9:15 - 9:30			T
9:30 - 9:45			T
9:45 - 10:00			T S
10:00 - 10:15			T S
10:15 - 10:30			
10:30 - 10:45			T
10:45 - 11:00			T S
11:00 - 11:15			
11:15 - 11:30			T S
Total Observations:			T=8 S=5
Percentage of Intervals			T=80 S=50

Some Practical Suggestions for Making Multiple Observations

1. Reserve the use of multiple observations for teachers who have used the measurement procedure before on a single student or single behavior. As valuable as they can be, multiple observations do require that the person feel confident in their ability to track a behavior. Asking for too much data or what appears to be complicated data from a

novice observer can overwhelm the teacher.

2. Consider lengthening the intervals to be measured in order to allow sufficient time for charting. Five-minute intervals can be hard to chart when two students are involved.

3. Consider whether multiple behaviors are incompatible. It wouldn't make much sense to chart out-of-seat and on-task seatwork for the same whole intervals, since if one is happening the other cannot. Note, however, that partial interval recordings might make sense for both of these during the same intervals (i.e. Tom could be out of his seat at some time during a 10 minute interval and could also be on-task at some time during that same interval.)

Displaying the Results of Observations

Some data is straightforward enough to understand by just glancing at it, and there is no need for the team to require graphs or additional manipulation. (This is one of the ways in which the team differs from a behavioral consultant, who is likely to routinely graph all data which is collected. The team tries to expedite matters and minimize the paperwork burden.) The data shown in Figure 2-11 exemplify this approach.

Fig. 2-11 Tallies on John's Fighting for One Week

Team Event Recording Form	
Student <u>John R.</u> Teacher <u>Applebee</u> Room _____	
Behavior being Charted: <i>John strikes another student either in anger or to provoke a fight</i>	
Date <u>3/3</u> Start Time <u>8:30</u> Stop Time <u>2:30</u> Tally //// //	Date <u>3/4</u> Start Time <u>8:30</u> Stop Time <u>2:30</u> Tally //// ///
Total <u>7</u>	Total <u>8</u>
Date <u>3/5</u> Start Time <u>8:30</u> Stop Time <u>2:30</u> Tally //// //	Date <u>3/6</u> Start Time <u>8:30</u> Stop Time <u>2:20</u> Tally //// ///
Total <u>7</u>	Total <u>8</u>
Date <u>3/7</u> Start Time <u>8:30</u> Stop Time <u>2:30</u> Tally //// //	Date _____ Start Time _____ Stop Time _____ Tally
Total <u>7</u>	Total _____
Date _____ Start Time _____ Stop Time _____ Tally	Date _____ Start Time _____ Stop Time _____ Tally
Total _____	Total _____

However, there are some times when data needs to be translated and/or plotted for it to make sense. Applied behavior analysts have devised many sophisticated techniques for data display (see -----, 19-- for examples) . In this chapter, only those which are most appropriate for teachers working in classroom settings and on teams will be discussed.

Percentages

When data is collected (e.g.) on a daily basis for one week, we often assume that the opportunity for the behavior to occur is virtually identical on each day. For example, if we give a daily spelling quiz and there are 15 words each day, then we are talking about an opportunity for 15 answers per day. Under such conditions, simply reporting the number correct is adequate.

But in situations where the number of opportunities for the behavior to be displayed varies from day to day, we need to first translate the raw scores into percentages. The data in Figure 2-12 exemplify this approach.

Figure 2-12 Results of Norma's Daily Spelling Quizzes over Two Weeks

Week 1	Mon	Tues	Wed	Thurs	Fri
# Correct	6	7	6	5	6
# Problems	10	10	10	10	10
% Correct	60	70	60	50	60
Week 2	Mon	Tues	Wed	Thurs	Fri
# Correct	5	8	13	12	16
# Problems	12	14	18	20	24
% Correct	42	57	72	60	66

It would be seriously misleading to compare Norma's raw scores (# Correct) over the 2 week period. While this would be adequate throughout the first week when 10 problems were given each day, what would appear to be major gains during the second week would actually be almost no gain at all because of the increase in opportunities (problems). The "% Correct" row gives the most accurate picture.

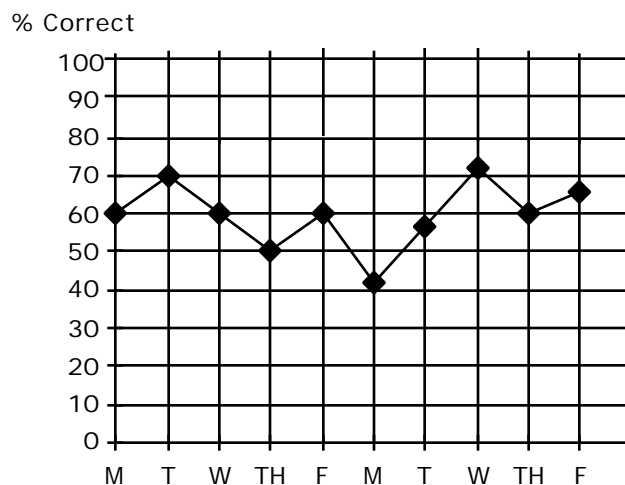
Most teachers intuitively understand and recognize the situation

portrayed above because it is fundamental to the grading procedures which they use regularly. But when social behaviors are being charted, many people fail to recognize that the same principles apply. If Theo raises his hand and waits to be called on before answering a question 9 times on Monday and 4 times on Tuesday, we must also know something about the opportunities for hand raising before we can say anything about his cooperation with a hand-raising rule. A simple tally, in this case, would be very misleading. The teacher must also keep track of the number of questions which were presented to the class as a whole, so that a percentage of opportunities for hand raising can be computed. Obviously, we would come to very different conclusions if we knew that the teacher asked 12 questions on Monday (75% hand raising) or if 27 questions were asked (33% hand raising).

Graphing

When data is not easy to understand from just glancing at the charts on which it was recorded, it is usually necessary to plot the data on graphs. For most purposes, simple "XY Graphs" are sufficient. Figure 2-13 is a graph depicting Norma's spelling data (shown in raw format in Figure 2-12).

Figure 2-13: Graph of Norma's Spelling Data (from Figure 2-12)

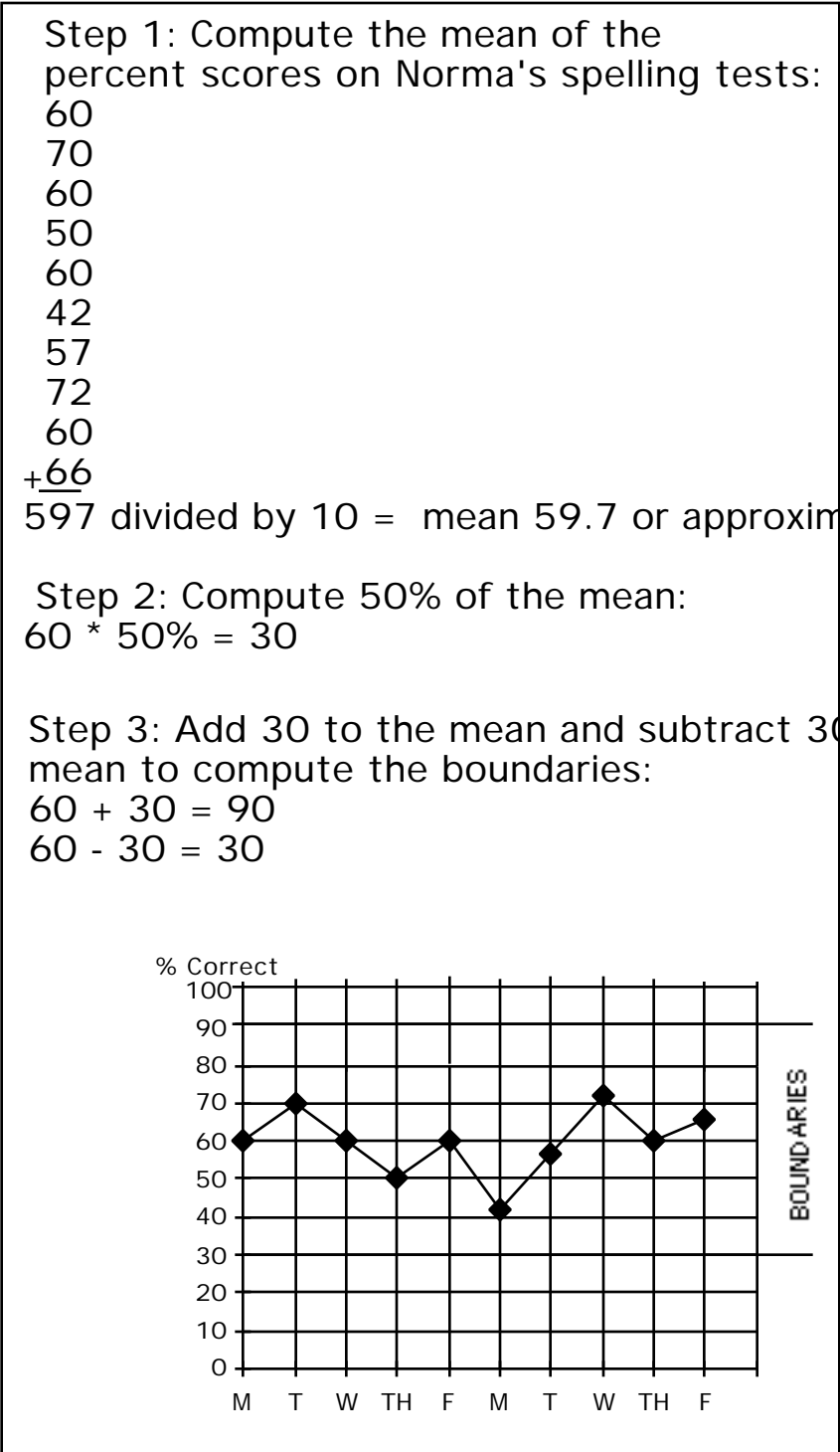


As can be seen from the graph in Figure 2-13, Norma's performance has been *relatively stable* over the two weeks shown. Relatively stable ? Relative to what criterion?

While there is no hard and fast rule regarding stability, the author uses a rule-of-thumb which states "If no data point lies outside of the mean plus or minus 50%, the data is sufficiently stable for baseline." This is easy to calculate and has been shown to be adequate for most situations.

Calculation of this criterion is shown in Figure 2-14. As can be seen in Fig. 2-14, all of Norma's spelling data points lie inside the area which is plus or minus 50% of the mean.

Figure 2-14: Calculation of the Boundaries for Norma's Spelling Scores



What if one or more of the data points had been outside the criterion

lines? Once again, there is no hard and fast rule concerning this but in most cases it means that additional baseline data should be collected. The main reason is that the team needs to be sure that performance which is much higher or much lower than mean performance is not part of "normal performance". Remember that we have already defined "normal" or "typical" performance as including up to a 50 % spread on either side of the mean. If higher or lower performance is part of what's normal, then the team can account for this when setting goals.

Realistic Goal Setting

Once the team members feel that they understand what constitutes the student's normal baseline performance, they can attend to setting a realistic goal for changing that performance. But what is realistic when it comes to goal setting? Is it more than just common sense?

Two important considerations need to be taken into account in the setting of realistic goals. They are:

- a) *What is normal behavior for other students in this class?*
- b) *How much time will be allotted for changing the behavior?*

If the teacher and team are concerned about Tommy's out-of-seat behavior (between 21 and 26 times per day) because it interferes with his completion of his seatwork, then one of the first considerations must be "How often are other students out-of-seat"? If a typical student in this teacher's third grade class is out-of-seat about six times per day, this says something important about the classroom climate and what should be expected of Tommy. It would be unrealistic to expect him never to leave his seat. After all, the other students feel that it's OK to roam now and then. A more realistic goal would be about five or six out-of-seat behaviors.

Determining how often other students in the room are out-of-seat is fairly

easy. Just observe a student or two whom the teacher feels are typical students for a few days, and use the mean for them as the measure of what's normal.

The second major issue (time allotment for change) is equally important. If Tommy was pulling a knife out and threatening other students, the team would undoubtedly work on eliminating that behavior immediately. But he's only out-of-seat, and while this may be a nuisance it's not critical that it be reduced to five or six times within a day or even a week. It's probably OK to set a goal of "no more than five out-of-seat behaviors per day one month from now" and to use procedures that will gradually reduce the out-of-seat behavior.

The setting of realistic goals is very important for the team's credibility as well the student's success. Rapid improvement in student performance may be exciting and dramatic, but if it costs too much in time or intensity of the effort, the team's reputation will suffer accordingly.

Anecdotal Records

Although they do not produce the same type of data as the other recording procedures discussed in this chapter, anecdotal records can be an important source of information about the typical behavior of students. When taken systematically, anecdotal records can lead to insights which team members would not otherwise attain.

Good anecdotal records include three parts:

- *A description of the antecedents to the behavior* - What happened immediately before the behavior occurred that might have triggered it?
- *A description of the behavior itself* - For example, if a tantrum is being described, what were the component behaviors (whining, crying, shouting, throwing, running, etc.)
- *A description of the consequences* - What did the teacher do in response to

the behavior? How did other students react?

Writing down all of this information as soon as possible after the event, along with the date, time, location of the event, and names of relevant others who were present can be most useful. When such data is collected immediately following several episodes, patterns may emerge which were not apparent when isolated episodes were considered.

References