Selection From Concurrent RSVP Streams: Attention Shift or Buffer Read-Out?

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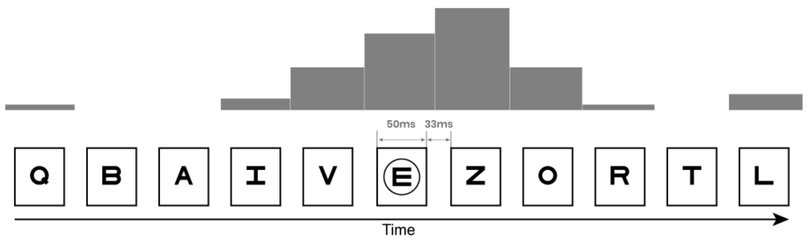
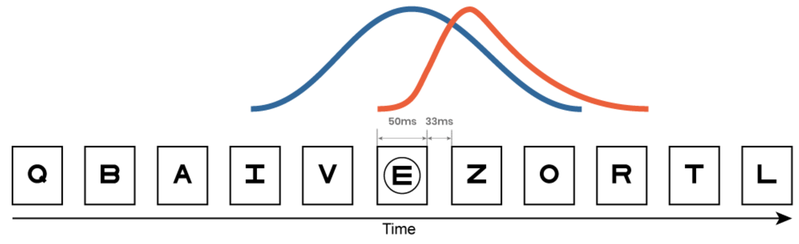
I am finishing my PhD soon and am looking for postdoc jobs in 2020

In the RSVP stream below, participants must report the circled letter. However, they report the letter before the cue more often than chance. This suggests buffered information.



Buffering is surprising, because we expected letters would be selected with **Attention Shifts** triggered by the onset of the cue.



Aim: Investigate the buffer's capacity

Method: 2 to 18 simultaneous RSVP streams

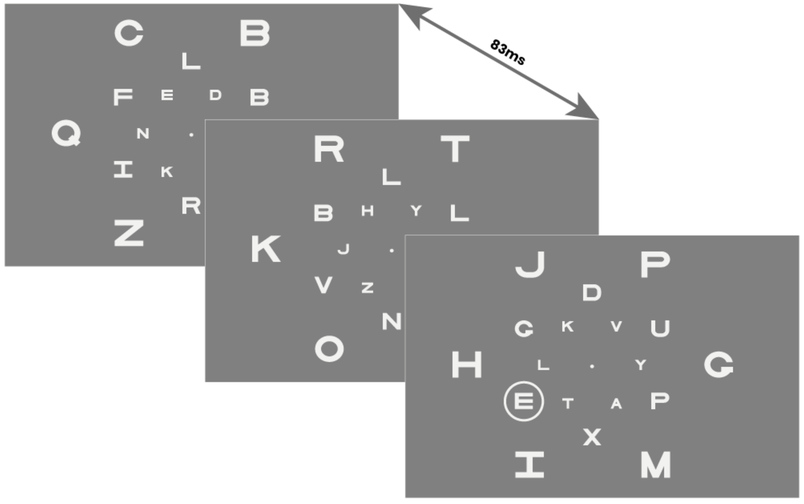
Modelling: The distribution of responses is modelled as a result of two processes.

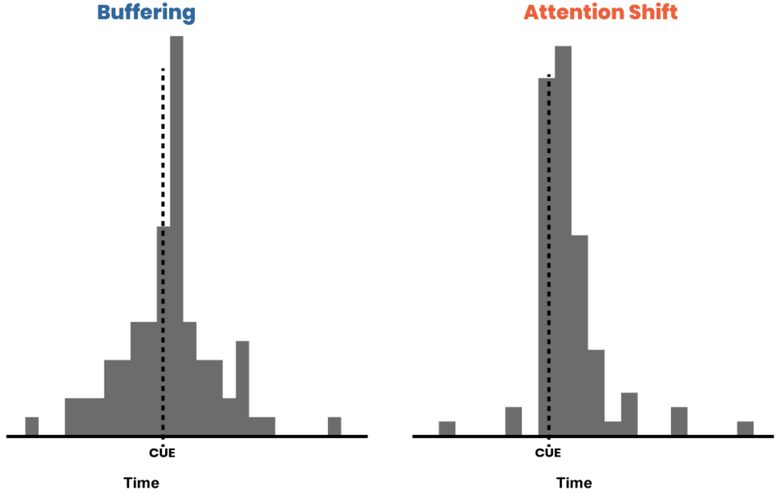
- Guessing
- Responses informed by the cue: **Buffering** or **Attention**

Fitting these models allows us to estimate:

- Efficacy: The proportion of guesses
- Latency: The mean time of non-guesses
- Precision: The dispersion of non-guesses

Another test for buffering: Bootstrap from the guessing distribution and compute a p-value for the observed count of responses from 1 item before the target.



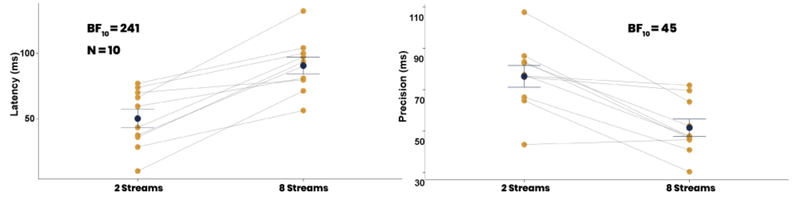


Experiment 1

Model Fits:

Two Streams: **9 Buffering**, **0 Attention**, 1 Ambiguous

Eight Streams: **0 Buffering**, **3 Attention**, 7 Ambiguous



Bootstrapping suggests some non-guesses from before the cue with 2 streams. None with 8

No Buffering with 8 Streams!?

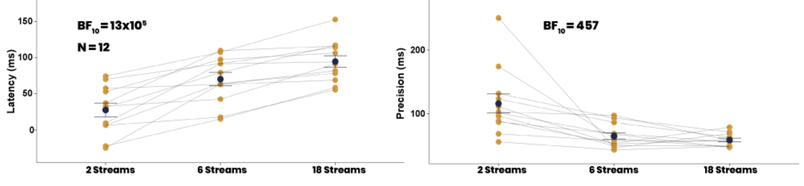
Experiment 2

Model Fits:

Two Streams: **11 Buffering**, **0 Attention**, 1 Ambiguous

Six Streams: **6 Buffering**, **0 Attention**, 6 Ambiguous

Eighteen Streams: **2 Buffer**, **5 Attention**, 5 Ambiguous



Bootstrapping suggests some non-guesses before the cue with 2 or 6 streams, none with 18 streams

No Buffering with 18 Streams!?

Control Experiments

Similar effect when number of streams held constant, but number of cue positions vary (**Experiment 3**). Effects not due to crowding (**Experiment 4**)

Conclusions

- **With few RSVP streams,selection can occur based on buffered information**
- **As the number of streams increases, evidence for buffering decreases**
  - **Converging evidence from model fits and bootstrapping**
- **Attention shifts appear as the number of streams increases**

Outstanding Issue
Is the buffer automatic or not?