Item Recognition And Familiarity

An Electrophysiological Investigation Into The Costs Of Unitization.

Lea K. Pilgrim, Jamie G. Murray & David I. Donaldson

SINAPSE Scottish Imaging Network - A Platform for Scientific Excellence

UNIVERSITY OF STIRLING
Psychological Imaging Laboratory

Lay Summary

Recognition relies on two processes: **familiarity** (a general feeling that you recognise someone or something) and **recollection** (a more detailed recognition including, for example, the context or time someone/something was encountered). Recent research suggests that familiarity can aid in the recognition of word pairs only if they have been 'unitized', i.e. combined into a single unit. But what happens if you try to recall just a single word from a unitized pair – can familiarity still support its recognition or is recollection required? In the following study we address this question using event-related potentials - a well-established technique for distinguishing between familiarity and recollection.

Background

Two theoretical accounts of unitization – with different predictions about its effect on familiarity (F) for individual items:

Benefits-only (F)

Unitization creates both a unitized representation plus representations of the constituent elements. All would be accessible via ***familiarity***.

Cost & Benefits (F)

Unitization creates a single bound representation that is perceived and remembered as one entity. Recognition of the individual constituents would require ***recollection***.

QUESTION

Does unitization of word pairs impair later familiarity for individual words from that pair?

Study Design & Methods

Three study conditions: Single Item (I), Non-Unitized pairs (NU) and Unitized pairs (U). 40 words/pairs per condition. Unitization is achieved by asking participants to imagine the two words interacting together. In the non-unitized condition they imagine the two words separately.

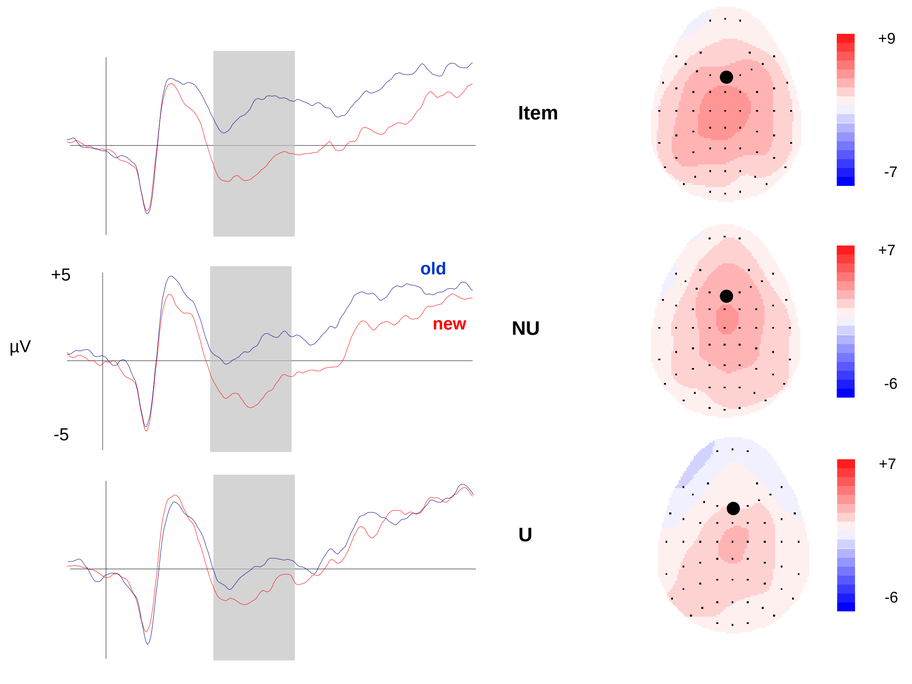
Single **Recognition Task** – single words presented from each of the three study conditions, plus an equal number of unstudied words, for 'old' or 'new' decision. Word pairs were unrelated. Words across conditions were matched for frequency, length, age of acquisition, familiarity, concreteness and imageability.

EEG was recorded from 62 scalp locations using silver/silver chloride electrodes and re-referenced offline to linked mastoids. **ERPs** were formed relative to the onset of words during the Recognition Task.

Grand averages were created in four conditions: words previously studied as Single Items (I), words studied in Non-Unitized pairs (NU), words studied in Unitized pairs (U) and New (unstudied) words. Contrast correct **old-new** responses in each condition in two time windows reflecting Familiarity & Recollection

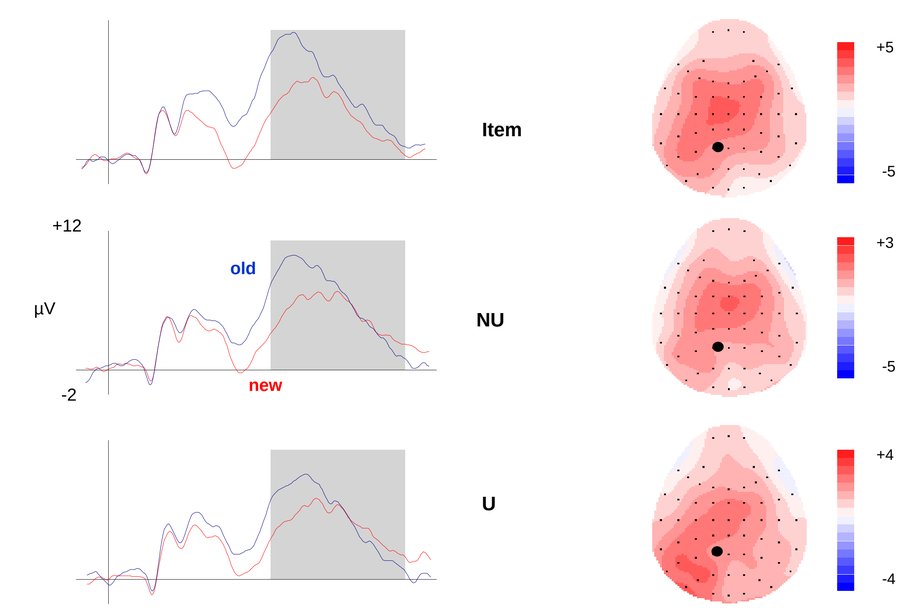
Results

Familiarity (Frontal 300-500ms)



We found the largest familiarity effect in the Item condition as predicted by transfer appropriate processing theory. More interestingly there was a significant difference between NU and U conditions (t_{21} = 2.19, p = .040) – with a smaller familiarity effect in the U condition.

Recollection (Left Parietal 500-900ms)



Although the recollection effect was largest in the Item condition, in contrast to the familiarity effect, there were no significant differences between NU and U conditions (t_{21} = .936, p = .360).

ANSWER

YES (F) **familiarity for individual words from unitized pairs is reduced compared to those from non-unitized pairs.**

This pattern is consistent with the ***'Costs & Benefits'*** model of unitization – the constituent elements that make up a unitized representation are no longer readily available to familiarity and must rely instead on recollection.

Contact: lea.pilgrim@stir.ac.uk. LKP is funded by SINAPSE. DID is a member of SINAPSE.