

ABA 1995 – Panel: Fluency Research

Fluency Research: Questions, Parameters, and Designs (A Panel)

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Panelists

- Carl Binder, Chair
- Ogden Lindsley
- Kent Johnson
- John Eshleman
- Joe Parsons
- Henry Pennypacker, Discussant

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Frameworks for Research

- **Ceilings on Performance**
 - Measurement-defined
 - Procedure- and Materials-imposed
 - Deficit-imposed
 - Handicap-defined
- **REAPS**
 - Retention
 - Endurance
 - Application
 - Performance Standards (aims)

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Ceilings-related Research Questions

- What difference does *time* add to the sensitivity of skill/knowledge assessment? (assessment research)
- What are the least restrictive and most efficient procedures and materials for building fluency for different types of behaviors? (methods research)
- What component behaviors contribute to the fluency or dysfluency of specific composite behaviors, and what are the ratios between their behavior frequencies? (fluency-based curriculum research)
- What component frequencies characterize what types of handicap, and how can we best remediate or compensate for them? (prosthetics research)

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Retention- and Maintenance-related Research Questions

- How much, if any, does achieving a given performance frequency affect performance levels after various periods of non-use (retention)?
- What levels of performance frequency (aims) produce optimal retention after various periods of non-use? Where is the point of diminishing return?
- How do the effects of achieving high performance frequencies on retention vary by type of behavior?
- How does behavior frequency contribute to maintenance of behavior in the natural environment?

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Endurance-related Research Questions

- What is the effect on performance frequency of requiring longer performance durations? How does this effect vary by initial performance level and by different performance duration requirements?
- What is the effect on learning rate or celeration of requiring longer or shorter performance durations?
- What are the most effective and efficient procedures for ensuring optimal endurance of different types of behaviors?
- How does initial performance level and performance duration affect distractibility?

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Application-related Research Questions

- How does performance frequency of component behaviors contribute to performance and celeration of composite behaviors?
- Which components are critical in specific curriculum areas or behavior domains?
- What levels of performance of component behaviors (aims) are needed to produce optimal acceleration and performance of composite behaviors?
- What component behaviors at what levels produce creative or novel behavior in specific domains? (generativity)

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Selected Fluency Research Paradigms

- Application
 - Component / composite relationships
 - Mediated transfer & stimulus equivalence
- Endurance
 - Single-subject
 - Parametric group studies
- Distractibility or free operant “automaticity”

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Application: Component/Composite

- Paradigm # 1 (Houghton, et al)
 - 1 - Assess/establish rate of component behavior
 - 2 - Assess/attempt to build rate of composite behavior
 - 3 - Return to building rate of component
 - 4 - Re-assess/attempt to build rate of composite
- Paradigm #2 (Van Houten)
 - 1 - Practice composite until rate flattens
 - 2 - Build component rate, monitor composite rate
 - 3 - Stop component practice, monitor composite
 - 4 - Alternate practice and non-practice of component

Note: Calculate component/composite ratios.

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Application: Mediated Transfer

- 1 - Establish two paired-associates (see/say, hear/tap, or other types of responses) for mediated transfer.
- 2 - If the acquisition procedure is a controlled operant, fade materials & procedure to eliminate rate ceiling.
- 3 - Assess free rates and accuracy ratios for the two paired associates.
- 4 - Test the emergent, using free rate measures.
- 5 - Build rate on one or both original paired-associates.
- 6 - Test emergent for changes in rate and/or accuracy.

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Endurance: Single-subject Design

- 1 - Select behavior that has space to accelerate (is well below any ceiling due to components or physical limits)
- 2 - Conduct daily timings for 7-10 days to assess split-middle celeration and median rate.
- 3 - Shorten or lengthen timings and continue 7-10 days.
- 4 - Look for changes in average frequency, error rate, variability (“bounce”), and/ or celeration.
- 5 - If there is still space beneath the ceiling, reverse procedure to original practice duration.

Option: Use subjects or behaviors with different starting rates and check for related differences in effect.

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Endurance: Parametric / Group Design

- 1 - Select behavior in which the subject group has x5 to x10 range of beginning frequencies.
- 2 - Schedule randomly sequenced “snapshot” measures of performance at wide range of durations (e.g., 15 sec, 30 sec, 1, 2, 4, 8, and 16 min.)
- 3 - Analyze rate of decline in performance over the range of durations sorted by bins of starting rates.
- 4 - Display with log scale on left and durations equally spaced across bottom and draw best-fit lines.

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Distractibility / Free Operant Analog of "Automaticity" Experiments

- 1 - Select see/say paired associate response class (e.g., naming unfamiliar patterns).
- 2 - Identify individuals or specific instances of the response class at different performance levels relative to maximum possible performance, and without component or physical ceilings.
- 3 - Use voice-operated relay and cumulative recorder to monitor within-session performance.
- 4 - Introduce distracting auditory stimulus for intervals (e.g., 30 seconds) during ongoing performance.
- 5 - Look for rate suppression (graphic, & sup. ratio).

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Free Operant Distractibility / Automaticity Paradigm with Mediated Transfer or Stimulus Equivalence

- 1 - Select see/say elements for a 2- or 3-level free operant mediated transfer paradigm (requires a lot of "attention" to perform 3-level).
- 2 - Conduct sessions with subjects and/or sets of responses at range of performance levels.
- 3 - Use free-operant, voice operated relay distractibility procedure with each of the original elements in the mediated transfer and each level of emergent.
- 4 - Look for differences in suppression across subjects, performance levels, and behaviors.

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Some Cautions and Rules of Thumb

- **Exploit the quantitative analytical power of the Standard Celeration Chart:** jumps and turns, bounce, projection of straight-line trends and envelopes, frequency multipliers, celeration multipliers, accuracy ratios, deficit ratios, etc.
- **Avoid controlled operants and latency measures:** unless you're trying to demonstrate the negative effects of procedure-imposed ceilings or replicate cognitive research paradigms. Fluency is *free*!
- **Avoid unexpected frequency ceilings:** be sure you have enough response frequency "headroom" if you're studying variables expected to increase frequency. Ceilings truncate celeration.
- **Calculate component/composite frequency ratios:** use them to estimate potential for improvement of composites.

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