

ISPI 2004 Carl Binder, PhD, CPT
Charting Results So We Can Understand and Communicate Them

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The Standard Celeration Chart in Examples



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Agenda

- Introduction and Background
- Rationale and Principles
- Illustrative Examples
- Questions and Discussion

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Reasons for Measurement

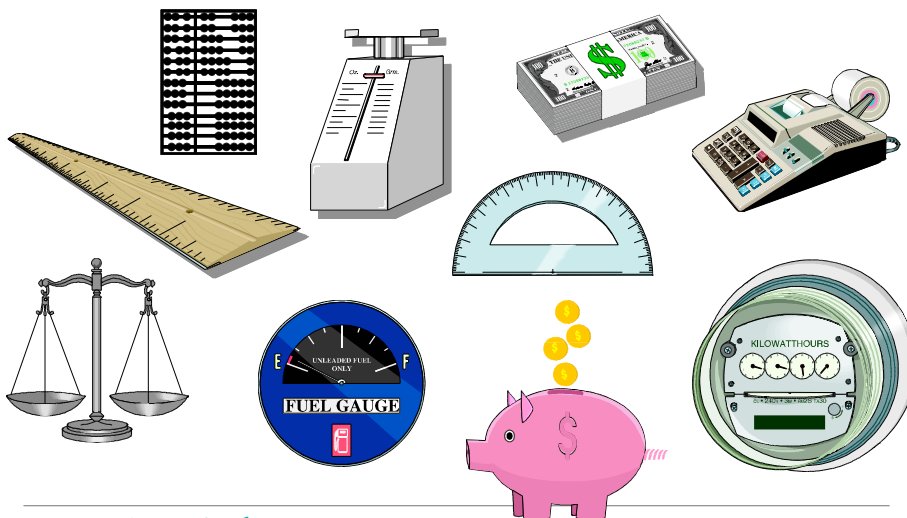
Also TYPES of Measurement

- Validation
- Accountability
- Decision-making

If you have data for making decisions, you've generally got the other two covered.

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The Foundation of Measurement is Counting with Standard Units!

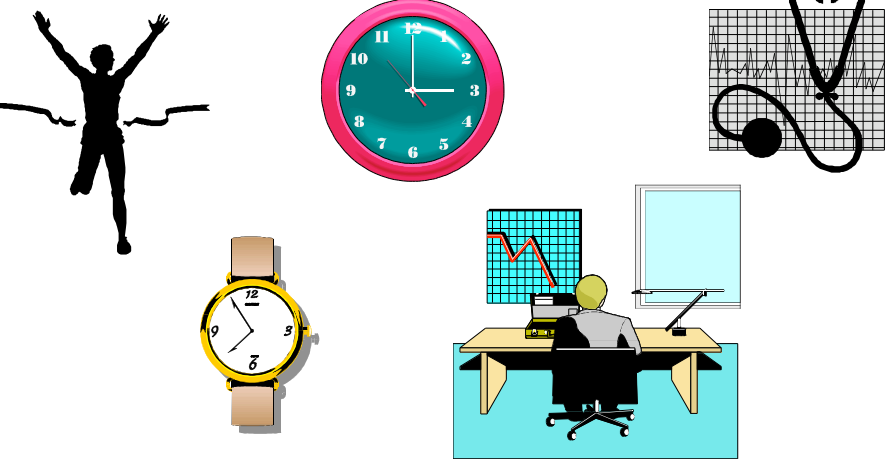


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All Performance Occurs in Time
So Don't Ignore The Time Dimension



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Choose Time Intervals to Support Your Decision-making Frequency

- **Count per minute** each day to monitor skill learning
- **Count per day** to monitor on-the-job behavior
- **Count per week** to manage at the front line
- **Count per month** for executive decision-making
- **Count per year** for macro economics and long-term strategic planning.

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Percentages are *Dangerous!*

- Can you *show* me a performance of 100% correct?
- $100 + 20\% = 120$. *What is 120 - 20%?*
(The answer is 96!)

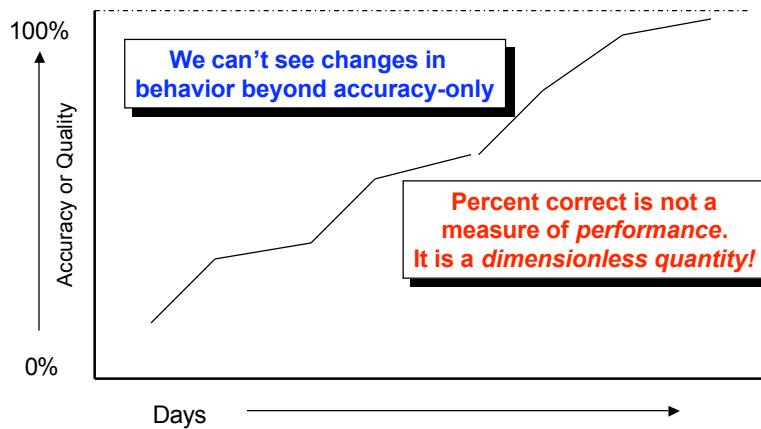
Percentage is NOT a measure of Performance.

A given percentage increase is not equal to the same percentage decrease.

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100% Accuracy or Quality *As Good as It Gets?*

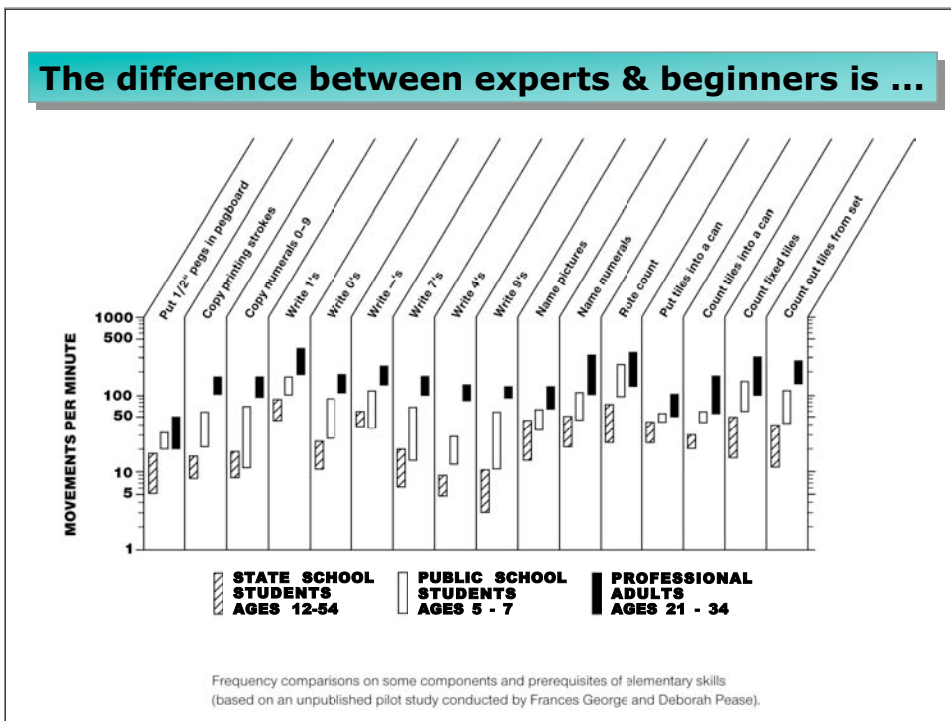
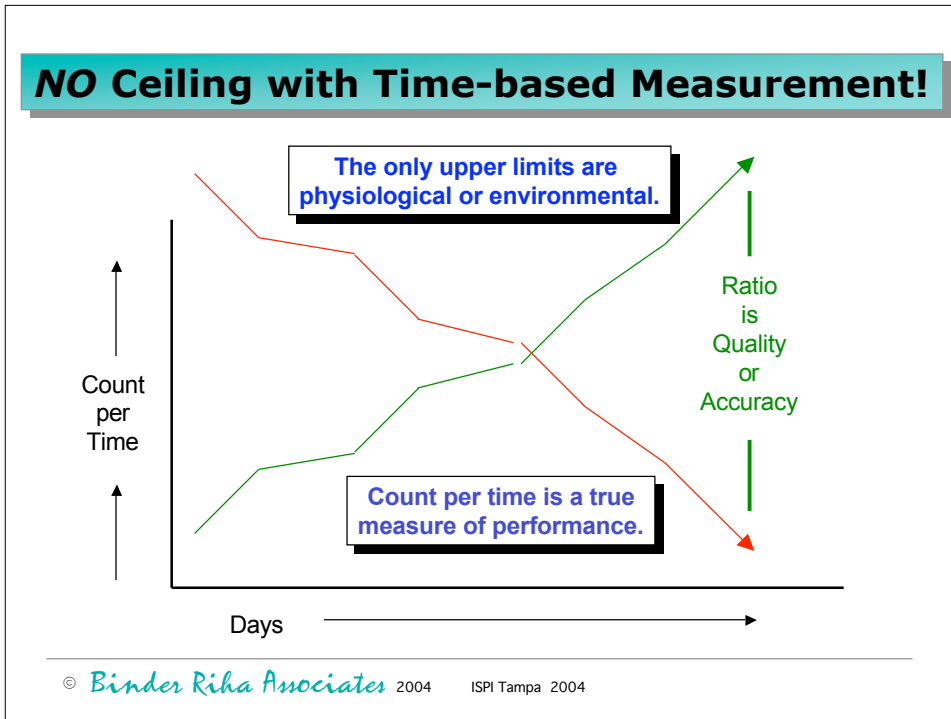
?? "Overlearning" ??



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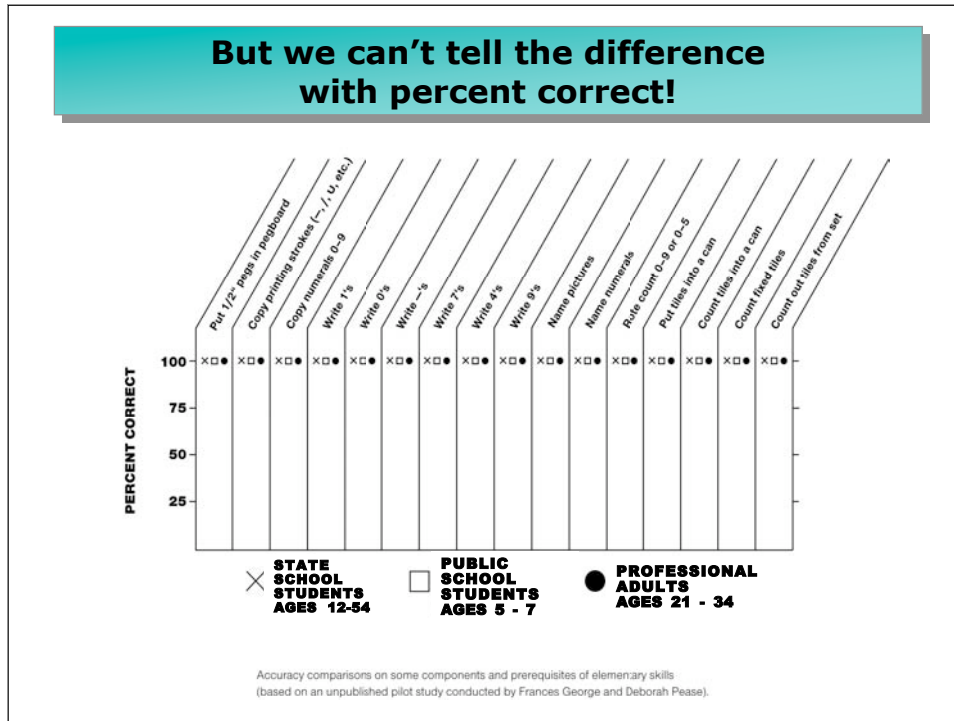
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Rule About Percentages

Have you ever seen a budget or a balance sheet without the actual dollar amounts?

If you use percentages or ratios, ALWAYS show the original counts, too.

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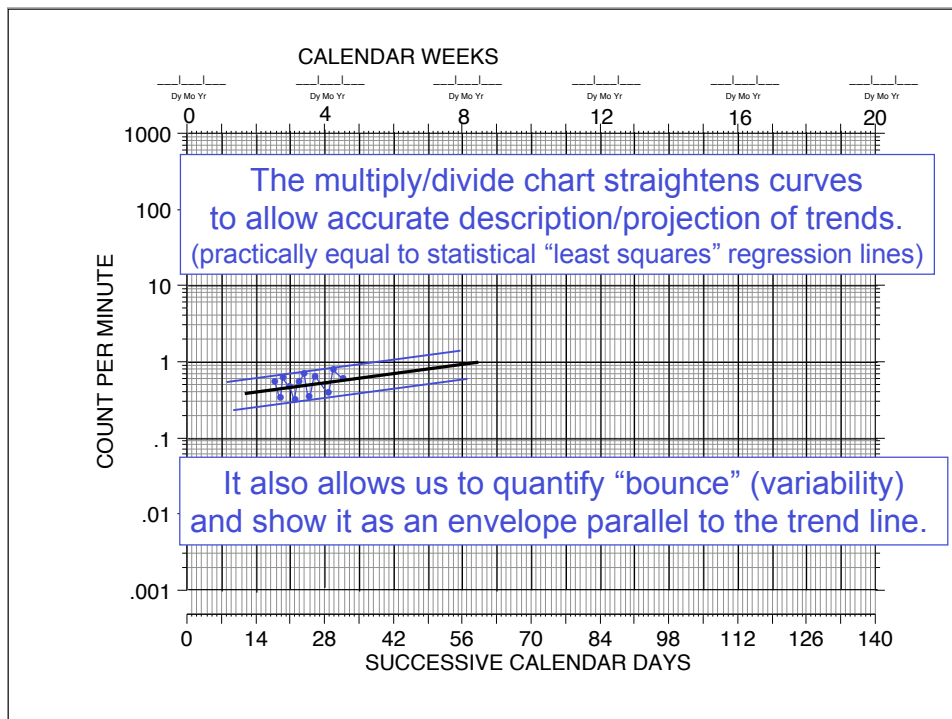
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Multiply / Divide Charts Work Best

- Performance **multiplies**, it does not add.
- Multiply/Divide charts allow us to see and quantify **trends independent of levels**.
- Multiply/Divide allows us to see and quantify **ratios and variability (bounce, range) independent of levels**.
- Multiply/Divide allows us to see **accuracy and productivity independently**, but simultaneously.

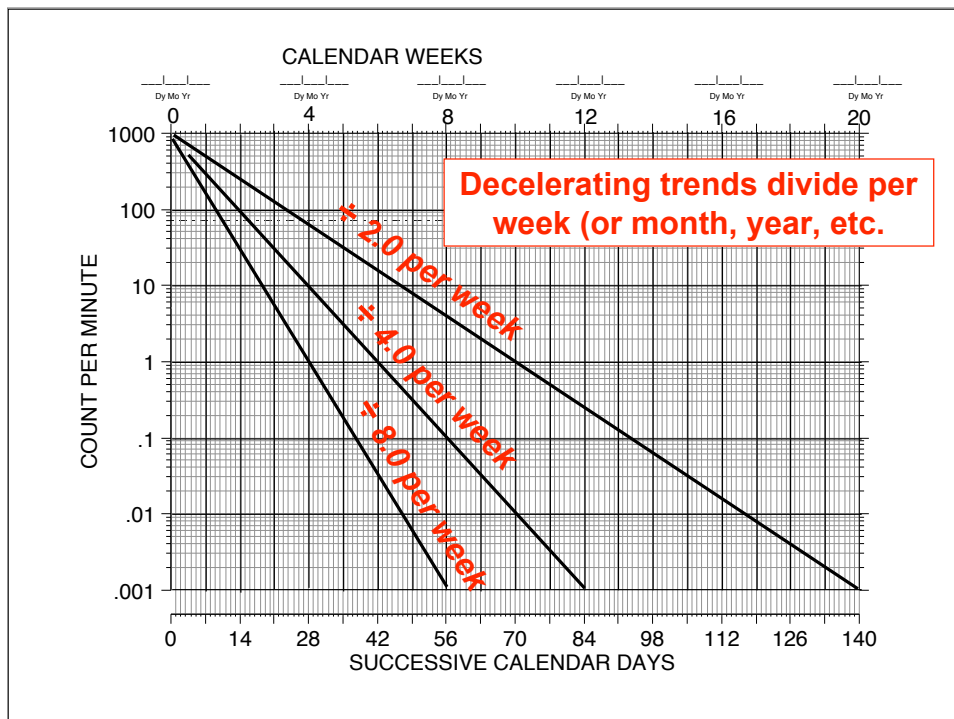
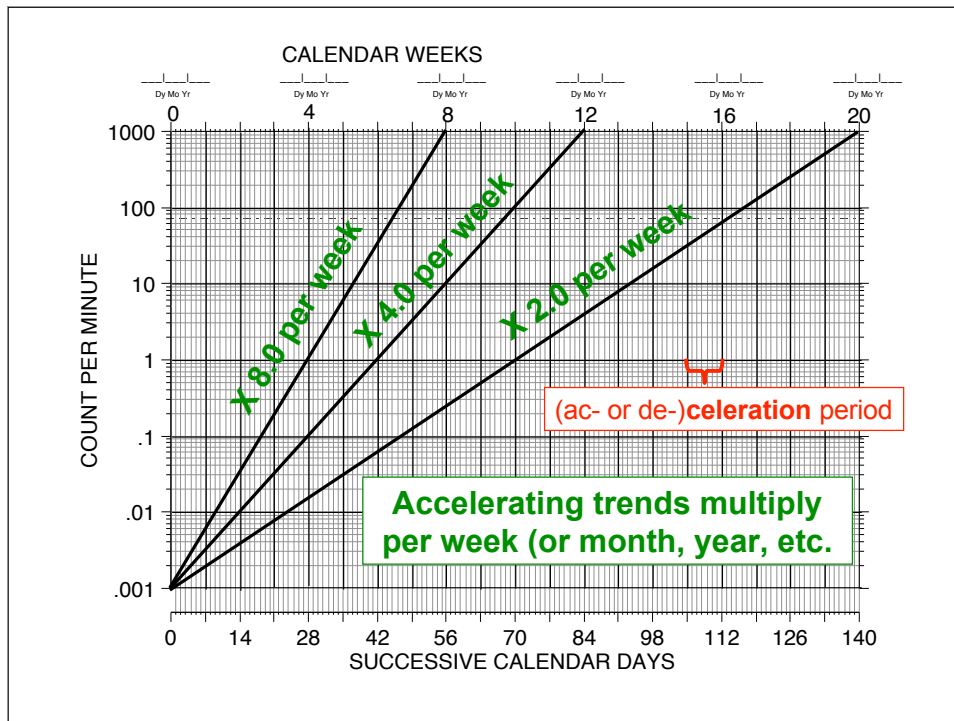
**Ogden Lindsley invented the
Standard Change Chart
(aka Standard Celeration Chart)**

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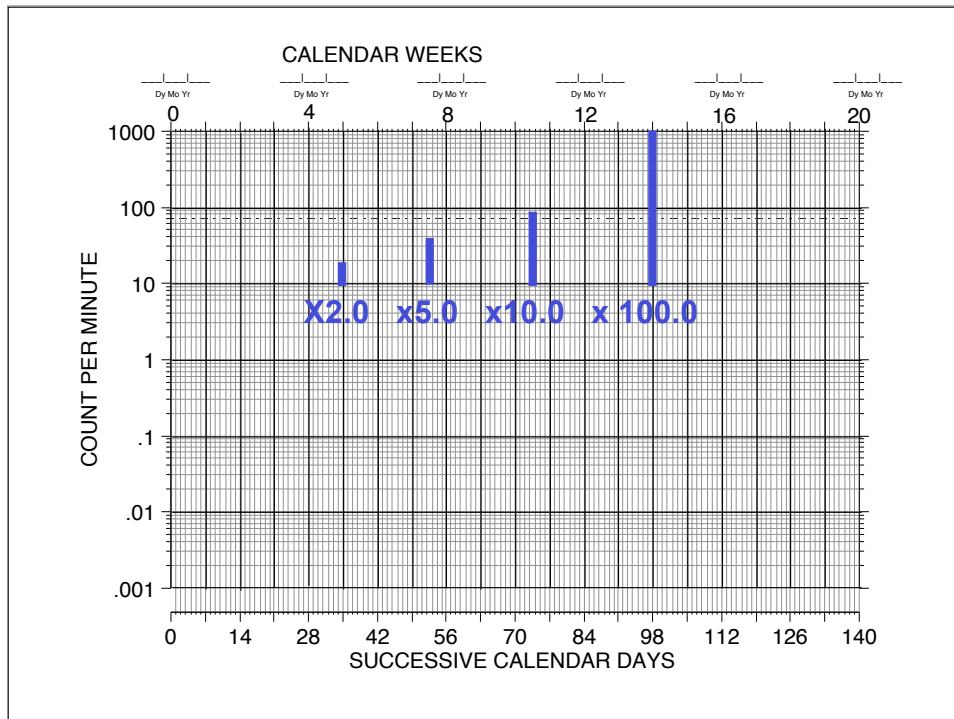
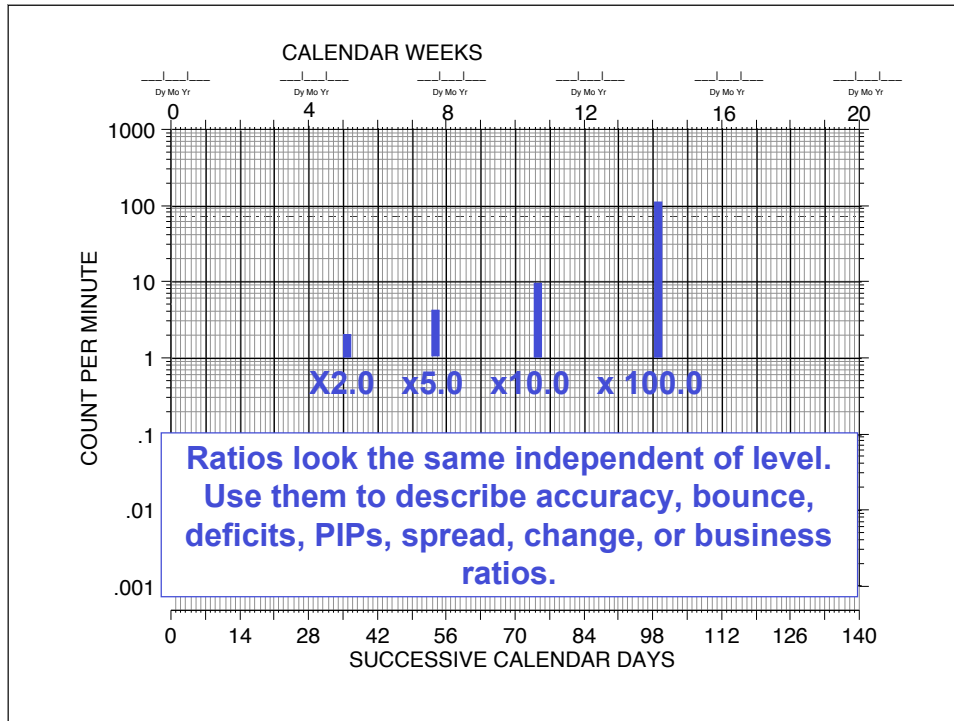
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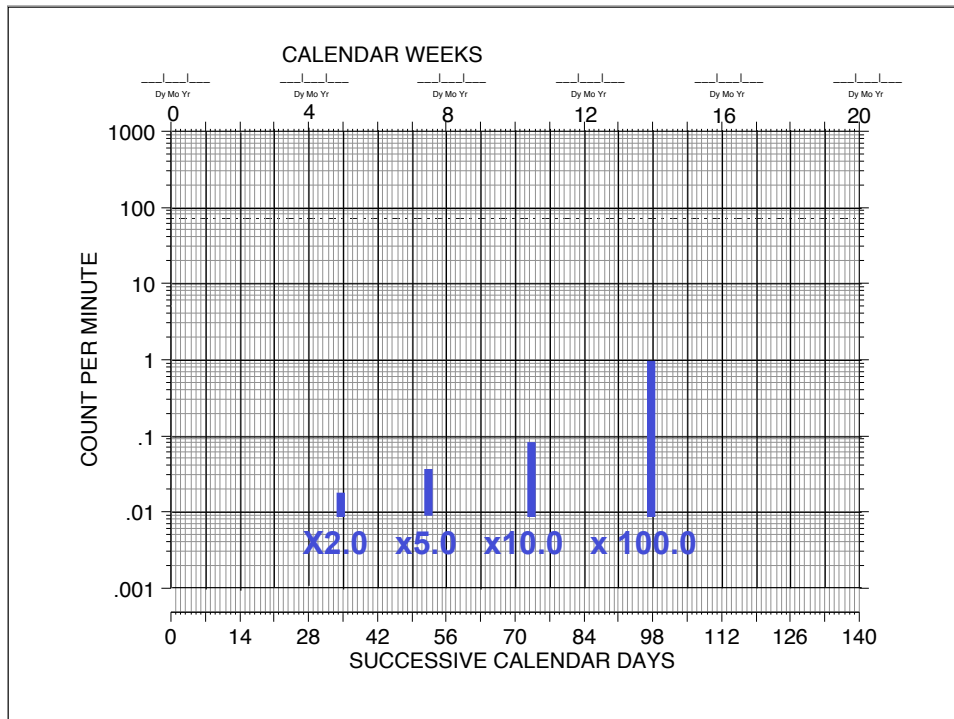
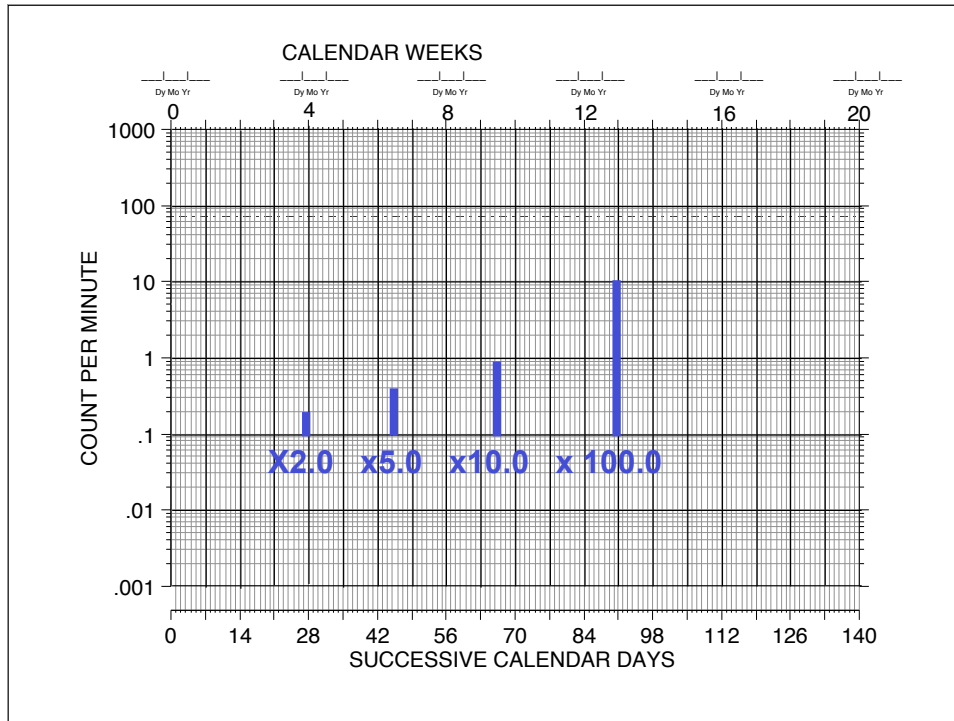
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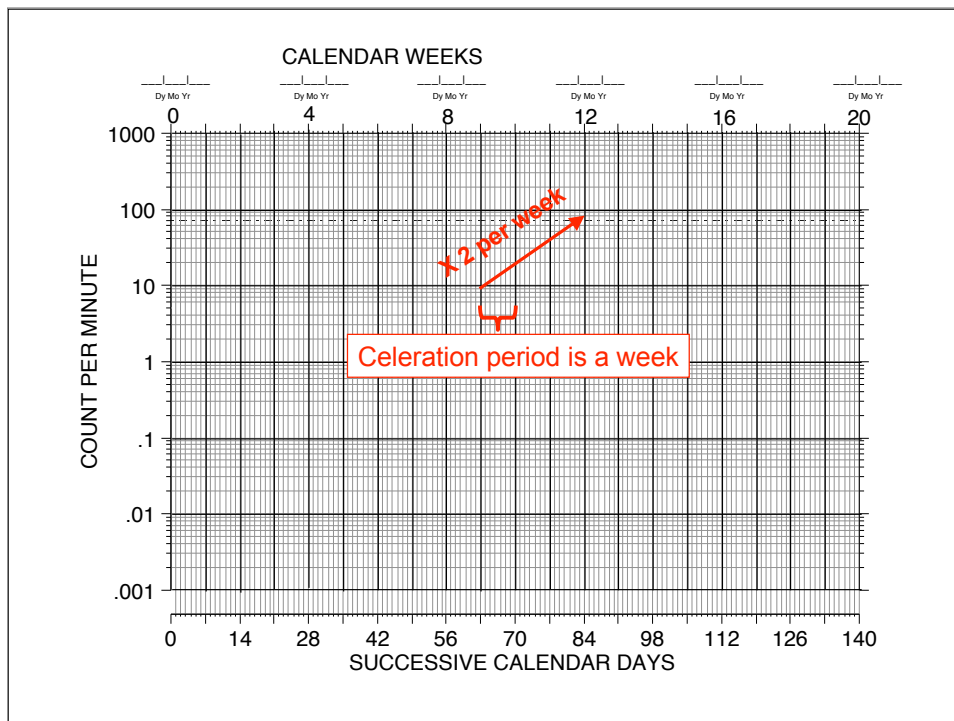
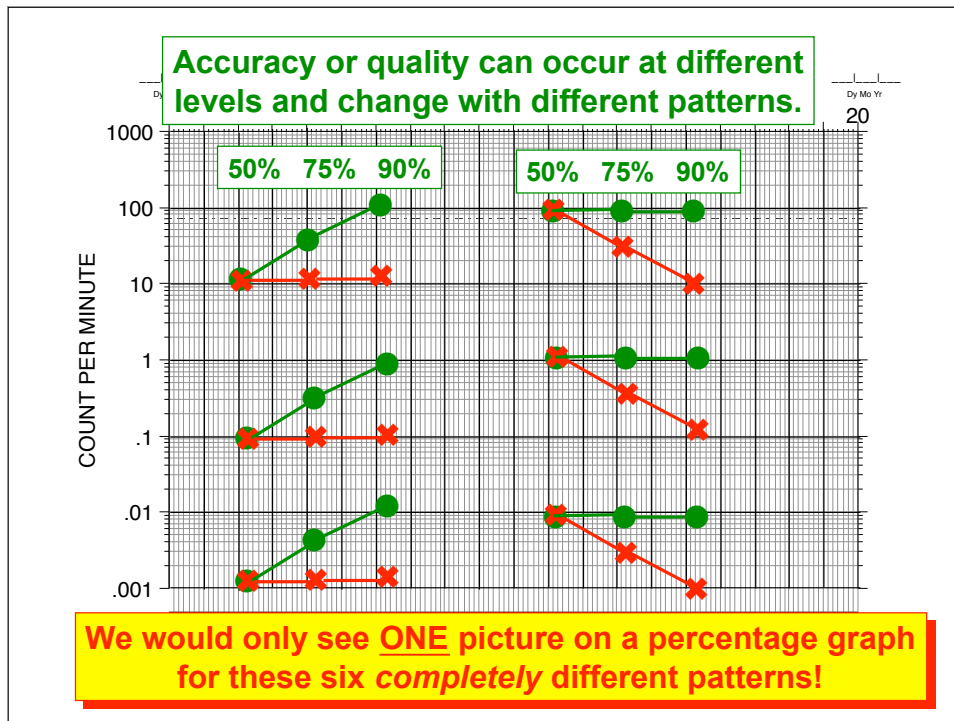
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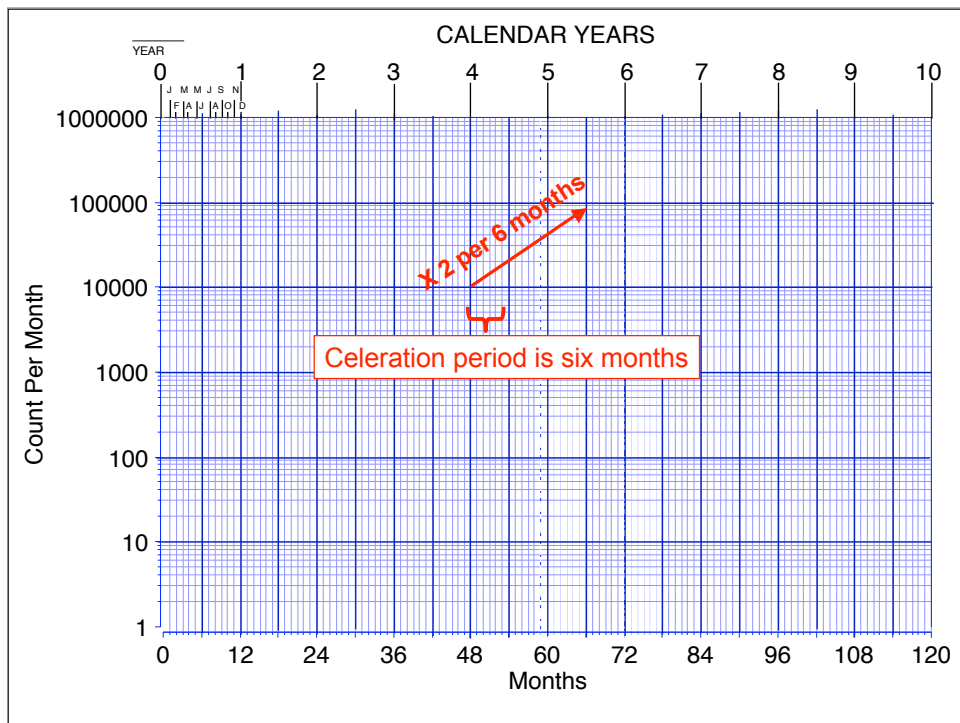
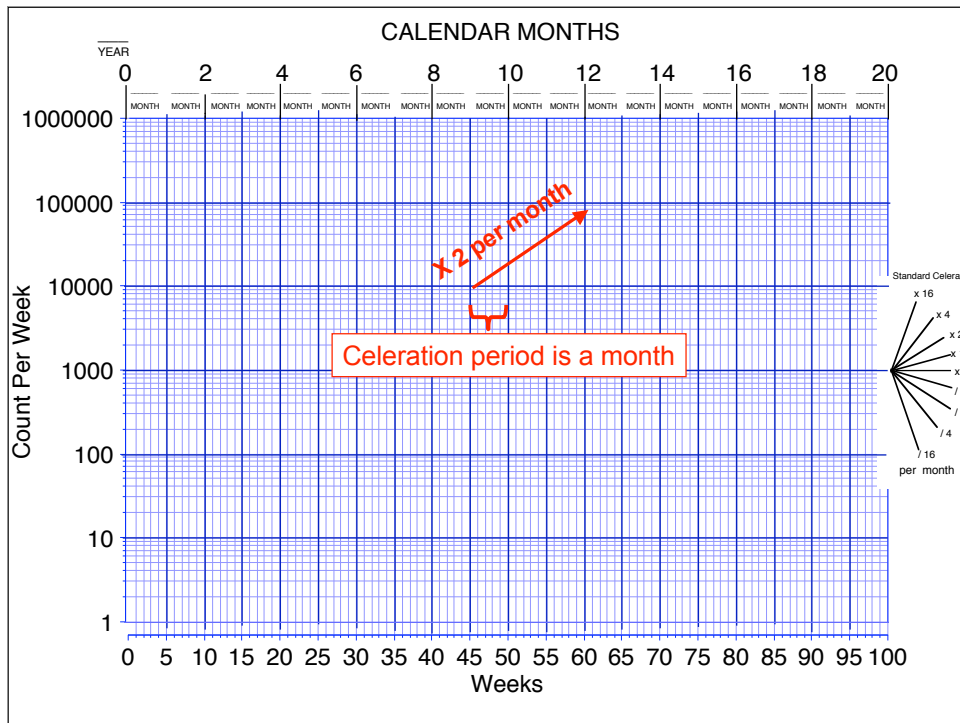
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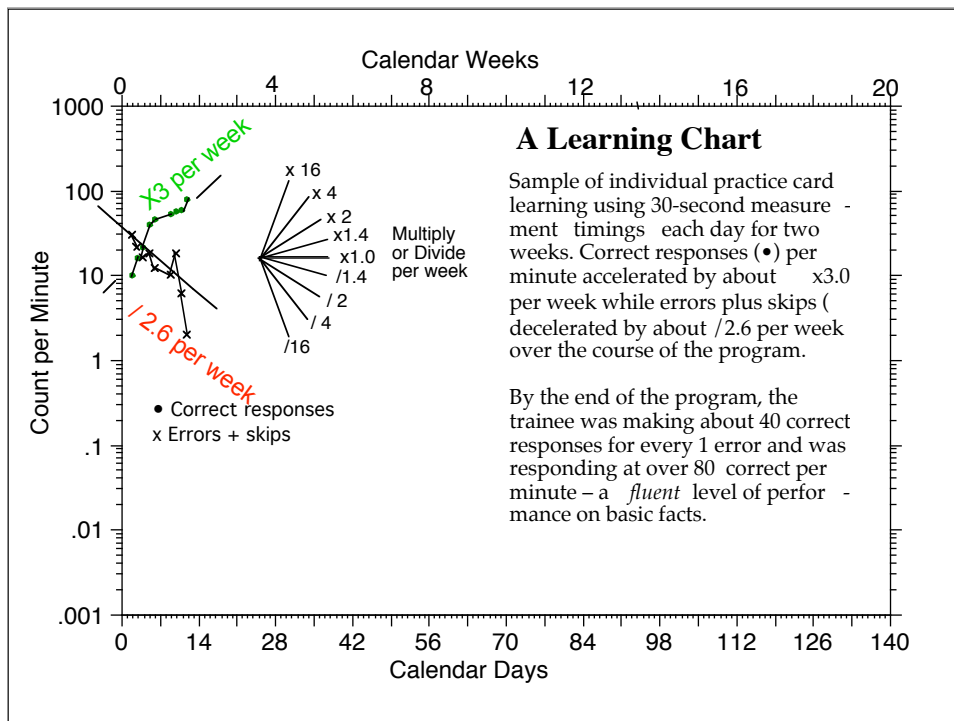
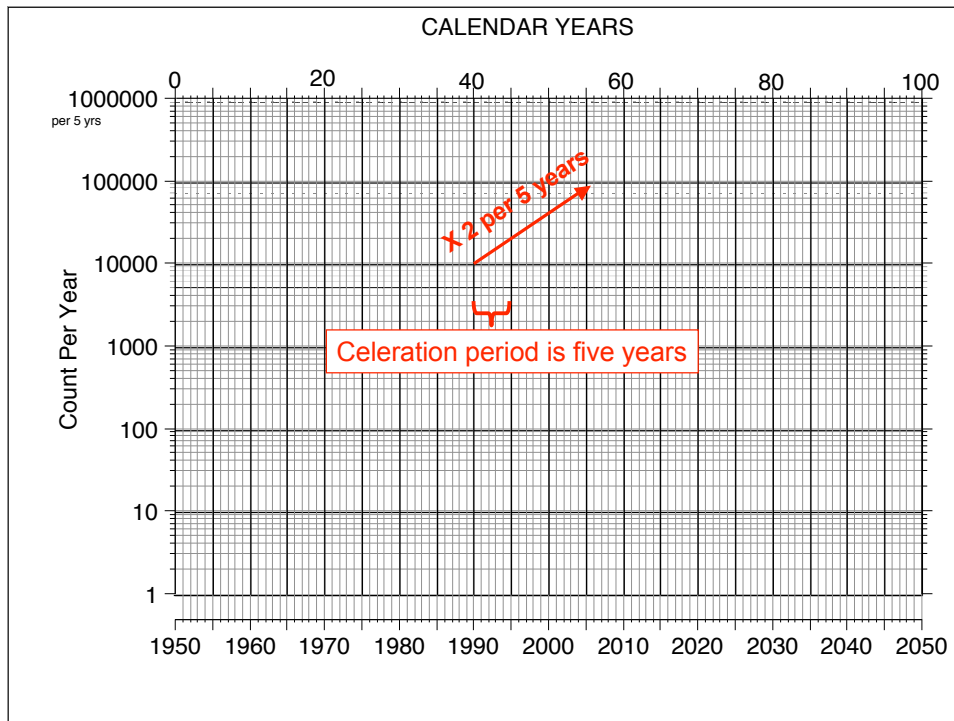
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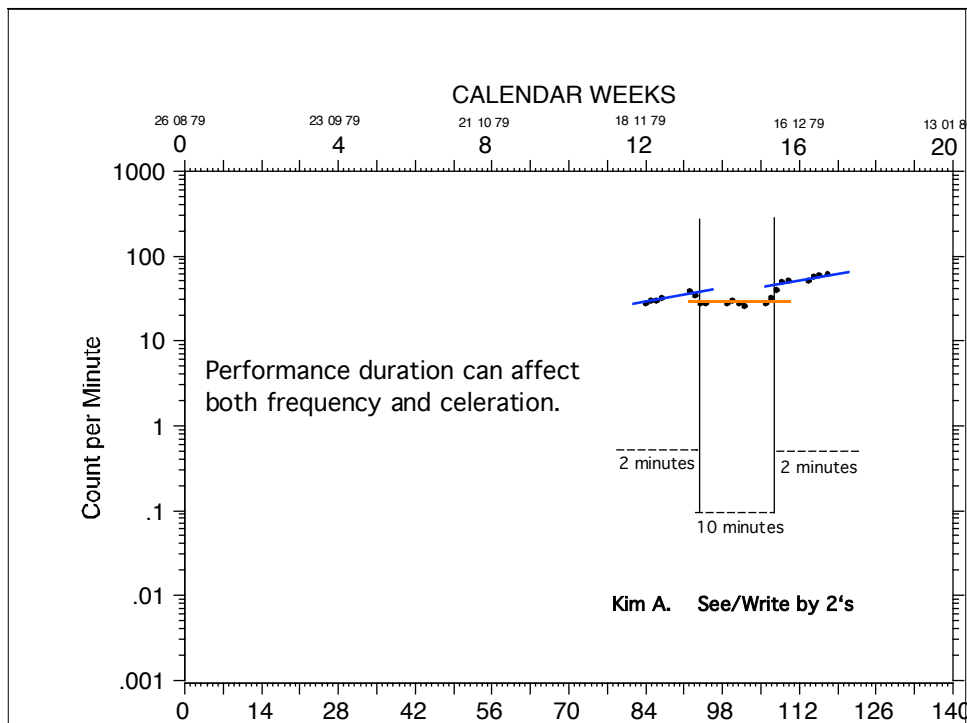
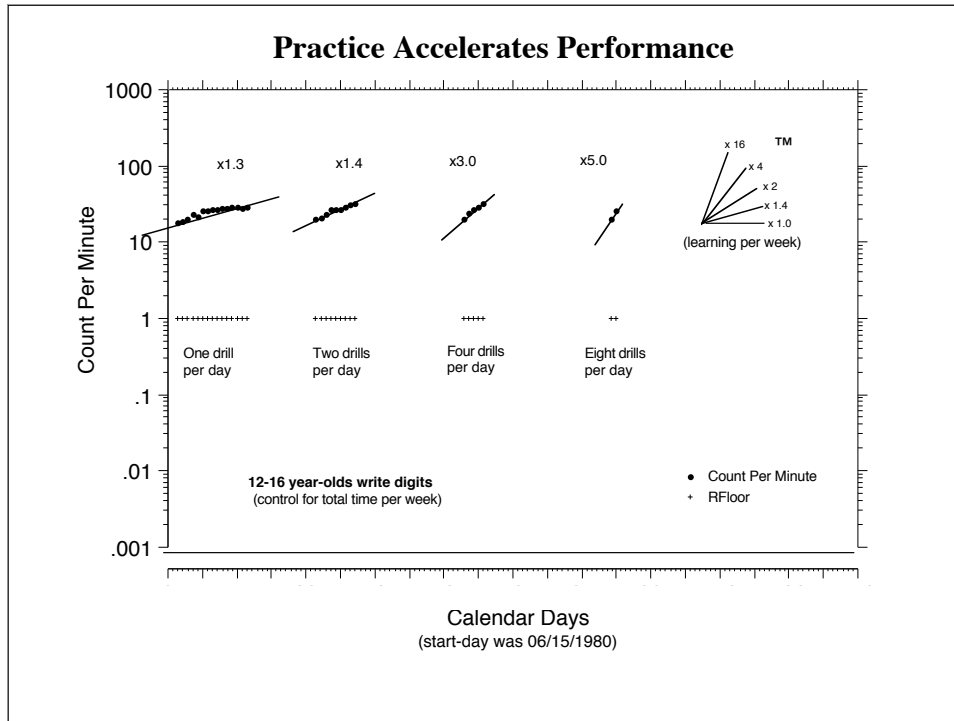
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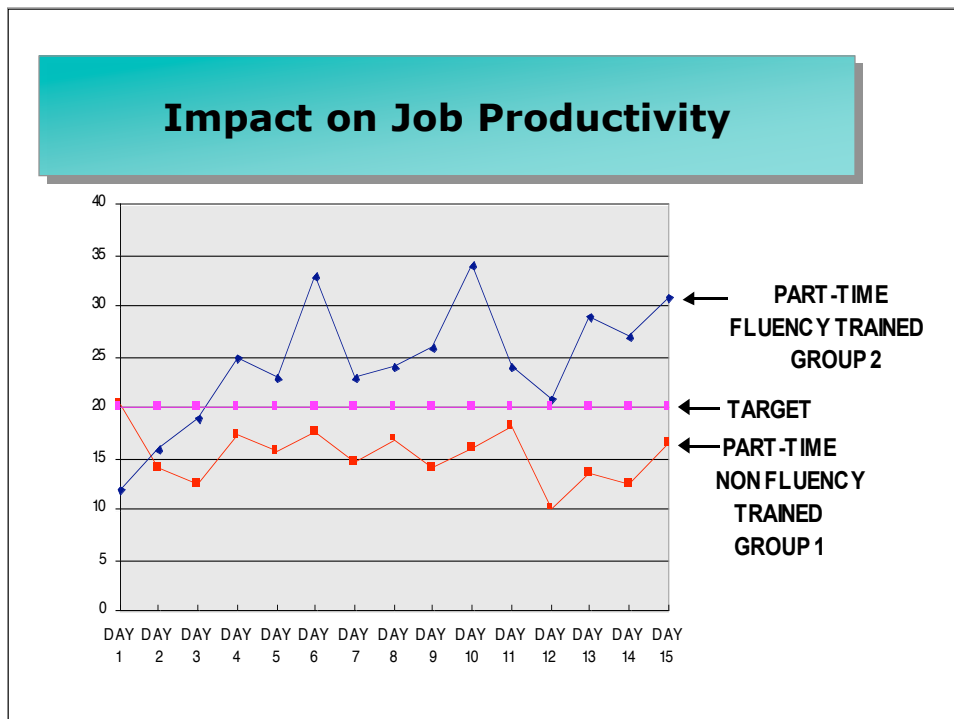
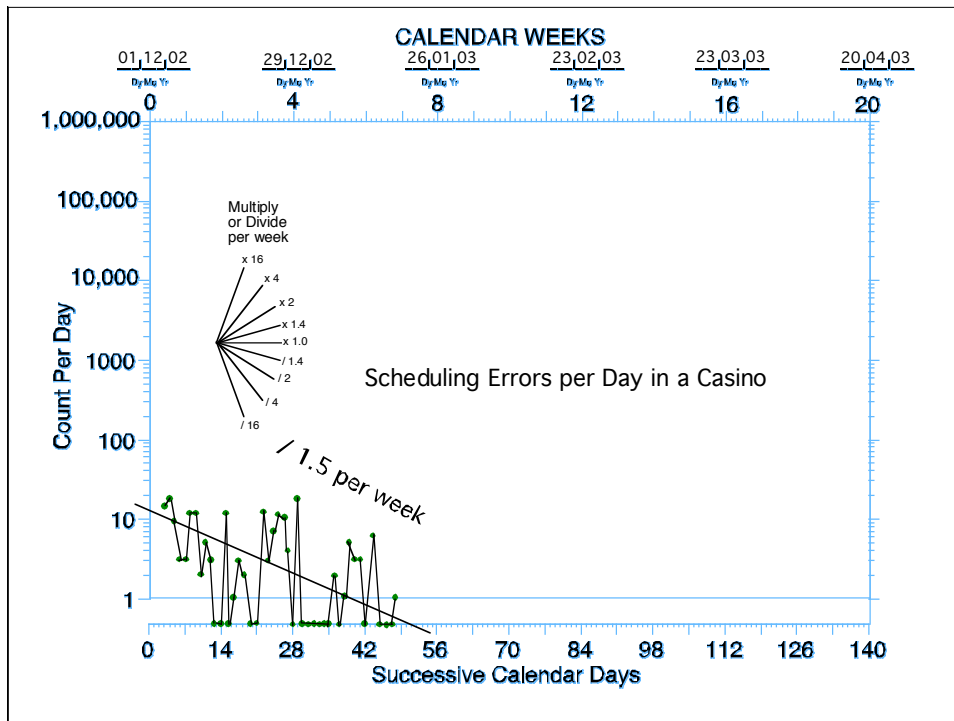
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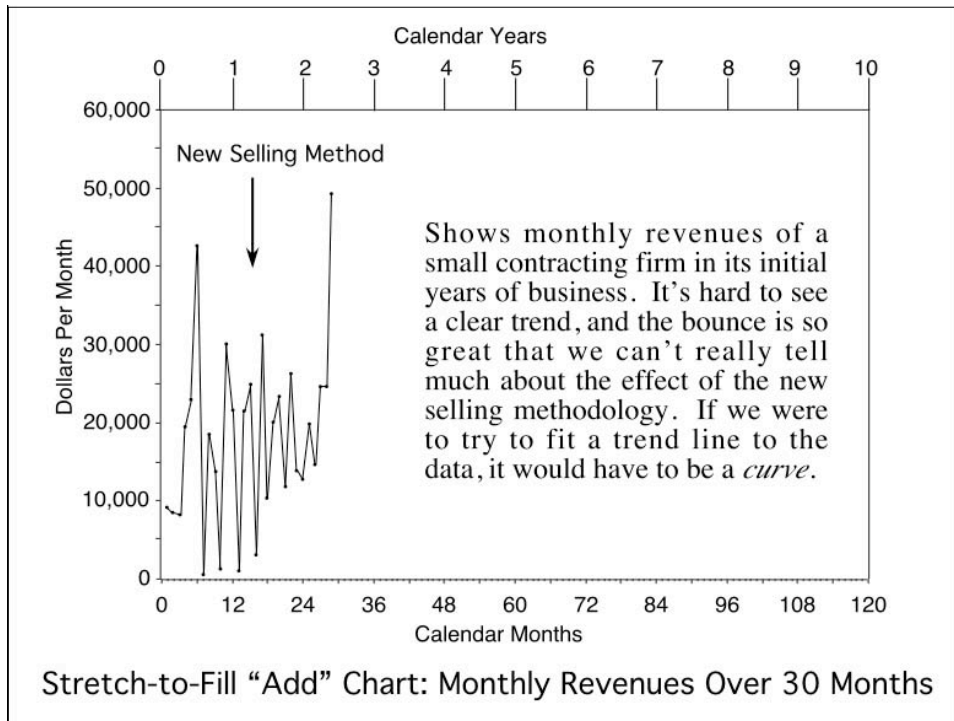
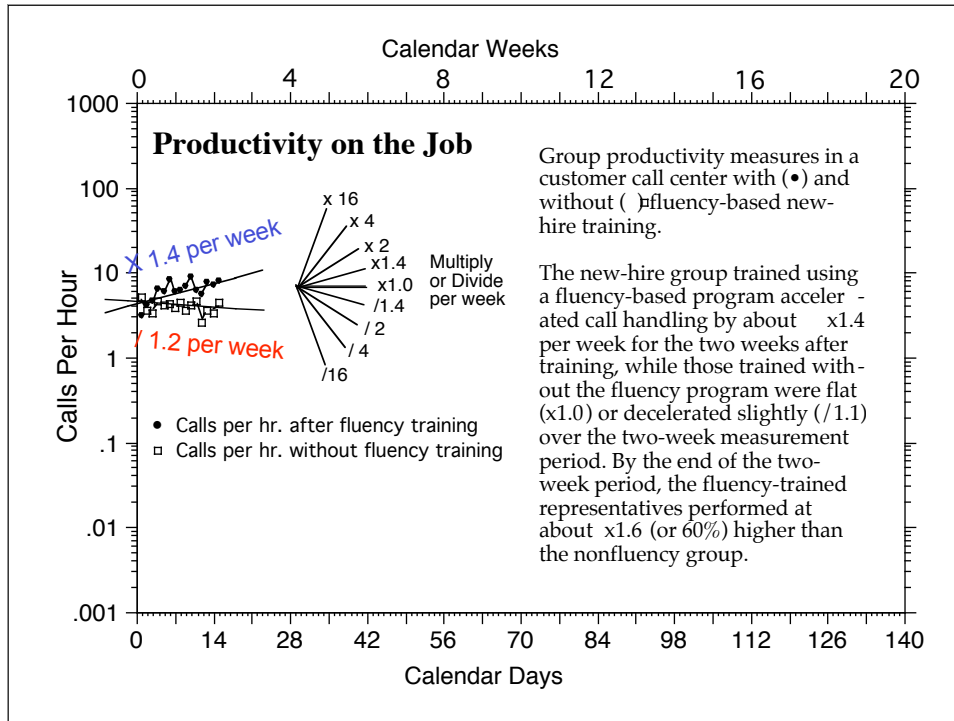
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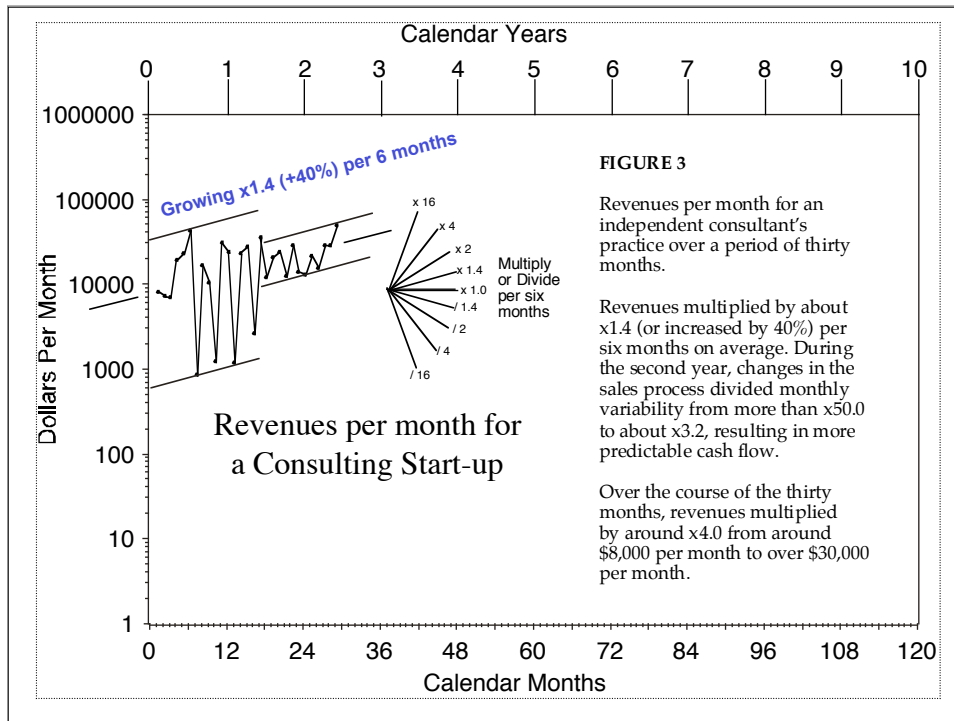
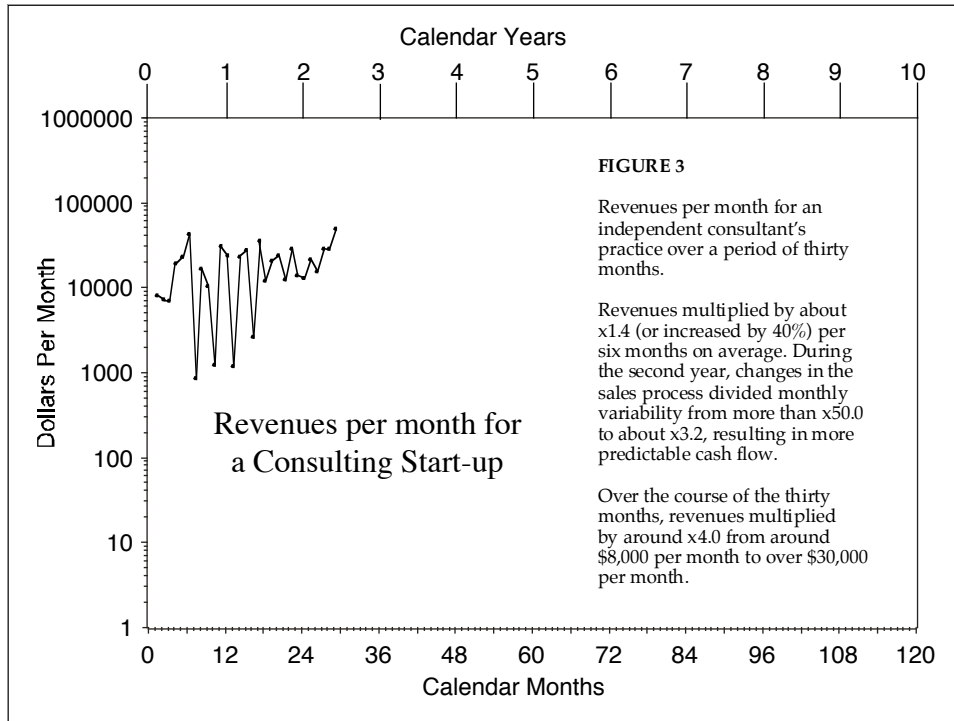
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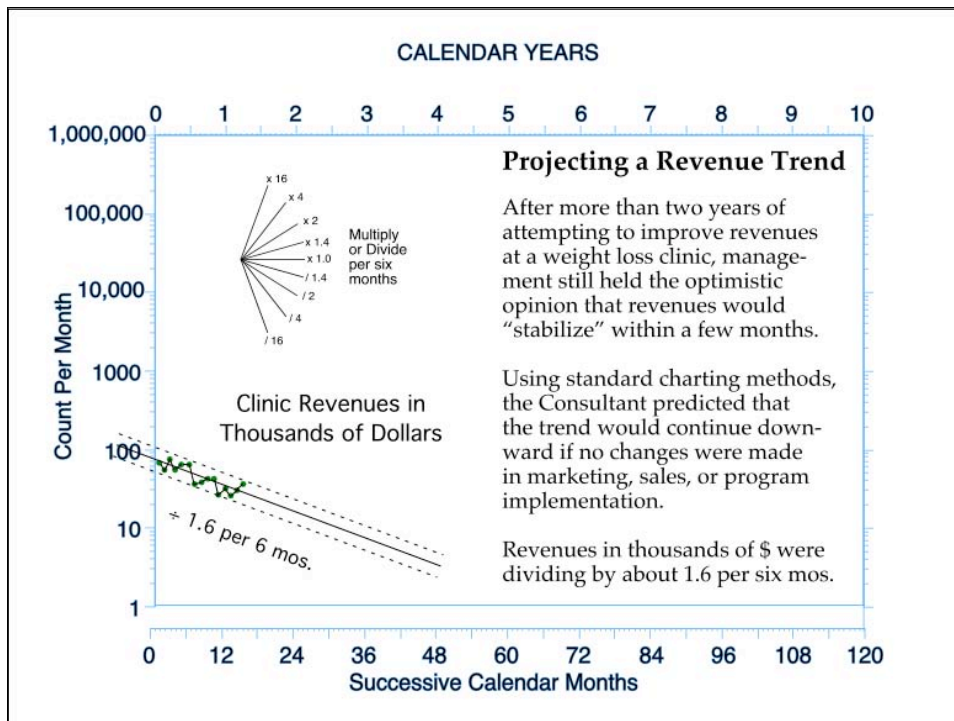
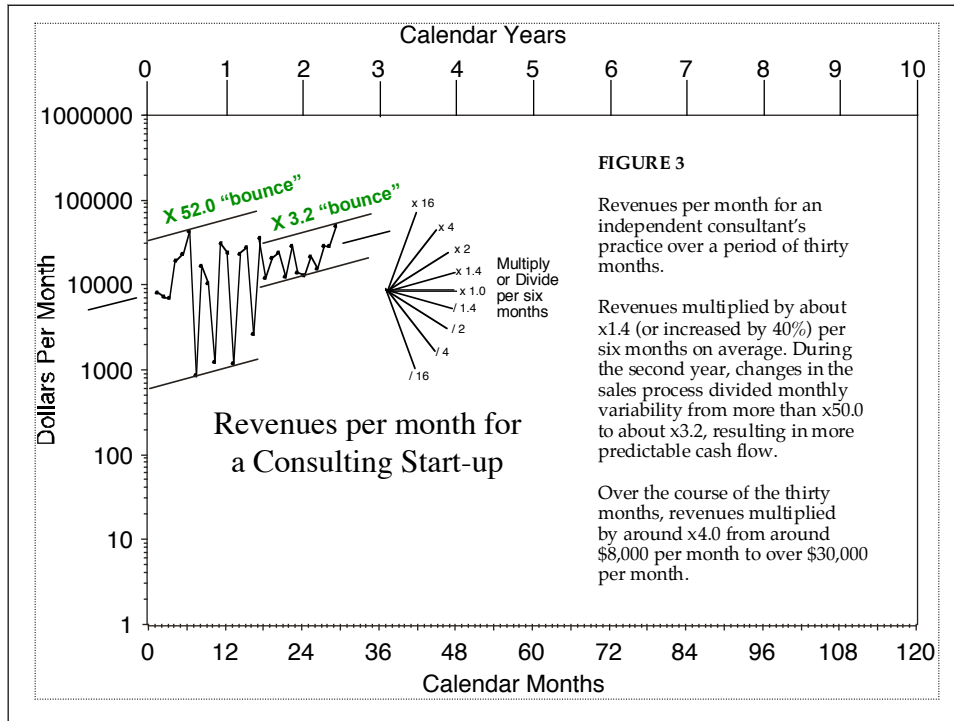
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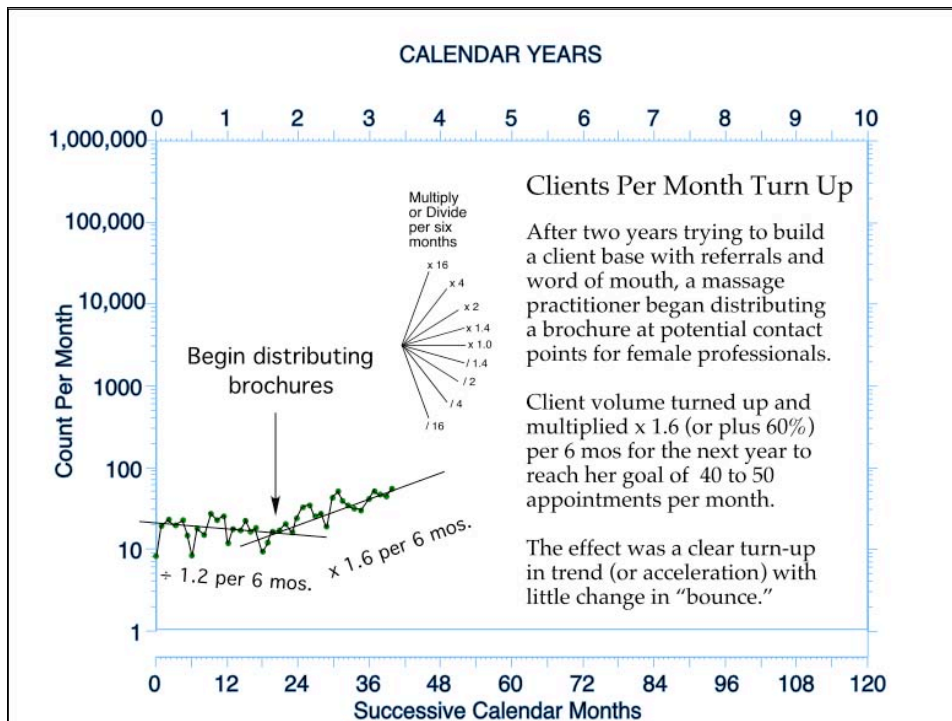
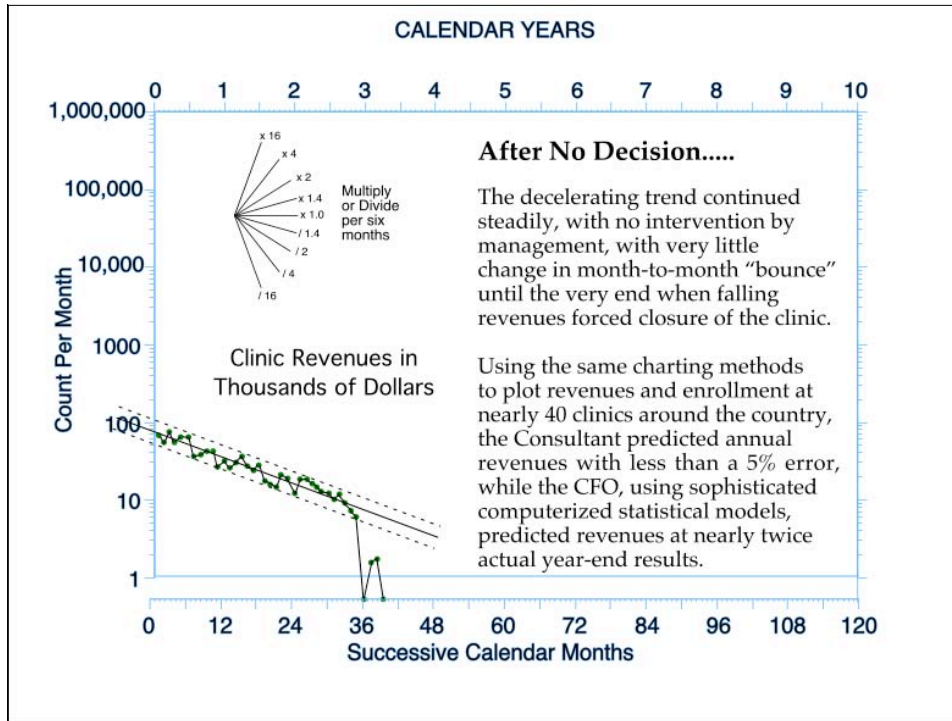
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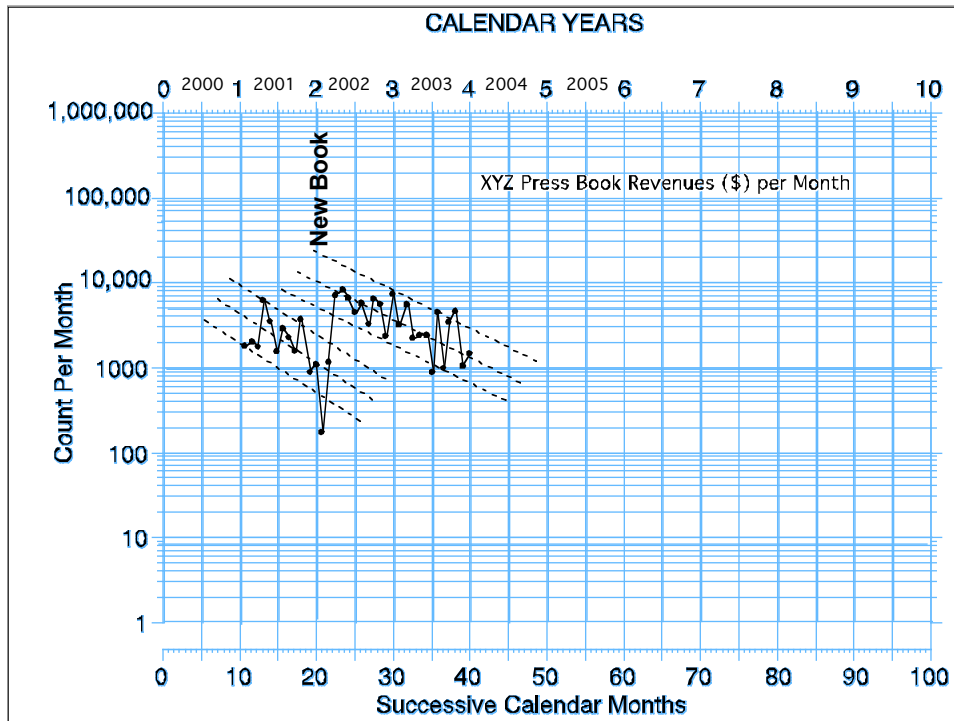
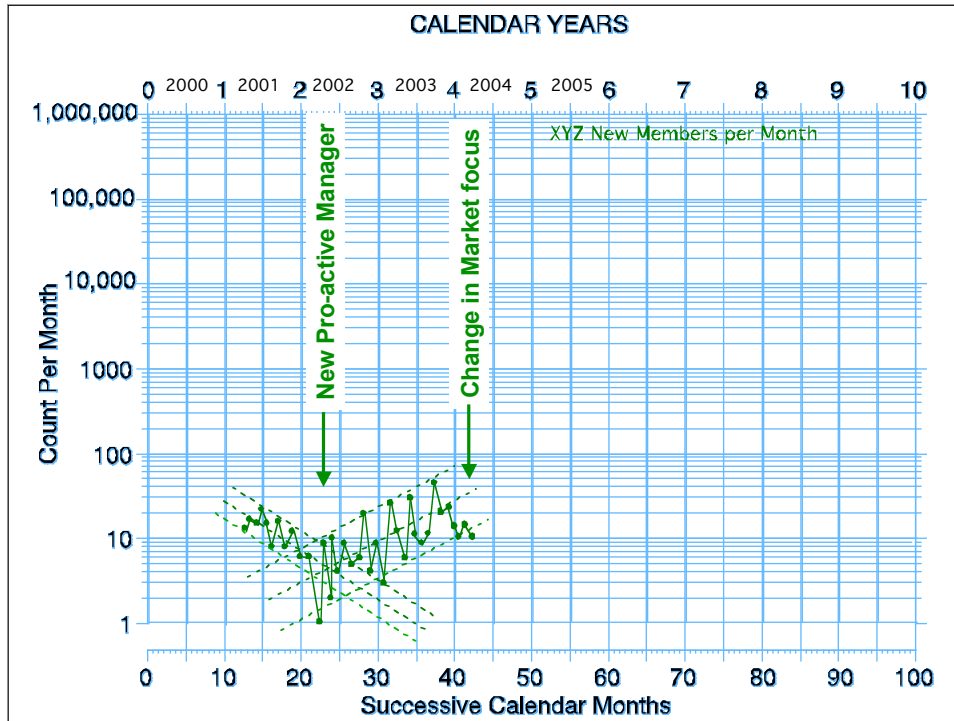
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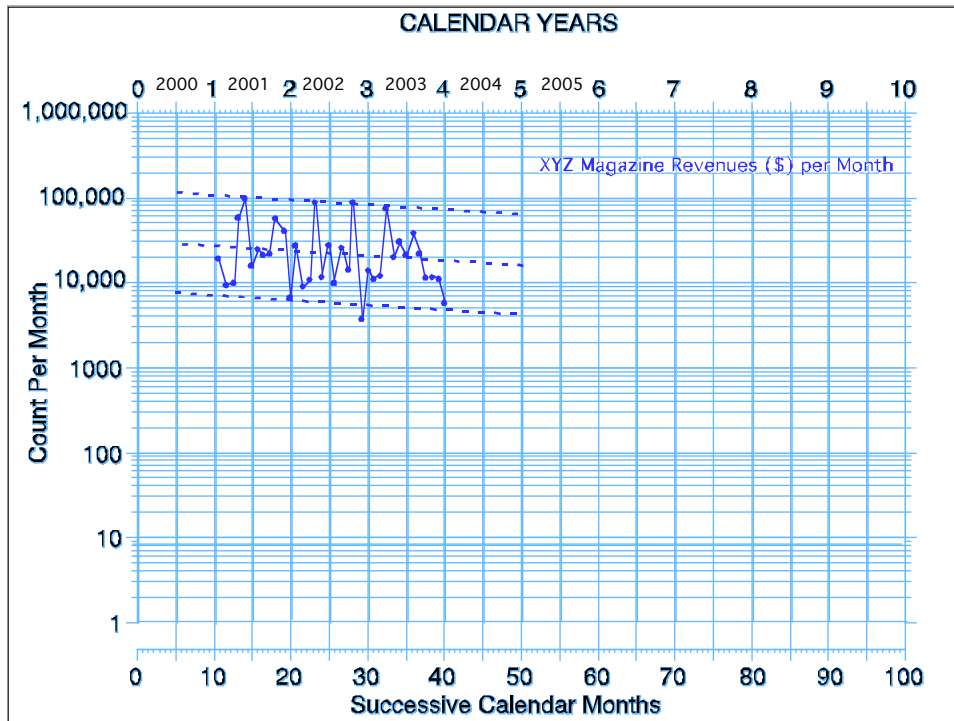
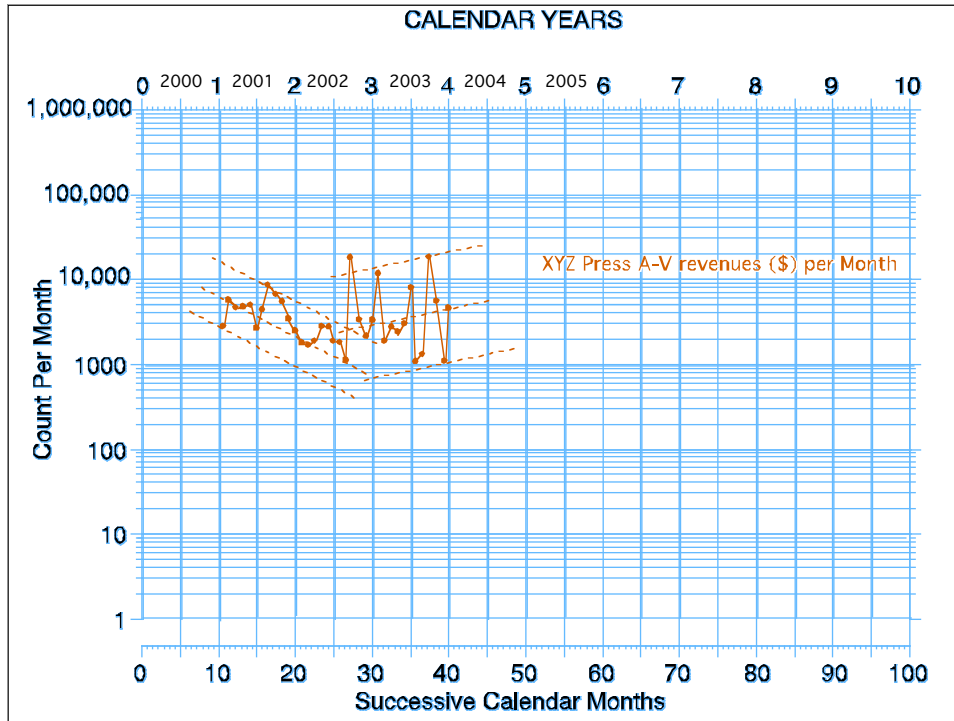
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Summary

- The foundation of measurement is **counting**.
- We need **standard units** to count –like **science** and **accounting**.
- All performance occurs in **time**, so don't ignore it. (Frequency - **count/time** - is a universal measure.)
- **Percentages are dangerous**.
- We look for changes in trends, levels, and/or variability (“bounce”). We should be able to see them separately.
- Most graphs (and tools that produce them) are **stretch-to-fill** or **fill-the-frame**. This leads to distortion, inefficient and even biased communication. (“Lying with graphs”?)
- The Standard Chart **family** allows us to rapidly visualize and make decisions about trends, levels, and bounce.

Thank You!

And please check the handout for more information.

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Value of the Standard Celeration (Change) Chart

Ogden Lindsley invented the Standard Celeration Chart (also known as the Standard Change Chart) during the 1960's to improve analysis and sharing of results among educators who used systematic data-based teaching methods. By creating a single graphic format that could be used to monitor the frequency and trend of *any* countable behavior, accomplishment/output, or organizational result, he reduced the time needed to share a chart from around 20 minutes to 2-3 minutes. This was a huge improvement in communication efficiency and it also turned out to be a big advance in analytic power.

The chart has been used in scientific research, teaching, and organizational management by tens of thousands of people since that time. "Celeration" is a term referring to either acceleration or deceleration – the rate of change in whatever is being measured. What is standard about these charts is that they represent trends or rates of change (accelerating or decelerating) as *standard visual angles*. And because they are "multiply/divide" charts up the left (versus "add/subtract" or equal interval), they depict ratios or multiply/divide relationships between levels as standard visual distances. One need not know the technical details underlying the Standard Celeration Chart to use it. Once you become accustomed to its standard visual features, directly reading trends, levels, and variability ("bounce") becomes simple and intuitively obvious.

We are in a sort of transition now, from paper versions of the charts, which have been used for decades, and computerized versions of various kinds that are not quite ready for prime time. Excel and other computerized charting tools produce "fill-the-frame" or "stretch-to-fill" graphs by adjusting both scales up the left and across the bottom based on the particular set of data being displayed. This distorts the data and prevents simple visual evaluation of changes and trends – even allowing "lying with charts" for those so inclined. The distances and angles that represent differences in level and rates of change, respectively, vary from one such fill-the-frame chart to another. We are working on easier-to-use computerized versions of the standard chart and they should be available in the coming months.

Read *Measurement Counts!*

The double meaning of my column's name at www.PerformanceXpress.org is that *measurement is important*, and that *the foundation of measurement is counting standard units* of things or dimensions. Over the last two years I have included a number of standard chart examples, and lots of rationale, in the column. You can see past columns by going to the site and clicking "Back Issues" at the lower left.

What to Count

To measure performance improvement we can count three kinds of things:

- **Behavior:** We can count instances of behavior that we define as important to measure. (A good guideline for defining behavior, by the way, is that it is *a repeatable action – a verb.*) For example, we can count instances of customer service people saying "Thank you" to their customers (positive) or instances in which they use inappropriate language (negative). We can count occurrences of specific types of safe or unsafe behavior in the workplace. We can count correct and incorrect responses in testing, certification, or other learning or assessment situations. We can count many different types of behavior. However, for us Human Performance Technologists, *it's essential that the behavior we count produces or contributes to valuable accomplishments or job outputs.*

- **Accomplishments or Job Outputs:** As Human Performance Technologists we're interested in the valuable accomplishments or job outputs that contribute to organizational or business results. (A good guideline for defining an accomplishment, by the way, is that it is *a thing produced by behavior – a noun.*) For example, we can count accepted and rejected proposals, transactions completed, widgets, handled calls, tables served, items that meet quality standards and those that don't, as so on. We can also count certain types of intangible job outputs such as decisions, which are harder to capture but nonetheless valuable outputs of jobs or processes. For us Human Performance Technologists, *it's essential that the accomplishments or job outputs that we choose to count (including the outputs such as poor quality products that we want to reduce or eliminate) produce or contribute to the desired results for the business or organization.*
- **Business Results:** When we speak of *business results* we usually mean things like dollars in revenues or profits, customers, people who say they like our company, and so on. These measures represent goals of the organization or of its major sub-organizations and processes that indicate success in the market or in financial or operational terms. In the end, improving these counts is our reason for existence since increasing behavior or accomplishments is not valuable unless it ultimately improves business results. In many cases, after we count these things, we then create derivative calculations such as market share or profit margins – ratios or percentages of the original counts. But it's always important to remember that the counts themselves are what's important, and *that we will not fully understand those ratios or percentages if we are not also looking at the original counts.* (For example, profit as a percentage of revenue changes over the lifetime of the organization as it grows from start-up to maturity, usually in direct relation to the actual dollar amount. So knowing the actual revenues is critical for evaluating profit percentages or ratios.)

References / Web Links

Binder, C. (2001, March). Measurement: A Few Important Ideas. Master's Series article in *Performance Improvement*, 40(3), 20-28. Available as PDF for downloading at www.Binder-Riha.com/publications.htm

Binder, C. (April 2002 – ongoing). *Measurement Counts!* In ISPI's monthly online newsletter, www.PerformanceXpress.org (Find back issues by scrolling down the left-hand navigation bar.)

Esque, Timm. *Making an Impact*. This great little book is available online from the ISPI book store at <http://www.ispi.org/bookstore/pc/5219.htm>. Although Timm is not a champion of the Standard Chart, his elegant approach to performance improvement provides a context for using the chart to monitor results and make decisions for managing and improving performance.

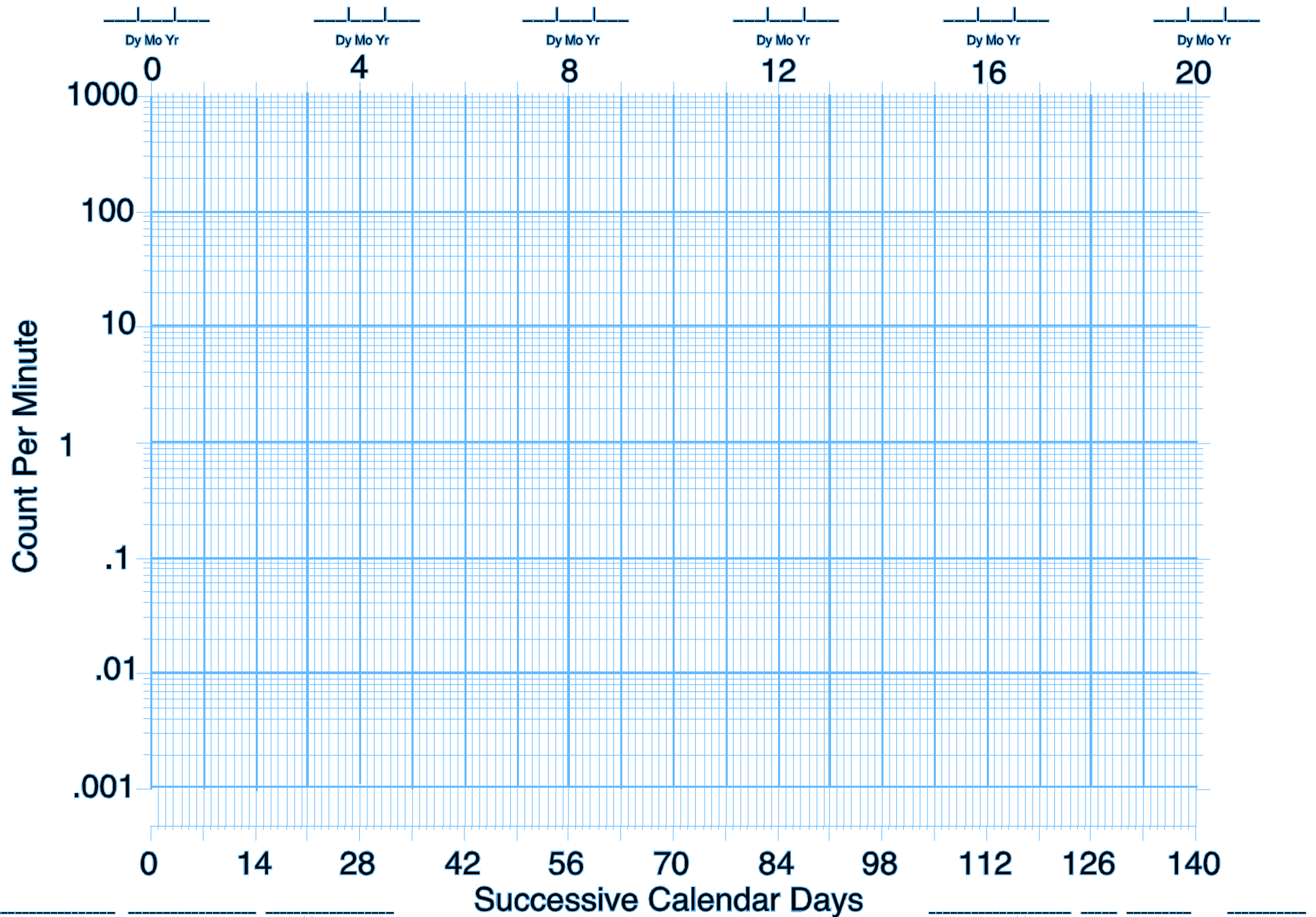
Pennypacker, H.S., Gutierrez Jr., A., and Lindsley, O.R. (2003) *Handbook of the Standard Celeration Chart*. Cambridge Center for Behavioral Studies. Available from www.Behavior.org at the CCBS Store, on page 3 of the "Behavior Analysis Topics and Tools" section of the online catalog.

Standard Celeration Society web site: www.Celeration.org. Other useful links appear on that site, including links to various types of computer-based charting tools.

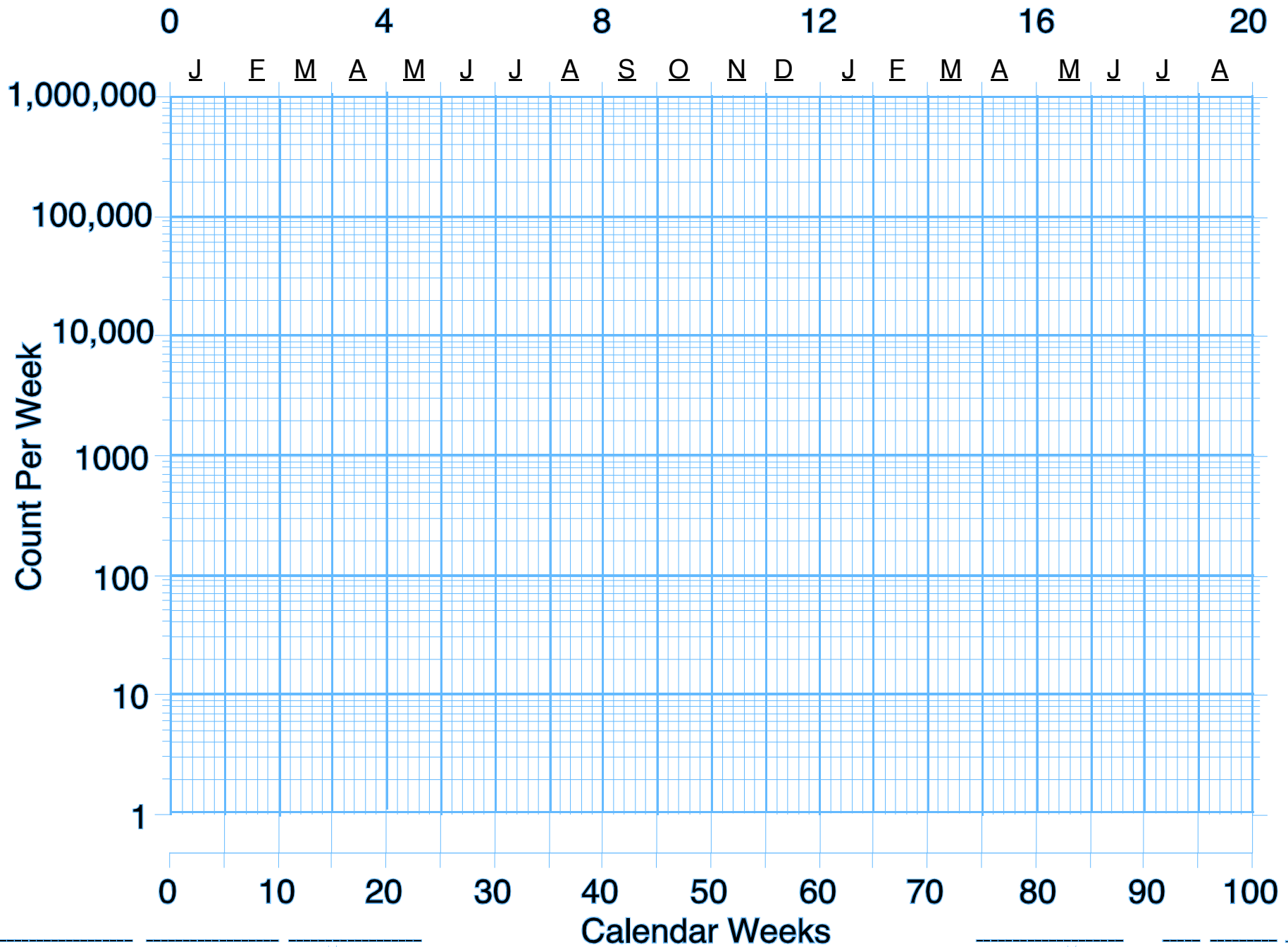
To purchase paper charts: Behavior Research Company, P.O. Box 3351, Kansas City, Kansas 66103, Fax orders or to request price list 913-362-5900

Things I Can Count and Chart		
Behavior (specify counting period)	Accomplishments / Job Outputs (specify counting period)	Business Results (specify counting period)

CALENDAR WEEKS



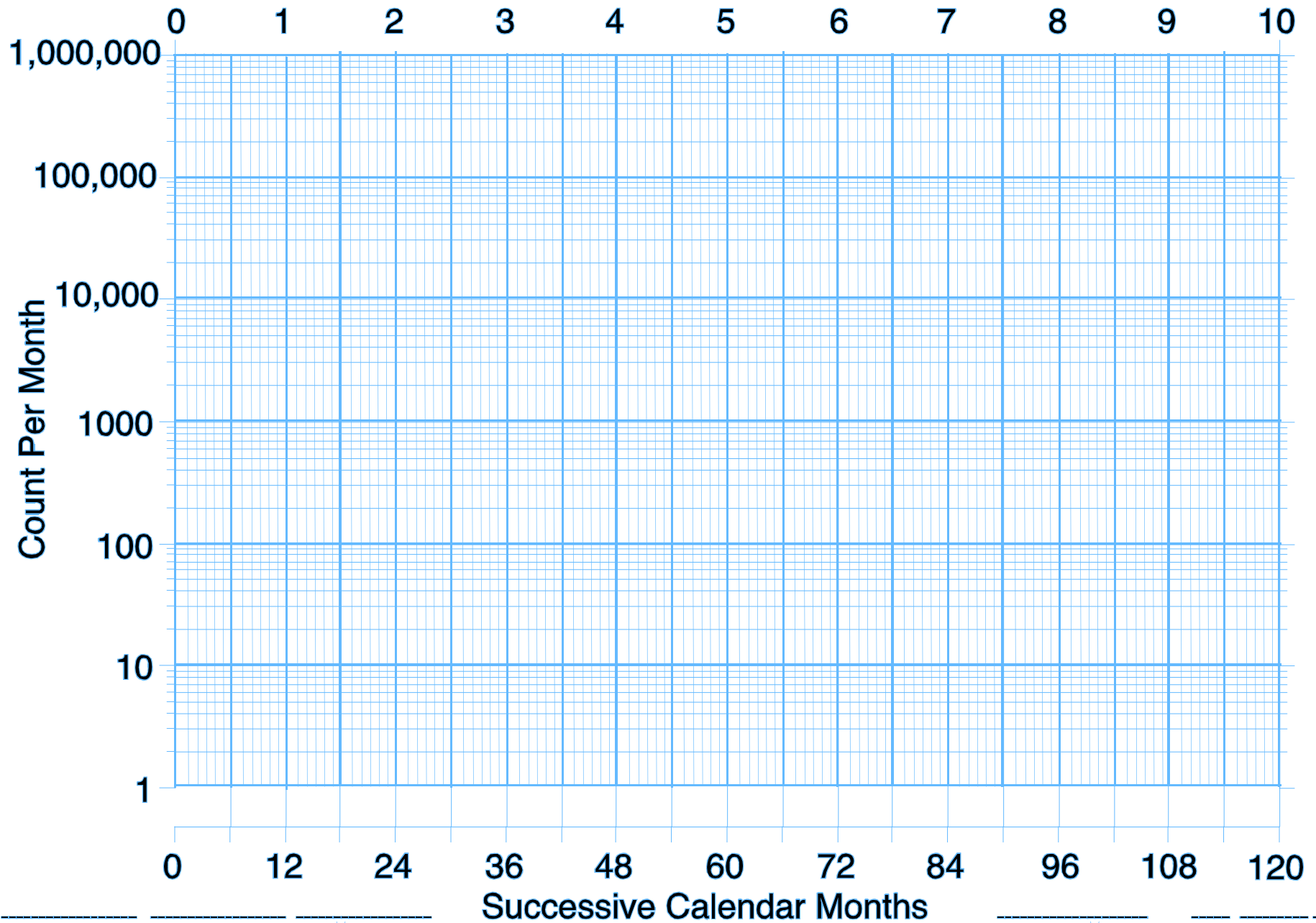
CALENDAR MONTHS



SUPERVISOR ADVISER MANAGER PERFORMER AGE LABEL COUNTED

Count per Week CHART ORGANIZATION TIMER COUNTER CHARTER

CALENDAR YEARS



SUPERVISOR

ADVISER

MANAGER

PERFORMER

AGE

LABEL

COUNTED

Count per Month CHART

ORGANIZATION

TIMER

COUNTER

CHARTER