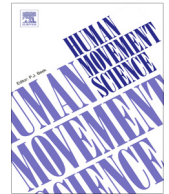




ELSEVIER

Contents lists available at ScienceDirect

## Human Movement Science

journal homepage: [www.elsevier.com/locate/humov](http://www.elsevier.com/locate/humov)

# The death of recency: Relationship between end-state comfort and serial position effects in serial recall: Logan and Fischman (2011) revisited



Samuel W. Logan <sup>a,\*</sup>, Mark G. Fischman <sup>b</sup>

<sup>a</sup> Oregon State University, School of Biological and Population Health Sciences, Women's Building 203b, 160 SW 26th St., Corvallis, OR 97331, USA

<sup>b</sup> Auburn University, School of Kinesiology, 301 Wire Road, Auburn, AL 36849, USA

## ARTICLE INFO

### Article history:

Received 6 April 2015

Revised 3 August 2015

Accepted 7 August 2015

### Keywords:

Motor processes

Learning and memory

## ABSTRACT

Two experiments examined the dynamic interaction between cognitive resources in short-term memory and bimanual object manipulation by extending recent research by Logan and Fischman (2011). In Experiment 1, 16 participants completed a bimanual end-state comfort task and a memory task requiring serial recall of 12 words or pictures. The end-state comfort task involved moving two glasses between two shelves. Participants viewed the items, performed the end-state comfort task, and then serially recalled the items. Recall was evaluated by the presence or absence of primacy and recency effects. The end-state comfort effect (ESCE) was assessed by the percentage of initial hand positions that allowed the hands to end comfortably. The main findings indicated that the ESCE was disrupted; the primacy effect remained intact; and the recency effect disappeared regardless of the type of memory item recalled. In Experiment 2, 16 participants viewed six items, performed an end-state comfort task, viewed another six items, and then serially recalled all 12 items. Results were essentially the same as in Experiment 1. Findings suggest that executing a bimanual end-state comfort task, regardless of when it is completed during a memory task, diminishes the recency effect irrespective of the type of memory item.

© 2015 Elsevier B.V. All rights reserved.

## 1. Introduction

The end-state comfort effect (ESCE) is defined as the preference of individuals to maximize comfortable hand and arm positions at the completion of object transport tasks, rather than at the beginning. The ESCE has been studied for over 25 years, beginning with the pioneering work of Rosenbaum et al. (1990), as a way to investigate the relationship between the cognitive and physical components of motor behavior. See Rosenbaum, Chapman, Weigelt, Weiss, and van der Wel (2012) for a comprehensive review of the ESCE. The effect has been observed for unimanual and bimanual bar-transport tasks (Fischman, Stodden, & Lehman, 2003; Rosenbaum et al., 1990; Short & Cauraugh, 1999) as well as the overturned glass task (Breslin & Fischman, 2015). For this task, the planning constraint of end-state comfort is apparent when adults reach for an overturned glass to turn it right side up. Typically, initial contact with the glass is made with an awkward pronated grip (thumb-down), followed by supination of the hand at the end of the movement, which ensures a comfortable thumb-up

\* Corresponding author.

E-mail addresses: [sam.logan@oregonstate.edu](mailto:sam.logan@oregonstate.edu) (S.W. Logan), [fischmg@auburn.edu](mailto:fischmg@auburn.edu) (M.G. Fischman).

ending posture (Breslin & Fischman, 2015). The overturned glass task is also a simple and functional task that is ecologically relevant (Hughes & Franz, 2008).

Memory performance has received extensive investigation in the field of psychology. Working memory includes processes required for holding and manipulating information while performing cognitive tasks (Baddeley, 2000). A consistent finding of studies examining working memory performance is the serial position effect (Glanzer & Cunitz, 1966; Murdock, 1962). When individuals must recall a sequence of items recall is better for information presented at the beginning (primacy effect) and at the end of the sequence (recency effect), with much lower recall of information towards the middle of the sequence.

Research indicates that the primacy and recency effects can be disrupted through various task manipulations. Recall of primacy and middle items of a sequence can be affected by item presentation rate (Glanzer & Cunitz, 1966), frequency (Raymond, 1969), and list length (Murdock, 1962). The recency effect can be disrupted if participants perform an intervening task after item presentation but before recall of the items. The intervening task does not disrupt the primacy effect. This finding has been demonstrated with an intervening task of mental arithmetic (Glanzer & Cunitz, 1966; Postman & Phillips, 1965) and a backward counting task (Bjork & Whitten, 1974). The most common interpretation of this result is that the intervening task clears items from short-term memory (recency items) but items that have already been transferred to long-term memory (primacy items) are unaffected.

Evidence suggests that memory performance is influenced by the level of processing of stimuli (Craig & Tulving, 1975; Paivio, 1969, 1976). Research has demonstrated that in general, pictures are remembered better than words in free recall (Madigan, McCabe, & Itatani, 1972), associative recognition (Hockley & Bancroft, 2011), and item recognition tasks (Defeyter, Russo, & McPartlin, 2009). This finding is known as the picture superiority effect. An explanation of the effect includes the dual-coding hypothesis that holds that pictures are coded at the visual and verbal levels, thus increasing the depth of processing (Paivio, 1969, 1976).

Recently, a line of research has emerged that examined the end-state comfort and serial position effects in the same study (Logan & Fischman, 2011; Weigelt, Rosenbaum, Huelshorst, & Schack, 2009). Participants in Weigelt et al. (2009) used free or serial recall of a memory task (recalling 11 letters) while simultaneously performing the end-state comfort task of opening drawers of different heights. End-state comfort was measured by whether the dominant hand was used and if participants used a “palms up” or “palms down” grip, which should vary according to drawer height. Weigelt et al.’s (2009) results provided partial support for a motor interference hypothesis that stated the serial position effect, including both the primacy and recency aspects, may be affected by performing an intervening motor task. The end-state comfort and primacy effects remained intact and the recency effect disappeared in serial and free recall. Weigelt et al. (2009) suggested that proactive interference might account for the disappearance of the recency effect. Proactive interference suggests that the motor task was sufficiently demanding to influence memory performance and that recall of primacy letters was not influenced because there was not much motor activity yet. However, as the participants continued to open drawers to reveal letters, proactive interference disrupted recall of recency items.

Logan and Fischman (2011) extended the work of Weigelt et al. (2009) by examining the relationship between unimanual and bimanual end-state comfort tasks and memory performance in serial and free recall. The purpose was to determine if the findings of Weigelt et al. (2009) could be replicated during both more complex (bimanual overturned glass task) and simpler (unimanual cylinder task) motor tasks that were completed after all information of the memory task had been presented. In Experiment 1, participants viewed 11 letters, performed the bimanual overturned glass task, and then recalled the letters using serial or free recall. Similar to Weigelt et al. (2009), results indicated that the ESCE remained salient and the recency effect disappeared in serial and free recall, but with greater disruption for serial recall. These results provided partial support for the motor interference hypothesis. Logan and Fischman hypothesized that the results could be due to retroactive interference from the competition between cognitive resources needed for motor planning of the intervening end-state comfort task and mental rehearsal of items for memory recall.

Therefore, Logan and Fischman (2011) conducted a second experiment and hypothesized that simpler motor tasks might “bring back” the recency effect because fewer cognitive resources would be needed for motor planning. In Experiment 2, participants completed a bimanual or unimanual motor task that involved moving one or two plain, non-descript cylinder(s) from an upper shelf to a lower shelf. Participants viewed 11 letters, performed the motor task, and used serial or free recall. Similar to Experiment 1, the primacy effect remained intact and the recency effect disappeared for serial and free recall. Again, the disappearance of the recency effect was more prominent for serial recall. Logan and Fischman suggested that the disruption of the recency effect may have been due to a basic concurrence cost which holds that performance of a primary task is diminished due to the simple awareness of an upcoming secondary task (Navon & Gopher, 1979; Noble, Sanders, & Trumbo, 1981).

A recent series of systematic studies by Spiegel and colleagues (Spiegel, Koester, & Schack, 2013, 2014; Spiegel, Koester, Weigelt, & Schack, 2012) further investigated Logan and Fischman’s (2011) concurrence cost hypothesis within a broader theoretical framework. We briefly review their work next. Spiegel et al. (2012) manipulated high-precision and low-precision movements during the retention phase of a working memory task requiring the recall of 9 random English consonants presented in a 3 × 3 matrix. They found that having to replan high-precision movements produced greater reduction in memory performance than replanning low-precision movements, with the locus of the effect occurring in the planning phase rather than the execution phase. There were no effects of replanning on movement execution time.

Download English Version:

<https://daneshyari.com/en/article/7291709>

Download Persian Version:

<https://daneshyari.com/article/7291709>

[Daneshyari.com](https://daneshyari.com)