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Conjunction errors in recognition memory: Modality-free errors for older adults but not for young adults

Todd C. Jones [a,*], Larry L. Jacoby [b]

[a] *School of Psychology, Victoria University of Wellington, P.O. Box 600, Wellington, New Zealand*
[b] *Department of Psychology, Campus Box 1125, Washington University in St. Louis, St. Louis, MO, 63130-4899, United States of America*

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Abstract

A dual-process theory of memory was applied to processes in normal aging, with a focus on recognition errors in the feature-conjunction paradigm (i.e., false recognition of *blackbird* after studying parent words *blackmail* and/or *jailbird*). Study repetition was manipulated so that some parent words occurred once and others occurred three times. Age-related differences on hit scores occurred for two experiments. The results for feature and conjunction conditions showed repetition effects but no age-related differences when participants were uninformed of the lures (Experiment 1). However, age-related differences emerged when the retrieval of modality source information created a way to evade conjunction errors (Experiment 2). In the second experiment, study repetition decreased errors for the young adults but increased errors for the older adults, and young adults were better able than older adults to avoid conjunction errors when the parent words had been repeated. For older adults, the conjunction errors were modality-free. The results provide additional evidence that older adults experience difficulty in recollecting aspects of a study experience, and the results from groups of young adults required to respond quickly on the tests provide converging evidence for this conclusion.

* Corresponding author. Tel.: +64 4 463 5233x8227; fax: +64 4 463 5402.
E-mail address: todd.jones@vuw.ac.nz (T.C. Jones).

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1. Introduction

Dual-process theories offer a useful framework for recognition memory research (for a review, see Yonelinas, 2002), and a dual-process perspective has been applied to help understand changes in memory with the normal aging process (Jacoby, 1999a, 1999b; for a review, see Light, 1991). The basic idea is that older adults exhibit little or no decline in relatively automatic processes (e.g., familiarity) but show a substantial decline in controlled processes (e.g., recollection). A critical aspect of this approach is that familiarity and recollection provide alternative bases for responding on a memory test (Jacoby, 1991, 1999b). Reliance on familiarity or recollection can produce a hit. However, when conditions are created to place evidence from familiarity and recollection at odds with each other, one has an opportunity to observe their separate influences.

For example, Jacoby (1999b) concluded that a variable generally thought to benefit memory—study repetition—increases both familiarity and recollection (also see Jacoby, Jones, & Dolan, 1998; McElree, Dolan, & Jacoby, 1999). An increase in familiarity from study repetition was apparent in Jacoby's (1999b) recognition memory study by an increase in errors for words designated for exclusion from "old" judgments on the basis of study modality/list membership, and an increase in recollection was evident by a reduction in these errors. Study repetition increased exclusion errors for older adults but decreased exclusion errors for young adults. Relative to young adults, older adults suffered from a normal decline in recollection, leaving themselves open to the influence of familiarity.

Other familiarity-based errors, such as feature and conjunction errors (Reinitz, Lammers, & Cochran, 1992; Underwood & Zimmerman, 1973; Underwood, Kapelak, & Malmi, 1976), appear to be good candidates for informing a dual-process theory approach as applied to the normal aging process. In the feature-conjunction memory paradigm, parts of stimuli that are presented in a study phase (e.g., *nighthawk*, *blackmail*, and *jailbird*) are recombined to form challenging lures on a recognition test (*nightcap* and *blackbird*). A test item constructed from an old element and a new element (e.g., *nightcap*) is referred to as a feature lure, whereas a test item constructed with rearranged old components (e.g., *blackbird*) is called a conjunction lure. Error rates for feature and conjunction conditions above false alarms to wholly new words are considered feature and conjunction effects.

In a dual-process explanation, familiarity engendered by the old component(s) of feature and conjunction lures biases one to commit false recognition errors (above chance), but recollection for a parent word presented earlier in the study phase (e.g., *blackmail* was presented, not *blackbird*) can be used to overcome the influence of familiarity to avoid an error (e.g., Jones, in press; Jones & Atchley, 2002; Jones &