## R/APS, REAPS, and Other Acronyms

*Empirically Defining How We Set Aims*

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## Topics

- Acronyms: Why we use them
- Haughton's Acronyms: R/A PS, REAPS
  - Where they came from
- Lindsley's rendition – an error in the communication
- RESAA, AREAS, RESA and so on…..

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## Acronyms

**Why We Use Them**

- For short-hand
- As memory aids

**Reasonable Criteria for Good Ones**

- Easy to pronounce
- Unambiguous meanings of the letters
- Easy to remember the things abbreviated

We'll return to this shortly…

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## Haughton's Acronyms
*Some History*

- Haughton (1972). *Aims: Growing and Sharing.*
  - Frequency ranges predict successful "application" of tool skills in basic skills, e.g., see/say digits and see/write digits as components of see/write answers to problems.
- Haughton (1977). *Parameters of Pupil Freedom - Behavior Elements*
  - Identified Big Six and Body Control Movements, most basic elements of fine and gross motor behavior; identified adult frequency ranges as R/A PS - proficiency guidelines (Retention/Application Performance Standards).
- Haughton (1981, Oct.). *R/A PS and REAPS, Data-Sharing Newsletter*
  - *Expanded R/APS to REAPS to include Endurance.*

The "PS" highlighted a key concept:
"**P**erformance **S**tandards that optimize R, E, and A."

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## Retention

- Old verbal learning studies: shorter latency > better retention
- Orgel, (1984). better retention with SAFMEDS on calculus
- Berquam (1981). retention over the summer better with higher frequencies achieved before vacation.
- Bucklin, Dickinson & Brethower (2000). Basic research, better retention with higher frequencies
- Cathy Coyle (2005) PhD thesis (Murdoch University): higher frequency produces better retention than equivalent amount of practice at low frequencies.

….and so on……

Consider using Retention Ratios
*Frequency before / Frequency After*

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## But….

Dennis Edinger keeps reminding us that instead of concepts or "general findings," he'd like to see data that we're thinking of when we say words like retention, endurance, application, etc.

So here are some of mine…

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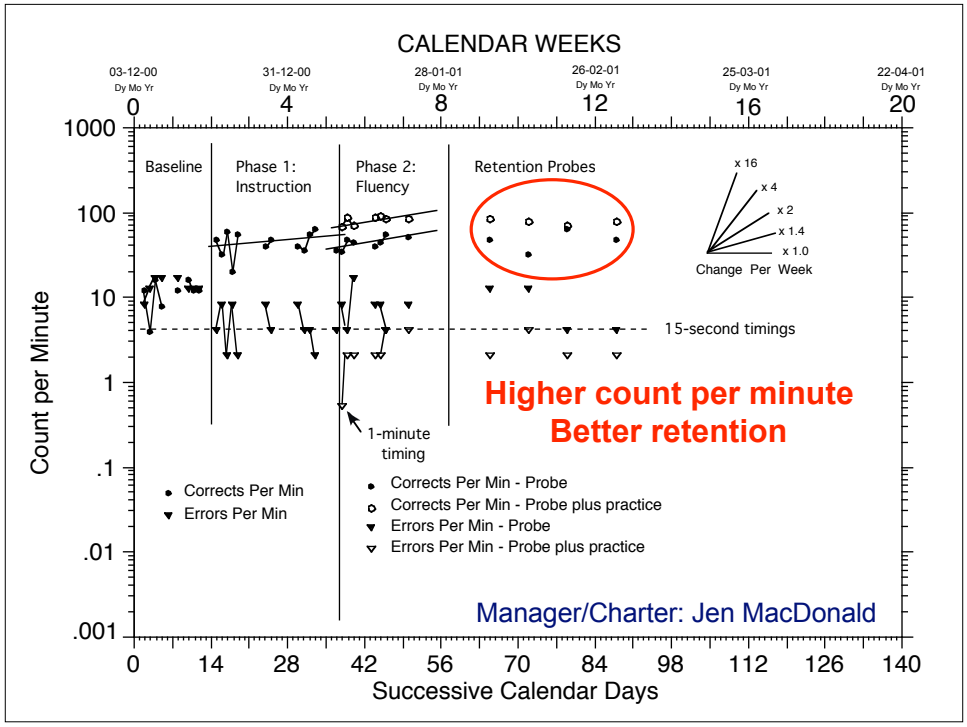
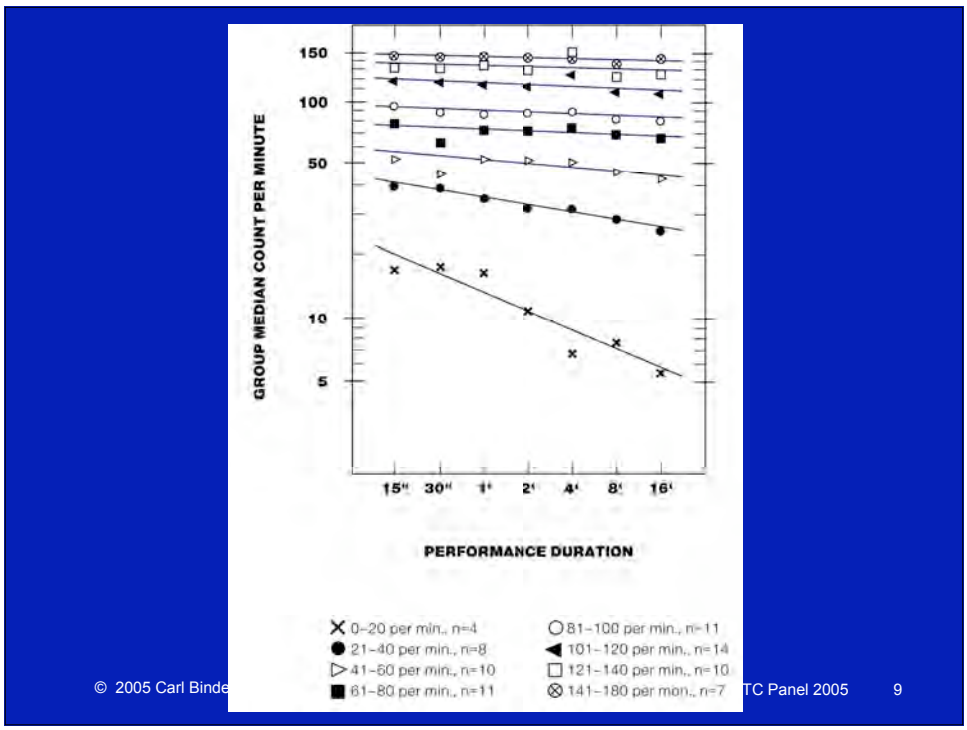



## Endurance

The ability to maintain a given level of performance without disruption or decrement over a substantial period of time (a long-distance running metaphor related to Skinner's concept of "response strength").

**Elements of Endurance**

- Relative decrement or "fall-off" over increasing performance durations (endurance ratio)
- Control of errors and bounce for extended performance durations (stability as a function of performance duration)
- Within vs. between session resistance to distraction


GROUP MEDIAN COUNT PER MINUTE
150
100
50
10
5
15" 30" 1' 2' 4' 8' 16'
PERFORMANCE DURATION
0–20 per min., n=4
21–40 per min., n=8
41–60 per min., n=10
61–80 per min., n=11
81–100 per min., n=11
101–120 per min., n=14
121–140 per min., n=10
141–180 per min., n=7
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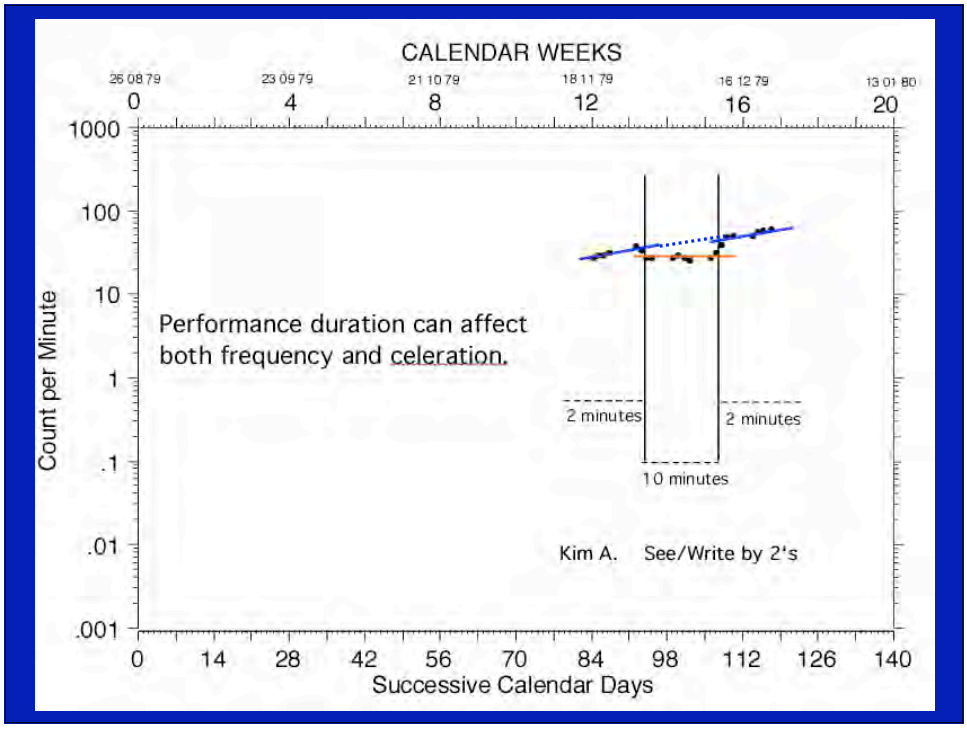
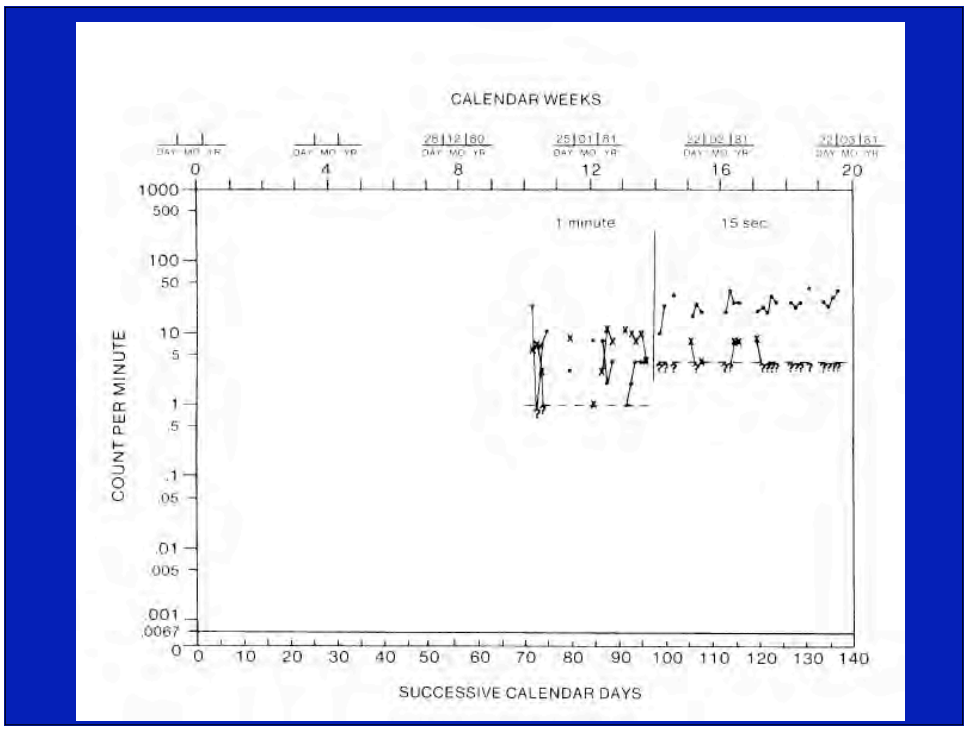

CALENDAR WEEKS
26 08 79
23 09 79
21 10 79
18 11 79
16 12 79
13 01 80
0
4
8
12
16
20
1000
100
10
1
.1
.01
.001
Count per Minute
Performance duration can affect
both frequency and celeration.
2 minutes
2 minutes
10 minutes
Kim A. See/Write by 2's
0 14 28 42 56 70 84 98 112 126 140
Successive Calendar Days


CALENDAR WEEKS
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1000
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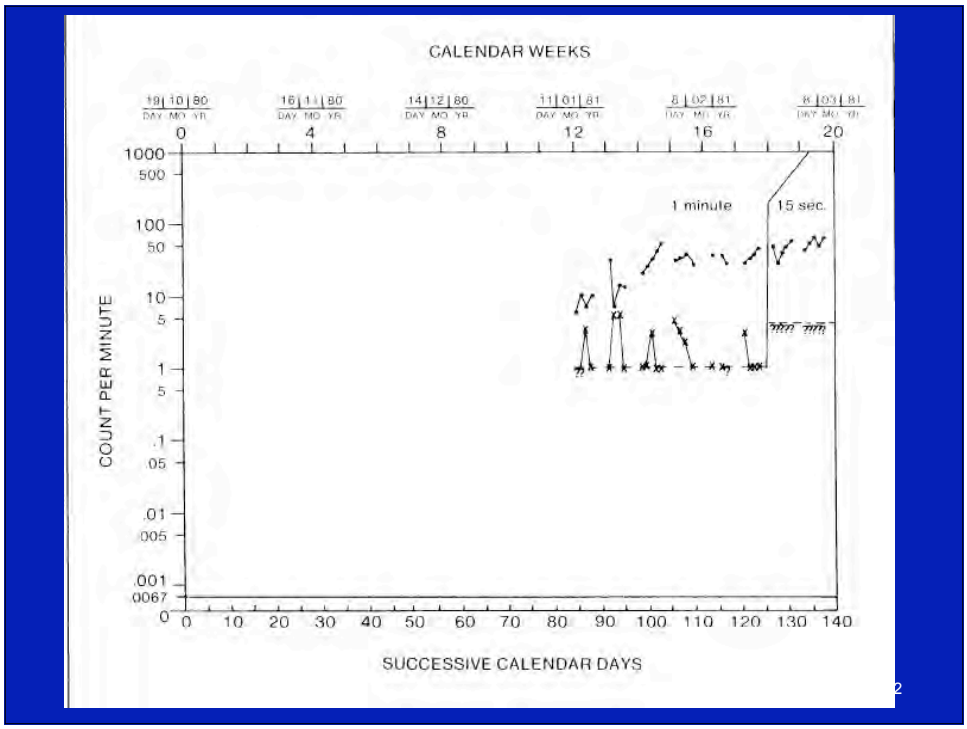
0
1 minute
15 sec.
COUNT PER MINUTE
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
SUCCESSIVE CALENDAR DAYS


CALENDAR WEEKS
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1 minute
15 sec.
COUNT PER MINUTE
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
SUCCESSIVE CALENDAR DAYS

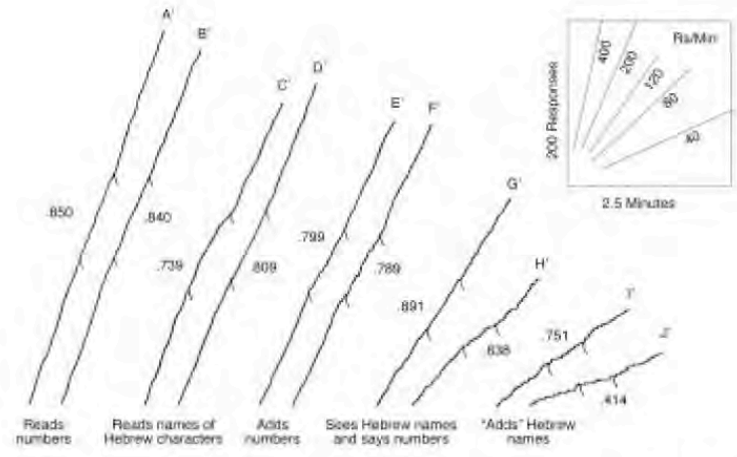


Figure 4: Each pair of cumulative records reprsents the same pair of subjects as i Figure 3 performing the listed behaviors, recorded by means of a voice-operated relay. Tick marks indicate onset and termination of a distracting auditory stimulus associated with the suppression ratios.

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## "Stability" is a Feature of Endurance

**Measures / Pictures of "stability"**

- Between-session bounce
- Between-session error spikes
- Within-session moment-to-moment variability

**Instability or Stability can be related to……**

- Punishment history, conditioned emotional stimuli
- Blood chemistry (e.g., "the shakes")
- Performance duration requirements
- Etc…..

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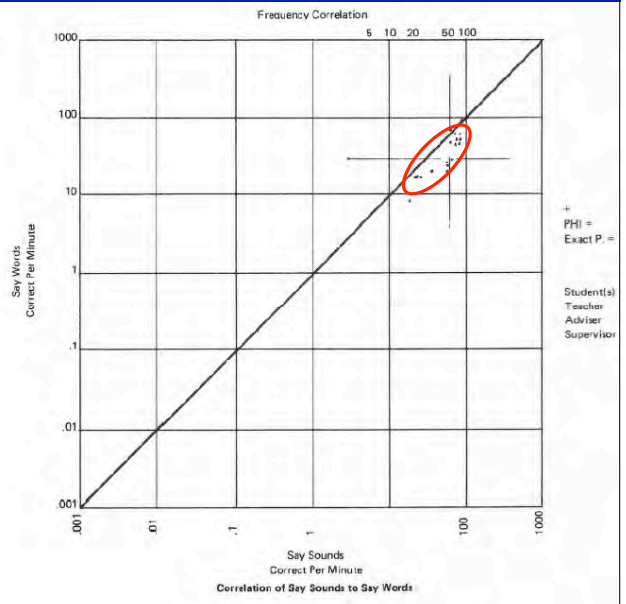
## Application in Haughton (1972)

Effective skills in the basic computation requirements involved in addition, subtraction, multiplication, and division are important basic tools that can be applied in complex mathematical problems. The best information that we have to date indicates that an aim of 80 digits written correctly per minute (or 40 to 50 problems per minute) is the appropriate level for basic math computation (Gaasholt, 1970; Haughton, 1971). The data indicate that a youngster able to do his basic facts at 30 to 40 problems per minute continued to accelerate even though the curriculum became progressively more complex, for example, moving from problems such as 7 x 5 or 8 x 6 up to 856 x 221. On the other hand, a youngster whose basic skill performance was below 30 per minute showed progressive decelerating frequencies as he was advanced through his curriculum (Figures 5 and 6). Drawing on more traditional areas of review and competency definition in the area of mathematics, Tapp finds that 25 to 30 problems per minute is

**Figure 4.** Correlation of Say Sounds to Say Words



## Component Practice Builds Composite Performance

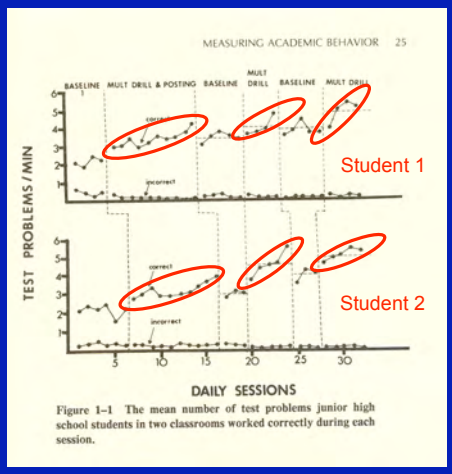


Figure 1–1 The mean number of test problems junior high school students in two classrooms worked correctly during each session.

Van Houten, R. (1980). *Learning through feedback: A systematic approach to improving academic performance.* New York: Human Sciences Press, p. 25.

During baseline conditions, students were tested on but did not otherwise practice see/write multiplication answers - a component of the long multiplication and division problems counted in these graphs. During "Mult Drill" phases, students practiced the see/write multiplication answers. Only during phases where they were practicing and increasing the frequencies of the component did they consistently accelerate on the composite. This is a classic case of "application" – the students "applied" their multiplication facts in doing long multiplication and division problems.

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## Adduction is a Sub-set of Application

- Application is using a skill in a new situation or more complex performance
  - Components combine
  - Same skill strong enough to be used elsewhere
- "Adduction" is when we get application "for free"
  - Andronis, Johnson & Layng
- Application is NOT "stimulus generalization"

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## Lindsley's (1992) Acronyms

*Abbreviated Lists*

- PRACTICED
  - Particular, Rapid, Aims, Counted,Timings, Informed, Charted, Error-full, Daily
- MUSIC
  - Multiply, Unique, Specific, Independent, Consequences
- FUN
  - Fun, Understanding, No cheating
- REAPS
  - Retention, Endurance, Application, Performance aims, Standards

But this introduced a conceptual and historical error!

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## An Important Distinction Lost

- An empirical challenge (Haughton)
  - Retention-Endurance-Application Performance Standards

**NOT**

- "A list of performance results…." (Lindsley)
  - Retention, Endurance, Application, Performance aims, Standards

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## Research About *Acronyms*?!

- More and more theses and dissertations have been attempting to prove or "demonstrate" REAPS, or RESAA, or RESA.
- Perhaps this is taking us off track. How about the specific sub-sets of phenomena under each letter? How about **M**aintenance, etc.?
- It might be more valuable to identify as many *specific* effects of building frequency as we can rather than to conduct hypothesis-testing experiments about the acronyms as things in themselves.
- As Dennis Edinger has often pointed out, we need charts that illustrate effects more than we need acronyms or general concepts.

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## As for *these* Acronyms....

- RESAA, RESA, or RESSA – We can't ***hear*** the difference!
- So if you like RESAA, then AREAS is easier to get right (Giordana Hrga)
- REAPS is parsimonious if you think that:
  - Application includes Adduction; and Endurance includes Stability.
  - But this might expose my ignorance of independent "stability charts."
- If we're REALLY going to build acronyms that adequately list the effects of frequency-building, they're going to get long and unweildy! (e.g., how about M for maintenance, R for resistance to distraction, etc.)

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## Conclusions?

- We probably should use whatever acronyms that suit our purpose in communication and sharing.
- We should forget about trying to "standardize" on acronyms for scientific description.
- Let's encourage research about specific outcomes under specific conditions, and try not to get fenced in by our acronyms!