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…..
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…

Haughton’s Acronyms

Some History
  - 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.

  - 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: “Performance Standards that optimize R, E, and A.”
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

\[
\text{Frequency before} / \text{Frequency After}
\]

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…
**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
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R/A PS, REAPS and Other Acronyms

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Performance duration can affect both frequency and celeration.

Kim A.  See/Write by 2's
"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…..
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 $7 \times 5$ or $8 \times 6$ up to $856 \times 221$. 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 considered the criterion.
Component Practice Builds Composite Performance


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.

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”
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
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 Maintenance, 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.

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 unwieldy! (e.g., how about M for maintenance, R for resistance to distraction, etc.)
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!