APPENDIX I

Precision Decisions for the Timings Chart

Data-Driven Decisions for Performance-Based Measures within Sessions

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Performance-based measures of a behavior reflect not only the behavior's *correctness,* but the *speed* at which it occurs. The basic unit of measure is *movement per minute* or *count per minute*.

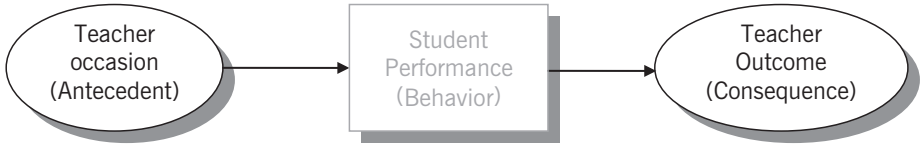
PHASES OF LEARNING AND TEACHING DURING A PROGRAM SESSION

During a student's program session, two phases of learning and teaching occur: (1) instruction/correction and (2) practice (performance-based measure). Total length of the session is no more than 10 minutes, unless otherwise specified.

Instruction/Correction

The instruction/correction phase is based on discrete-trial teaching or direct instruction materials. Instruction may happen at the beginning of each session and between each timing, but not during a timing.

Each set of instructions or corrections is a volley between student and instructor, which has a specific instructional sequence. An elementary instructional sequence is as follows:



The teacher–student volley is structured around the student's performance behavior. The teacher should adjust the instruction and feedback according to the student's behavior. The teacher should have clear and concise instructions, and the student's behavior must be measurable.

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Practice

> **"The learner knows best."**
> **—Ogden Lindsley**

The practice phase is based on Precision Teaching (PT) and frequency building; it consists of performance-based measures. PT is a teaching technology based on the principles of behavior analysis. It is not a curriculum, but rather a way to evaluate specific instructional strategies for each individual student by using behavioral measures. Its foundation is "The learner knows best," as Ogden Lindsley used to say. It looks at a student's behavior concretely, so that it can be measured and recorded quickly in a standardized way (the Standard Celeration Chart). In PT, as long as a student's learning picture is progressing, then the program is appropriate; otherwise, the program needs to be changed in some way. PT does not tell an instructor what to do, just when to try something else.

CHARTING THE STUDENT'S PROGRESS

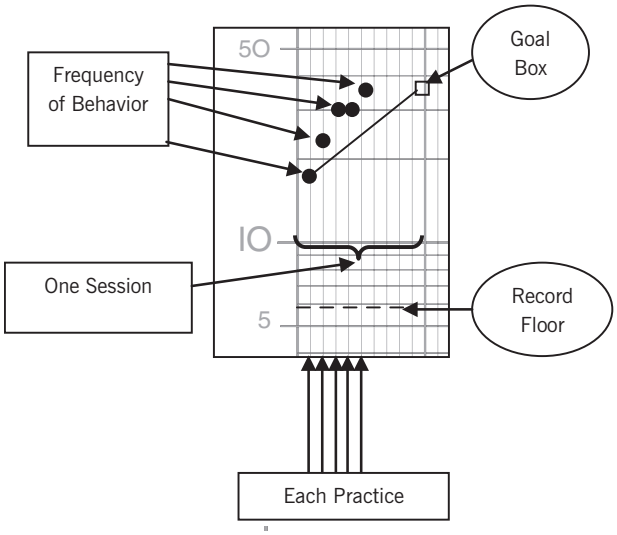
A student's performance progress is determined from two separate charts: (1) the Daily per minute Standard Celeration Chart and (2) the Timings Standard Celeration Chart. These charts are multiplicative charts, rather than the linear charts so often used. One reason these charts are used is that you can see high-frequency and low-frequency behaviors on the same chart.

Daily per Minute Chart

The Daily per minute Chart is where the student's day-to-day progress is monitored. This is the chart on which overall performance aims are set, starting point is set, and minimum celeration is determined. Daily goal aims can be determined as well.

Timings Chart

The Timings Chart is for making decisions within a program session. The scale that runs up and down on the left indicates the frequency of the behavior being charted. Each vertical line allows for each timed practice during a session. The sessions are broken up by the darker blue lines. Not all lines may be used if a session ends before nine practices.



CHARTING THE COURSE ON THE TIMINGS CHART

The Team and Targets

At the bottom of each timings chart, there is space to put information about the student, and the program personnel, and the behavior. *Performer* is generally the student. *Charter* is the person who is charting. *Counted* is the behavior being counted (e.g., "See/say words in isolation"). *Counter* is the person counting the behavior. *Manager* is the person who manages the program. *Advisor* is the person who is advising the manager, and *Supervisor* is the person who runs the organization. The top of the chart should list the month and day the session is being run, the time (if the program is run more than once per day), and the slice or lesson being conducted.

Setting Aim

For a new program, or a major change in a program, the instructor should get the student's baseline and compare it with the performance standard of the program or predetermined goal for the student. The session should be labeled "SET AIM"; three timings should be completed; the best or average performance should be placed on the daily chart (manager's decision); and a minimum celeration line should be determined by the manager. The daily performance goal will be established by the minimum celeration line crossing the specific day of the week. The line will cross at a specific frequency, which is the daily performance goal.

Daily Performance Goal

The daily performance goal may be obtained from the daily chart or otherwise specified by the instructor. A staff member should place a goal box on the timings chart at the correct session block. This daily performance aim is the frequency of correct responding the student should achieve by the end of the session. It is determined by examining past performances.

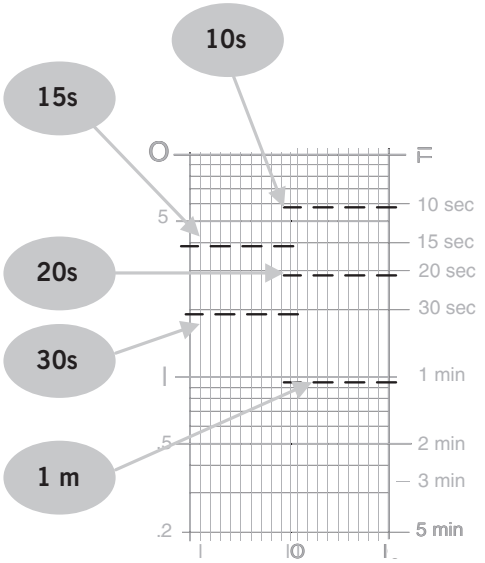
Record Floor

Each timing is specified by the program for each individual student. A timing may last 10 seconds 15 seconds, 20 seconds, 30 seconds, 1 minute, or longer. Depending on the length of time, there may need to be a conversion to 1 minute to standardize all the charts.

Conversions:

10 seconds → # × 6 = #/minute
15 seconds → # × 4 = #/minute
20 seconds → # × 3= #/minute
30 seconds → # × 2 = #/minute
2 minutes → # ÷ 2 = #/minute
5 minutes → # ÷ 5 = #/minute

The *record floor* is based on the length of the timing. It is the lowest non-zero score that can be obtained, and the number that is needed to a convert to count-per-minute score. For example, if a student was timed for 15 seconds and performed only 1 behavior, to convert this to a count per minute, we would multiply 1 × 4. So the lowest score possible would be 4. Another example (see the adjoining illustration) has the record floor on the 6 line, which means it was a 10-second timing. The first practice score was 3 in 10 seconds (3 × 6 = 18) recorded as 18 per minute. The record floor can be stable or constant for a particular session, or it may change (e.g., four 10-second timings and 1-minute timing). But there's no need to worry: On the right-hand side of the timings chart, there are labels to indicate the correct lines for the most common floors. A line should be drawn just under the corresponding line on the chart (see the illustration).



Timing the Target Behavior

After the initial instruction, practice should begin. The program should have a designated time for the practice. The instructor should begin the timing by saying, "Please begin," and start a timer. This is for pacing, not racing. At the end of the time period, the instructor should say, "Please stop." The instructor should count correct responses and incorrect responses (errors).

Plotting the Student's Performance

The instructor should make any conversions to 1 minute if necessary. The timings chart should be marked with a '•' denoting corrects and a '×' denoting errors with conversions. If no errors were made, place a '?' or '×' just below the record floor. (This will note a zero score; there is no zero on the chart.). After each timing, corrects, errors, and the record floor should be plotted on the chart.

After the First Time, Drawing the Line

Every session (except for the "SET AIM" session), after the first timing is completed and the data have been plotted for corrects and errors, draw a line between the correct dot and the goal box. This is the student's minimum celeration line. The goal for the session is to keep the student at or above the line until he or she reaches the frequency recorded in the goal box.

PRECISION DECISIONS

When Do You Stop?

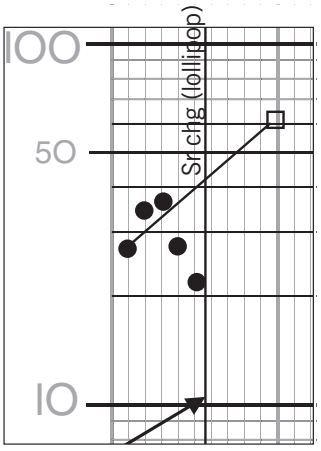
1. When the dot meets the box, you can stop.
   - This means that on any particular timing, if the student meets or exceeds the goal box frequency, the session can stop. If the student meets this on the first timing, the session can still stop. The manager may want to evaluate the student's learning picture for the future.
2. When the time has diminished, you are finished.
   - This means that if the time allotted for the program session is over, even if the student has not met the goal box, you should stop running the program. There probably needs to be a change that the manager needs to consider.

Do You Know When to Go?

3. At or above the line, do another time.
   - This means that the student is progressing toward the goal. He or she is making adequate gains to achieve the daily performance goal. Continue to get appropriate feedback, and provide another timing.
4. Once below the line is just fine.
   - Often one time under the line doesn't mean that the student is not making progress. Make sure that you have the student's attention and that he or she is prepared to go (finger following along, enough materials, etc.).

When Should You Make a Change?

5. Twice below, the reinforcer should go.
   - If the student was making successive approximations toward the goal and then drops off, motivation is generally the key. Rethink the reinforcer. Do a reinforcer survey; is there a more motivating activity or item? Try something new!
   - If a change is being made, draw a phase change line and state the change. In the example chart, the parents changed the reinforcer to a lollipop.



Phase Change Line

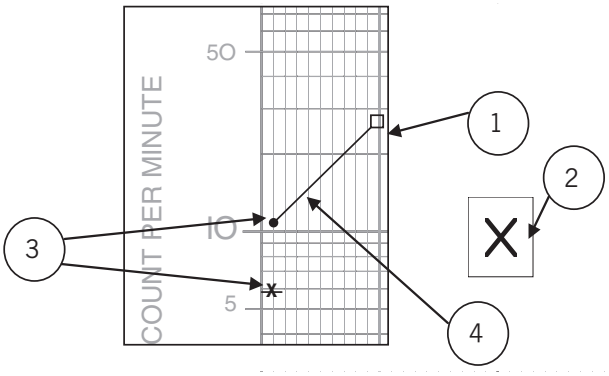
When Do You Ask for Help?

6. Three times or more, the manager must explore.
   - If the student falls below the line three times in a row, ask for help. The teacher or manager should try to vary the program in some way. If the teacher is able to help during a session, be sure to put a phase change line in, and state the change as well. (Stimuli may change, duration of timing, etc.).

END OF THE SESSION

At the end of the session, the best score from the Timings Chart should be transferred to the Daily per minute Chart. If the student is at or just above the celeration line, continue sessions. If the student has met his or her program aim, or the student is below or way above the celeration line, notify the teacher or manager of the situation.

SUMMARY/QUICK TIPS



Within Sessions

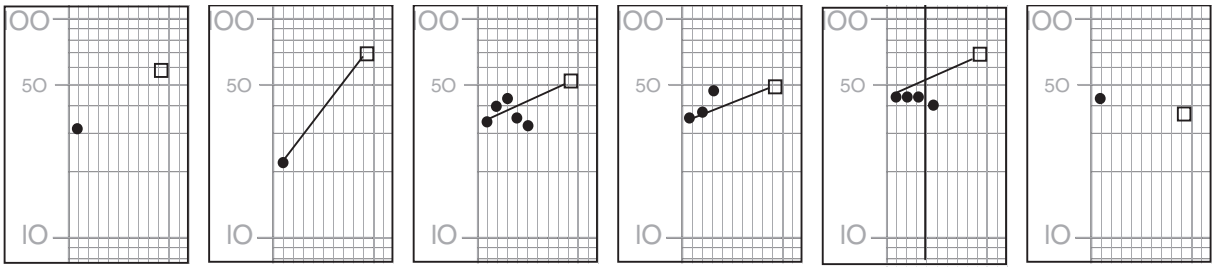
Charting the Course

1. Draw the box so the data "talk."
2. Time the target (behavior).
3. Plot the dot (student's performance).
4. After the first time, draw the line.

Precision Decisions

- When do you stop?
  1. When the dot meets the box, you can stop.
  2. When the time has diminished, you are finished.
- Do you know when to go?
  3. At or above the line, do another time.
  4. Once below the line is just fine.
- When should you make a change?
  5. Twice below, the reinforcer should go.
- When do you ask for help?
  6. Three times or more, the manager must explore.

What Should You Do?



Things to Remember

- Plot both corrects and errors.
- Plot the record floor.
- After each timing, make a decision.
- Don't forget to instruct between timings.
  - Tell the student what he or she is doing right too!
- Always be prepared to vary the possible reinforcers.

APPENDIX 2

Using the Timings Chart to Make Within-Session Decisions

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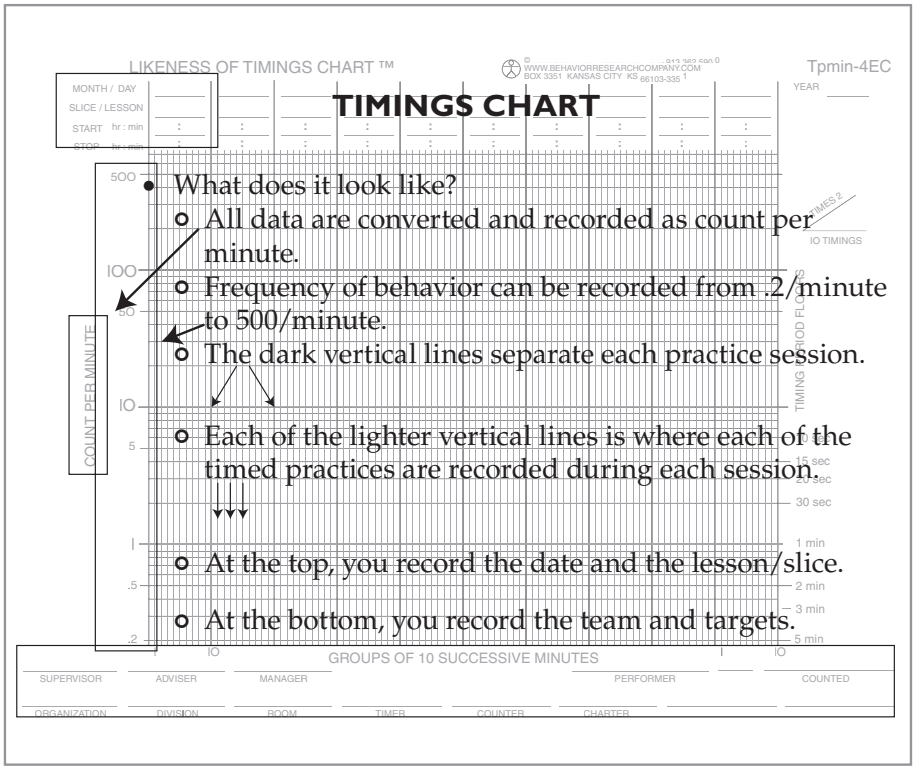
TWO TYPES OF DECISIONS

1. Timings sessions.
   - First level of decision making.
   - Timings Standard Celeration Chart is used.
2. Across sessions.
   - Decisions are based on learning pictures.
   - Daily per Minute Standard Celeration Chart is used.



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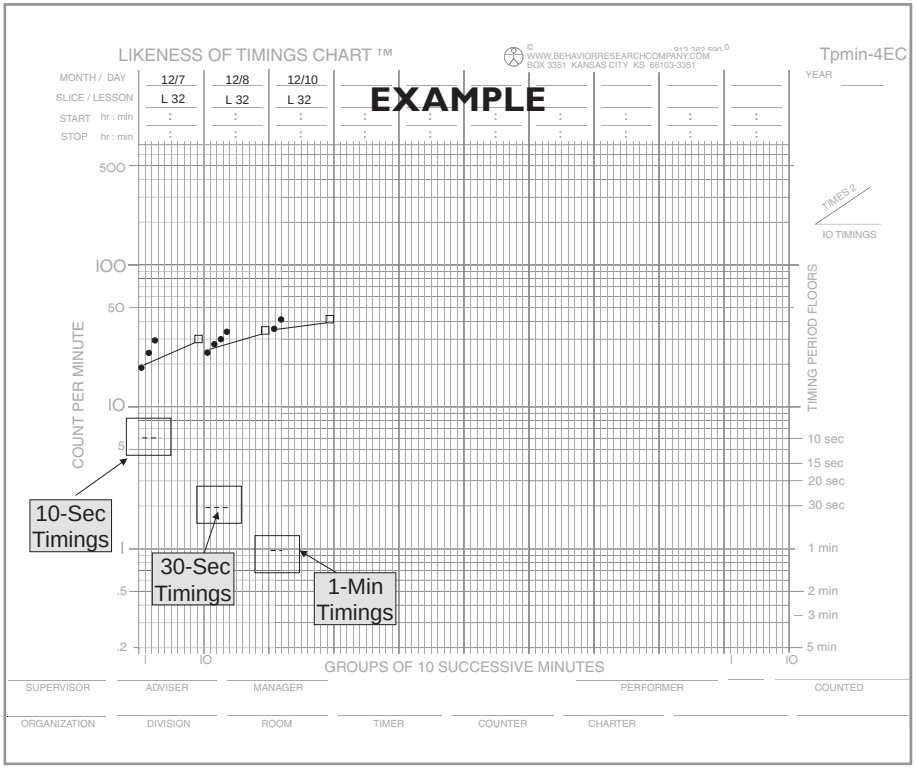
WITHIN THE SESSION

Decisions to make during practice

RECORD FLOOR

- The record floor is based on the length of the timing.
  - A timing can last 5 minutes, 1 minute, 30 seconds, 10 seconds, etc.
  - The recent floor denotes the lowest possible non-zero score.
  - It is a line just under the counting floor line.
    - Place floor line on correct practice line.



THREE BASIC DECISIONS (BASED ON DATA PATTERNS)

- Stop.
  - Student met goal for day or timed out.
  - Keep going/practicing.
  - Student performance on or above daily performance line.
- Change.
  - Consequences don't seem to be working.
- Ask for help.
  - Student performance dropped below the daily celeration line.

WITHIN SESSIONS, CHARTING YOUR COURSE

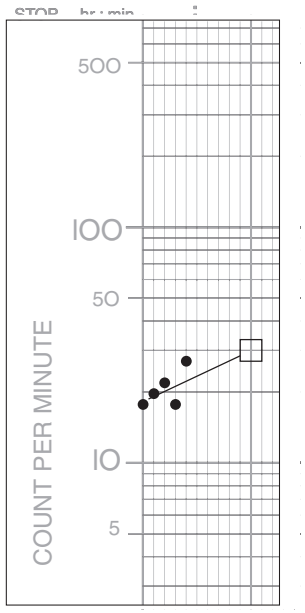
1. Draw the box so the data "talk."
2. Time the target.
3. Plot the dots.
4. After the first time, draw the line.
5. Use an incentive to keep the student attentive!

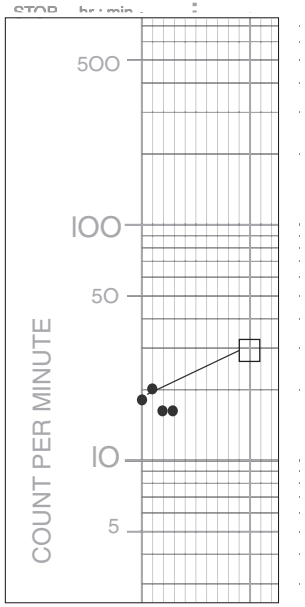
PRECISION DECISIONS

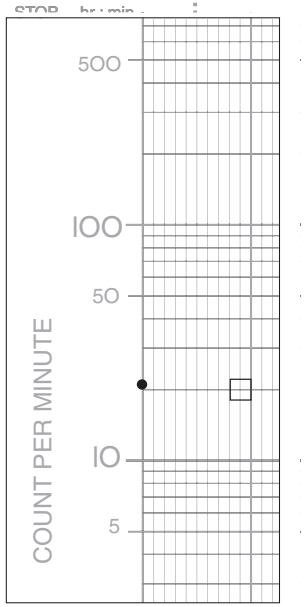
- Stop?
  1. When the dot meets the box.
  2. When the time has diminished, you are finished.
- Do you know when to go?
  3. At or above the line, do another time.
  4. Once below the line is just fine.
- Change?
  5. Twice below the reinforcer should go.
- Ask for help?
  6. Three times or more, the manager must explore.

WITHIN THE SESSION

- Decisions made after every timing
  - Compare student's performance to minimum celeration line.
- Decision about the goal box
  - Manager makes this decision; it's based on daily celeration or previous day's performance.

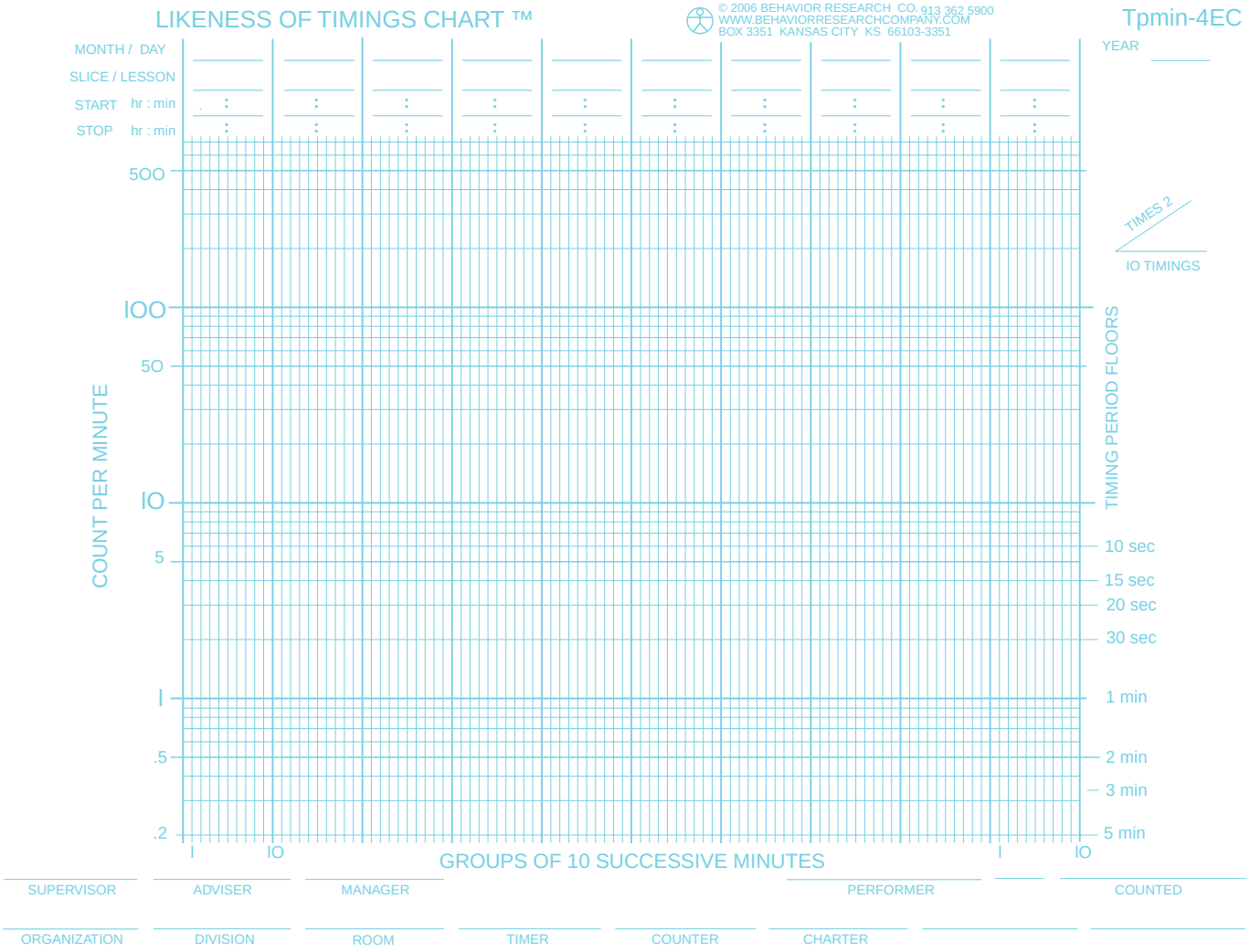



500
100
50
10
5
COUNT PER MINUTE


500
100
50
10
5
COUNT PER MINUTE

APPENDIX 3

A Timings Standard Celeration Chart



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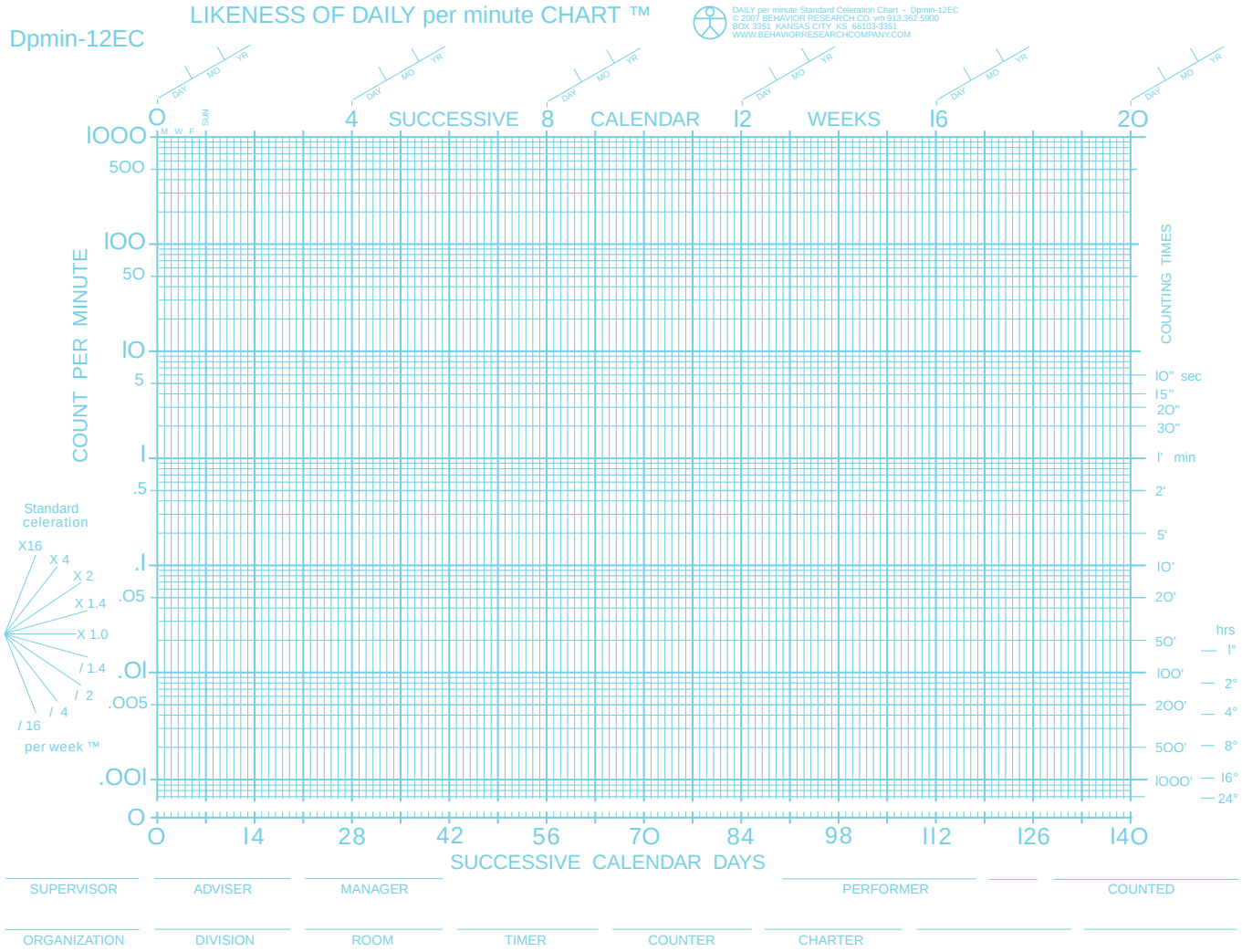
APPENDIX 4

A Daily per Minute Standard Celeration Chart



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APPENDIX 5

Exercise for Tiemann and Markle's Kinds of Learning

Using this key, identify the kind of learning from Tiemann and Markle's (1990) simple cognitive and complex cognitive domains represented by each example below.

A = Association
Se = Sequence
VR = Verbal Repertoire
C = Concept
PA = Principle Application
St = Strategy

Sometimes a context is required to classify these examples. In that case, describe the context and answer within that context.

Kind of learning	Example
	1. Given a set of sentences, circle the noun.
	2. Use a map to go to a location.
	3. Find a location by using map guide letters and numbers.
	4. Say the meaning of map symbols.
	5. Plot a point by using Cartesian (*x* and *y*) coordinates.
	6. Convert a Fahrenheit temperature to Centigrade.
	7. Convert inches on a map to miles on the ground.
	8. Use a map to find the shortest walking path between two points.
	9. Determine how goods will be distributed fairly among a group of people.
	10. Convert a measurement in English yards or miles to meters or kilometers.
	11. Tell the meaning of metric prefixes (*deca, kilo, mega, giga*, etc.)
	12. Say the names of letters of the alphabet.
	13. Say the letters of the alphabet in order.
	14. Remember "*i* before *e* except after *c*."
	15. Use "*i* before *e* except after *c*" to spell an *ie* word.
	16. Say the Pledge of Allegiance.

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Kind of learning	Example
	17. Find novel examples of *biography.*
	18. Say your phone number.
	19. Say your home address.
	20. Identify the artist who created a piece of art you've never seen before.
	21. Identify the hypotenuse of a triangle.
	22. Spell the word *boy.*
	23. Correctly punctuate a sentence.
	24. Say the Japanese equivalents of a series of English words.
	25. Count from 1 to 10 in Spanish.
	26. Tell how to take a person's blood pressure.
	27. Take a person's blood pressure.
	28. Differentiate between cases of addition and cases of subtraction.
	29. Complete a page of addition–subtraction facts.
	30. Select the theorem(s) for solving a geometry problem.
	31. Find the hypotenuse of a triangle, given the opposite and adjacent sides.
	32. Focus a camera.
	33. Tell the formula for mixing a particular color of paint.
	34. Appropriately identify own relatives as uncle, aunt, brother, sister.
	35. Match the gender of a noun and its pronoun.
	36. Match the number of the subject and verb in a sentence.
	37. Tell the meaning of symbols on a TV weather map.
	38. Tell the meaning of Latin abbreviations in reference citations.
	39. Differentiate among synonyms, homophones, and antonyms.
	40. Tell the order of succession to the presidency of the United States.
	41. Determine in a set of sentences those that are complex.
	42. Given two parallel lines that are bisected by a third line and angle *A*, find angle *B*.
	43. Predict what will happen to the price of fruit when a deep freeze destroys a substantial portion of the fruit crop.
	44. Name the state capitals of the United States.
	45. Decide whether to add or subtract in a word problem.
	46. Find the area of a rectangle.
	47. Tell the formula for the area of a rectangle.
	48. Examine a set of sentences, and use a semicolon before any conjunctive adverbs or transitional phrases that connect main clauses.
	49. Write a creative play.
	50. Give a live report of an emerging crisis.

Kind of learning	Example
	51. Tell the meanings of the symbols in the formula for finding the standard deviation of a set of numbers.
	52. Tell the formula for finding the standard deviation of a set of numbers.
	53. Find the standard deviation of a set of numbers by using a formula.
	54. Develop a recycling system that meets the unique needs of your community.
	55. Tell whose style is represented in a particular sculpture.
	56. Name six Impressionist artists.
	57. Select from a set of artworks those that are Impressionistic art.
	58. Observe vignettes of tennis players, and evaluate their grip on the racket.
	59. Differentiate between bacteria and viruses.
	60. String a guitar.
	61. Tell the order of pitches of guitar strings.
	62. Tune a guitar.
	63. Differentiate between major and minor chords.
	64. If your fire alarm sounds, take the appropriate action.
	65. Given a stroke volume and cardiac rate, calculate the cardiac output.
	66. Add fraction problems.
	67. Identify the appropriate rule to solve for x in problems of the sort "$x + b = c$" and "$ax = b$."
	68. Choose the appropriate filter to adjust the color in a photograph.
	69. Find x in statements of the type "$x + b = c$."
	70. Retell the story of *Much Ado about Nothing.*

EXAMPLES OF KINDS OF LEARNING—KEY

A = Association
C = Concept
Se = Sequence
PA = Principle Application
VR = Verbal Repertoire
St = Strategy

Variations may be acceptable, depending upon the context the student describes.

Kind of learning	Example
C	1. Given a set of sentences, circle the noun.
PA	2. Use a map to go to a location.
PA	3. Find a location by using map guide letters and numbers.
A	4. Say the meaning of map symbols.
PA	5. Plot a point using Cartesian (x and y) coordinates.
PA	6. Convert a Fahrenheit temperature to Centigrade.

Kind of learning	Example
PA	7. Convert inches on a map to miles on the ground.
PA	8. Use a map to find the shortest walking path between two points.
Sr	9. Determine how goods will be distributed fairly among a group of people.
PA	10. Convert a measurement in English yards or miles to meters or kilometers.
A	11. Tell the meaning of metric prefixes (*deca, kilo, mega, giga*, etc.)
A	12. Say the names of letters of the alphabet.
Se	13. Say the letters of the alphabet in order.
Se	14. Remember "*i* before *e* except after *c*."
PA	15. Use "*i* before *e* except after *c*" to spell an *ie* word.
Se	16. Say the Pledge of Allegiance.
C	17. Find novel examples of *biography.*
Se	18. Say your phone number.
Se	19. Say your home address.
C	20. Identify the artist who created a piece of art you've never seen before.
C	21. Identify the hypotenuse of a triangle.
A or Se	22. Spell the word *boy.*
PA	23. Correctly punctuate a sentence.
A	24. Say the Japanese equivalents of a series of English words.
Se	25. Count from 1 to 10 in Spanish.
Se	26. Tell how to take a person's blood pressure.
PA	27. Take a person's blood pressure.
C	28. Differentiate between cases of addition and cases of subtraction.
A	29. Complete a page of addition–subtraction facts.
PA/St	30. Select the theorem(s) for solving a geometry problem.
PA	31. Find the hypotenuse of a triangle, given the opposite and adjacent sides.
PA	32. Focus a camera.
Se	33. Tell the formula for mixing a particular color of paint.
A	34. Appropriately identify own relatives as uncle, aunt, brother, sister.
C/PA	35. Match the gender of a noun and its pronoun.
C/PA	36. Match the number of the subject and verb in a sentence.
A	37. Tell the meaning of symbols on a TV weather map.
A	38. Tell the meaning of Latin abbreviations in reference citations.
C	39. Differentiate among synonyms, homophones, and antonyms.
Se	40. Tell the order of succession to the presidency of the United States.
C	41. Determine in a set of sentences those that are complex.

Kind of learning	Example
PA	42. Given two parallel lines that are bisected by a third line and angle *A*, find angle *B*.
PA	43. Predict what will happen to the price of fruit when a deep freeze destroys a substantial portion of the fruit crop.
A	44. Name the state capitals of the United States.
C	45. Decide whether to add or subtract in a word problem.
PA	46. Find the area of a rectangle.
Se	47. Tell the formula for the area of a rectangle.
C	48. Examine a set of sentences, and use a semicolon before any conjunctive adverbs or transitional phrases that connect main clauses.
St	49. Write a creative play.
St (although for experienced newscasters, could be PA)	50. Give a live report of an emerging crisis.
A	51. Tell the meanings of the symbols in the formula for finding the standard deviation of a set of numbers.
Se	52. Tell the formula for finding the standard deviation of a set of numbers.
PA	53. Find the standard deviation of a set of numbers by using a formula.
St	54. Develop a recycling system that meets the unique needs of your community.
C	55. Tell whose style is represented in a particular sculpture.
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PA	60. String a guitar.
Se	61. Tell the order of pitches of guitar strings.
PA	62. Tune a guitar.
C	63. Differentiate between major and minor chords.
PA	64. If your fire alarm sounds, take the appropriate action.
PA	65. Given a stroke volume and cardiac rate, calculate the cardiac output.
PA	66. Add fraction problems.
C	67. Identify the appropriate rule to solve for x in problems of the sort "$x + b = c$" and "$ax = b$."
PA	68. Choose the appropriate filter to adjust the color in a photograph.
PA	69. Find x in statements of the type "$x + b = c$."
VR	70. Retell the story of *Much Ado about Nothing*.