Curriculum Effects in Multi-Schema Learning

Andre Beukers, Kenneth Norman

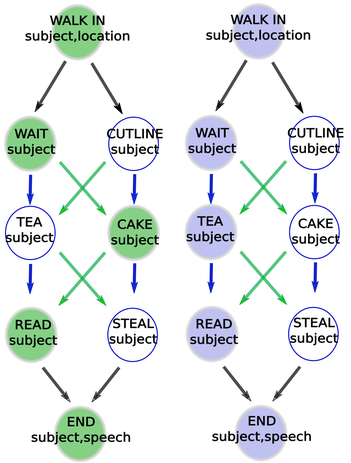
Curriculum A A A B B B vs A B A B A B

- Numerous experiments have explored the benefits of blocked vs. interleaved training on learning. For example, any studies have found that interleaved training benefits category learning [1], although sometimes benefits of blocked learning can be found [2]. Here we extend the study of curriculum effects to a statistical learning task involving explicit prediction.

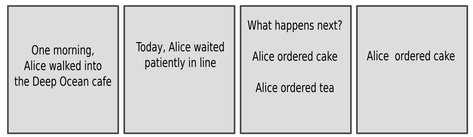
Event cognition theory

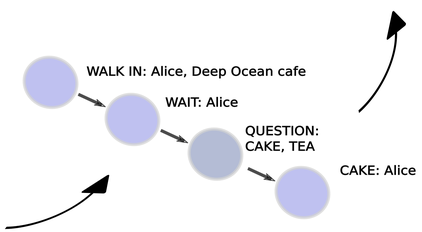
- How do we learn and use models of the environment for prediction? Event cognition proposes that the mind segments continuous experiences into discrete events [3] so that the appropriate event model (i.e. schema) can be brought to bear on prediction [4]. Because the driving learning signal of event segmentation is prediction error, which can only occur if there is a prediction or strong expectation, we hypothesize that event learning would also benefit from blocked curricula.

Approach:

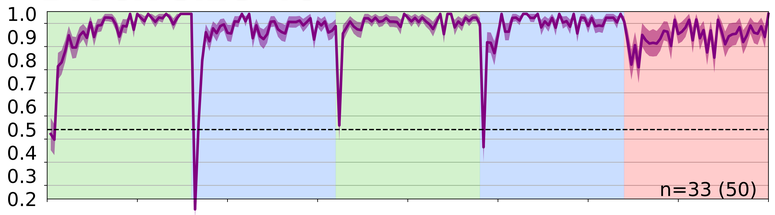


* 2AFC prediction paradigm
* algorithmically generated narratives
* manipulate curriculum
* measure learning and generalization



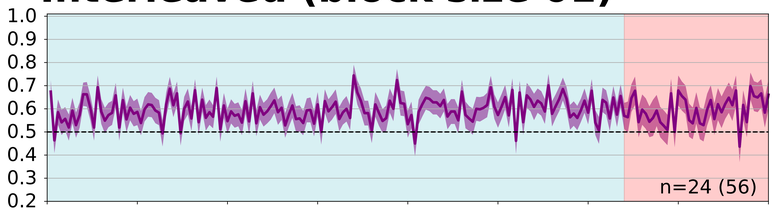


Block size 40

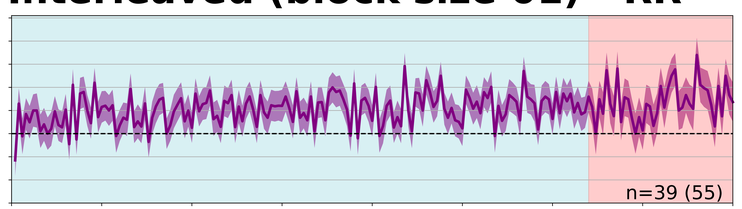


Block size 40 - RR

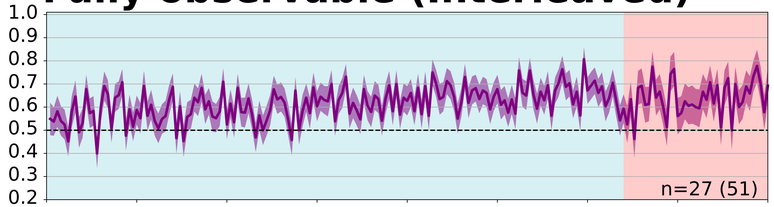
Interleaved (block size 01)



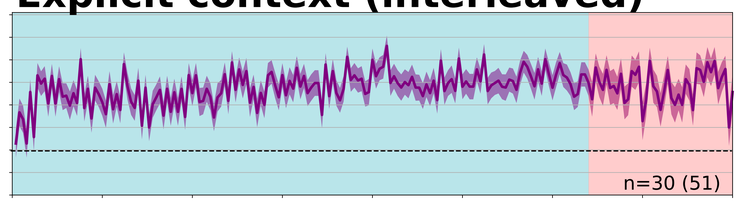
Interleaved (block size 01) - RR



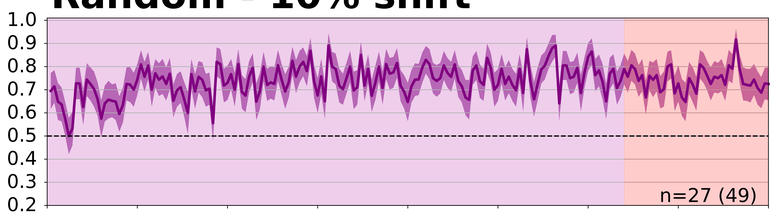
Fully observable (Interleaved)



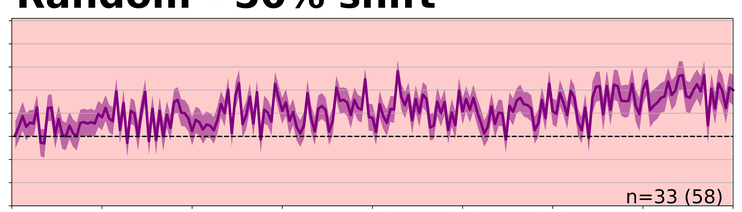
Explicit context (interleaved)



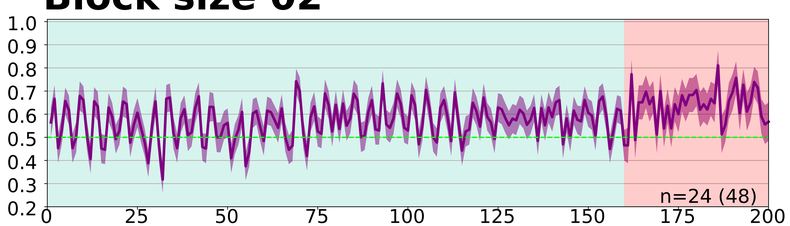
Random - 10% shift



Random - 50% shift



Block size 02



Discussion & Future directions

- We establish a behavioral paradigm for studying curriculum effects in event cognition. We show that unlike the majority of the category learning literature, learning is very challenging in environments that lack temporal autocorrelation (i.e. interleaved curricula). To better understand why this is the case we are developing computationally explicit hypotheses about how and when information from different contexts interfere and are testing these hypotheses using recurrent neural network archiectures.

References
[1] Schmidt & Bjork, 1992
[2] Carvalho & Goldsone, 2017
[3] Kurby & Zacks, 2007
[4] Franklin et al., 2019

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