

**Item Noise versus Context Noise: Using the List Length Effect
to Investigate the Source of Interference in Recognition
Memory**

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Declaration

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Overview

The present thesis aimed to investigate the source of interference in recognition memory. There are two primary alternatives – the item noise approach, in which interference comes about as a consequence of the other items on the study list, and the context noise approach, wherein interference arises from the previous contexts in which an item has been encountered. Alternatively, interference may occur through a combination of both item and context noise. There are many mathematical models designed to simulate the recognition process that incorporate either item or context noise, or both. Item noise models predict a significant list length effect, that is, that memory for an item that was part of a short list at study is better than that for an item that was part of a long list. Context noise models do not predict a significant difference in memory based on the length of the study list. The presence or absence of the list length effect can therefore be used as a mechanism by which to differentiate item and context noise models.

The list length effect is among the most documented and replicated findings in the recognition memory literature (Gronlund & Elam, 1994). Yet, while many experiments have been conducted which have identified a significant list length effect in recognition (e.g. Bowles & Glanzer, 1983; Cary & Reder, 2003; Murnane & Shiffrin, 1991; Ohrt & Gronlund, 1999; Strong, 1912; Underwood, 1978), a number of published studies have failed to identify the effect (e.g. Dennis & Humphreys, 2001; Dennis, Lee & Kinnell, 2008; Jang & Huber, 2008; Murnane & Shiffrin, 1991; Schulman, 1974).

Dennis and Humphreys (2001) argued that studies that had identified a significant effect of list length on recognition performance had done so because of a failure to control for four potentially confounding variables; retention interval, attention, displaced rehearsal and

contextual reinstatement. The possible confounding effects of retention interval and displaced rehearsal are already well established in the literature and most studies employ some controls for these. Dennis et al. (2008) also found that while the role of contextual reinstatement had a pronounced influence on the detection of the list length effect it did not appear to be the most influential of the potential confounds. Thus, a major aim of the present thesis was to investigate the role of attention in the identification of the list length effect.

Experiment 1 ($N=160$) involved two manipulations of attention. The first was to use either a retroactive or proactive design, with differential lapses of attention likely to be more pronounced in the latter. Second, in one condition participants were asked to perform a pleasantness rating task at study, a common technique to encourage participants to attend to the stimulus, while in the other condition they were asked to simply read the words. Results indicated that attention modulates the list length effect and that it is the retroactive versus proactive distinction which is most important as a significant effect of list length was found only when the proactive design was used. The encoding task had little effect.

The design of Experiment 2 ($N=80$) was based on Cary and Reder's (2003) Experiment 3 which itself was a partial replication of Dennis and Humphreys' (2001) experiments. Cary and Reder introduced the Remember-Know (RK) task into the test list in their experiments and identified a significant effect of list length in the presence of controls for the four confounds where Dennis and Humphreys had not. The RK task is thought to index the relative contributions of familiarity and recollection in the recognition process (Gardiner, 1988). To the extent that the RK task encourages a recall-like process (see Clark, 1999; Diana, Reder, Arndt & Park, 2006) it may influence the results regarding the list length effect, in that the effect is widely accepted to occur in recall. Experiment 2 compared recognition memory with or without RK instructions. One condition involved the standard

yes/no recognition paradigm, while the other made us of the RK task following all “yes” responses. Controls for the four potential confounds of Dennis and Humphreys were implemented. No significant effect of list length was identified in the accuracy data of either condition, however there was a small but significant effect on median response latency for correct responses in the RK task condition.

The results of Experiments 1 and 2 suggest that the effect of list length on recognition performance is negligible and nonsignificant when controls for the four potential confounds of list length are in place. However, both of these experiments, and almost all previous experiments investigating the list length effect, used words as the stimuli. The remaining four experiments in the present thesis ($N=40$ in each) sought to investigate the list length effect using stimuli other than words in an attempt to identify the boundary conditions of the effect. Each of these experiments followed the same basic method as Experiments 1 and 2. Four different kinds of stimuli were investigated, word pairs, images of novel faces, fractals and photographs. Results indicated a nonsignificant effect of list length for word pairs and photographs, however, there was a significant list length effect when faces (in the accuracy data) and fractals (in the response latency data) were used as the stimuli.

However, all of the experiments in the present thesis used a within subjects manipulation of list length in order to maximise experimental power. This design may be an additional confound of the list length effect. The nature of the within subjects design means that by the end of the second study list, all participants will have studied the same number of items, thereby potentially removing any list length manipulation from the experiment. In addition, participants who studied the long list first may be more likely to be affected by lapses in attention than participants who began with the short list with this, rather than interference, the potential cause of any list length differences. In order to investigate this

potential confounding, the results from all experiments of the present thesis were re-analysed using a between subjects analysis based on only the first list studied by each participant. The qualitative conclusions drawn from the majority of conditions remained unchanged. The between subjects analysis generally revealed larger effect sizes than did the within subjects analysis, although with the exception of the proactive conditions, these effects can be considered negligible to small at most.

The pattern of results across the six experiments of the present thesis are problematic for existing mathematical models of recognition memory. While context noise models are able to account for negligible and nonsignificant effects of list length when words, word pairs and photographs are used as the stimuli, they are unable to predict a slightly larger and significant list length effect when the stimuli are novel faces or fractals. Conversely, while item noise models are able to account for a significant list length effect for faces and fractals, they are unable to predict a nonsignificant list length effect for words and word pairs.

The results question whether either item or context noise can be taken as the sole source of interference in recognition memory. Rather, a combination of interference from different sources may be at work, with the precise nature of this combination dependent on the nature of the stimuli involved. However, it is important to note that these models must be able to all but eliminate interference from other items under certain conditions to obtain the negligible list length effect findings reported here.