Research Methods - Computational Methods Report - Phonological Loop

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The Phonological Loop is an auditory component in the working memory that is dedicated to the retention of verbal information. The loop is an adversarial system in which refresh and decay of the word occurs simultaneously and the two contrasting process struggle between remembrance and forgetfulness of the words.

Model provided in the Lewandosky book (Snippet 2.4):

The model of loop explains poorer memory for long words than short words has been taken to reflect the fact than in comparison to short words, fewer long words can be recalled or refreshed by rehearsal in the limited time before decay.

The model runs on certain assumptions,

1. All the 5 words are memorised together, not one by one.
2. The minimum activation, threshold is same for all the words in spite of word length (regardless of subjective familiarity for words)
3. The decay starts only after the item rehearsal starts
4. The decay function is similar for short and long words
5. The items of the list are rehearsed in the same order as presented
6. The loop considers primacy effect but does not consider latency effect (I think)

Variations:

1. Decay function is considered as an exponential to the word length.

   - This will rapidly increase the decay rate for the words, which will consequently decrease the proportionality correct of recall I.e. with rise in rate of forgetfulness of the list of words, the recall of the words drops down.

2. The decay function takes place word by word from the point of presentation

   - The decay function starts simultaneously with the presentation of the words which will also increase the decay compared to just decay during rehearsal which will pull down the proportionality correct when more almost to 0. This is implemented by introducing a for loop which will append activation for each word along with decay of the previous elements of the list. This will change activation of all 5 words from 100% to a gradient leading to 100% rememberance.

   The two variations affect the decay rate such that decay rises much rapidly compared to the provided model. So, to compensate, the decay rate(0.25) and standard deviation of decay(0.05) are scaled.

Limitations of the Variation:

1. The model considers the decay rate is exponential both during presentation and during rehearsal which may differ when compared to a realistic phonological loop.
2. It still considers the item rehearsal of words to occur in the same order as presented
3. The activation value for all words will commence at 100% (1.0)
4. The 1st item is always chosen for rehearsal when no words have the minimum activation value