Physical Retrieval Dynamics of Unexpected Fluent Processing

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Abstract

Inexplicable perceptual fluency often evokes feelings of familiarity, leading observers to interpret fluency as an indication of past experience. This discrepancy-attrition process (Whittlesea & Williams, 2001) is a central component of the Selective Construction and Preservation of Experience (SCAPE) framework. We observed inflated false-alarm rates for unexpectedly fluent items, and used mouse-tracking to document the time-course of these fluency effects.

The Present Investigation

Exactly where, and how, in the stream of processing does unexpected fluency have its effect?

- MouseTracker (10) was used to track decisions:
  - Initiation times: Production?
  - Area Under the Curve (AUC): Evaluation?

The Role of Expectations

- You never experience nagging familiarity upon seeing your spouse in the kitchen (6).
  - You do, however, have these experiences when seeing familiar people out of context.
- The expected realization that MEWSIC has meaning elicits an internal discrepancy.
- Discrepancy Attribution: Unconsciously attributing fluency to a source in the past.
  - Increased FA rates (7,8).

Selective Construction and Preservation of Experience (SCAPE) Framework

- SCAPE proposes that recognition decisions are the outcome of two stages (9):
  1) Production
     - The individual generates a mental representation of the current stimulus.
  2) Evaluation
     - The individual evaluates the efficiency, or quality, of production.

- When fluency is expected, evaluation should be rapid.
- When fluency is unexpected, evaluation should be exhaustive.

Fluency and Familiarity

- Fluency processing often produces strong feelings of familiarity (1,2).
  - Familiarity produced by fluency is often mistakenly attributed to prior experience.
  - In memory, this attribution process yields inflated false-alarm rates (1,3,4).
- Fluency can be measured with pronunciation latency (5).
  - Word pronunciation latency is shorter than latencies for pseudohomophones (e.g., MEWSIC, HOWCE) and nonwords (e.g., HENSION).

Results

Experiment 1

Will processing fluency affect familiarity (FA rates)? Does this effect occur during production (initiation times) or evaluation (AUC)?

- Small effect on AUC; no effect on initiation times.
- AUC was affected by familiarity: Unexpected fluency/familiarity yielded more curved trajectories.
  - SCAPE evaluation stage.

Experiment 2

How does unexpected disfluency affect memory?

- No effect on AUC or initiation times.

Discussion

- Unexpected processing fluency (Exp 1), or disfluency (Exp 2), produced stronger feelings of familiarity, relative to expected fluency.
  - This was reflected in inflated FA rates, consistent with Whittlesea and Williams (1998).
- Processing fluency marginally influenced AUC (Exp 1).
  - Suggests that fluency impacts the later, evaluation, stage of SCAPE.
- Fluency did not influence the production stage of SCAPE, as reflected by initiation times (Exps 1 and 2).
- Combined, the results suggest that unexpected fluency produces an exhaustive evaluation of the production process, without influencing production itself.
- Unanswered questions for future research:
  - People are usually not in “encoding or retrieval mode” (11). Is the memory task required?
  - Can participants recollect the change, and is this masking effects?

General Method

- Right-handed, native English speakers (n = 24 in Exp 1, n = 18 in Exp 2) first completed a pronunciation task.

Pronunciation Phase

- At test, mouse movements were tracked at 70 Hz.

Experiment 1: Unexpected Fluency

- New test items were either truly new, or changed versions of studied items (see table below).

Experiment 2: Unexpected Disfluency

- All new items were truly new. NWs items were divided between regular (e.g., ARROPHY, MICKED) and irregular (e.g., STOWFUS, PLUNDICT).

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Item Type</th>
<th>Stimulus</th>
<th>Status</th>
<th>Fluency</th>
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<tbody>
<tr>
<td>Exp 1 &amp; 2</td>
<td>Horse</td>
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<td>Expectedly fluent</td>
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<tr>
<td>Exp 1 &amp; 2</td>
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<td>Placuf</td>
<td>Expectedly fluent</td>
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<tr>
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</tr>
<tr>
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<tr>
<td>Exp 2</td>
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<td>Owl</td>
<td>Unexpectedly fluent</td>
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</tbody>
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References are available in handout:
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References


