lists and, when asked to freely recall items from an unstructured list, will tend to cluster their responses by category similarity (Bousfield, 1953; Bousfield & Cohen, 1955;

commercial breaks in brief movies. Like Boltz (1992), they found that placing interruptions at event boundaries facilitated subsequent memory. Zacks and Tversky (2003) taught participants to perform new everyday tasks, such as building a model, by using computer interfaces that either supported effective segmentation or did not. Learning was better when the interface supported effective segmentation.

Manipulating participants' orientation to event segmentation during event encoding also may affect subsequent memory. Lassiter and colleagues found that instructing participants to segment events at a fine temporal grain led to better memory than instructions to segment at a coarse grain (Lassiter, 1988; Lassiter et al., 1988). However, the generality of this finding has been a matter of debate (see Hanson & Hirst, 1989; Lassiter & Slaw, 1991).

In nearly all previous studies investigating memory and segmentation, memory was assessed within a few minutes following encoding of the event. Sargent et al. (2013), Bailey et al. (2013), Kurby and Zacks (2011), and Lassiter (1988) asked participants to segment movies of everyday actions lasting less than 10 min, and then assessed for memory of the movies directly following each MC/P << /0.0ssed fdcon.ace srlon, m2

(376 s), and a male actor gardening (354 s). A short practice movie of a man building a boat out of Duplo blocks (155 s) also was presented. During the initial encoding, each participant performed one of three tasks, *event segmentation, intentional encoding,* or *timing,* with all

Session two occurred 24 –48 hours later. During this session, participants completed memory tests for the second movie viewed during session one and completed the script knowledge task. Session three occurred seven to nine days following session one. During this session, participants completed the recall and recognition tests for the last movie viewed during session one.

In short, the study design included the between-participants variable of task (segmentation, intentional encoding, or timing) and the within-participants variable of delay (10 min, 1 day, 1 week).

Recall and Script Elicitation Scoring—The primary dependent measures were recall and recognition performance, and segmentation performance for the event segmentation group. Here, we describe how the recall protocols and segmentation agreement were scored, and also how the independent variable of script knowledge was scored.

Due to the large number of responses, hand scoring of the recall protocols was not practical. Therefore, we validated a simple alternative measure,eco95gue ll cript an a from25(practical.)] TJ pree alteious sh

performance,

When conducting Experiment 2, we found that the one month delay substantially increased our attrition rates. We therefore collected a second sample; the two samples are reported separately as Experiments 2A and 2B.

Method

delay, we compared the full model to a reduced model with no interaction terms. The comparison was not significant, meaning there was not evidence that the strength of the relation varied with delay [Experiment 2A: $\chi^2(1) = .35$, p

segmentation groups performed the recognition trials slightly and non-significantly faster than the intentional encoding groups.

Experiment 3

Experiments 1, 2A and 2B established that segmenting a movie while viewing it improved subsequent memory. They also found that participants with higher segmentation agreement scores consistently had better memory than those with lower segmentation agreement scores over time. These effects were present when memory was tested a few minutes after

Data Preparation—One hundred and twenty-nine participants were excluded from analyses because valid data were not recorded for one or more of the memory measures. Preparation procedures for recall and recognition were the same as in Experiment 1. As a result, seven participants were excluded for being outliers on memory measures. Thus, the final sample consisted of $n = 314$ participants, 120 in the segmentation condition and 194 in the intentional encoding condition.

Results and Discussion

As in Experiment 1, linear mixed models were constructed to predict the dependent measures. (Further pairwise comparisons were not required because the design included immediate test, whereas a normatively effective strategy (i.e., testing) produced better memory after a delay. [2] In addition, we replicated the finding of the previous experiments that participants with better segmentation agreement also had better memory; this also replicates previous results with immediate tests (

opportunity to practice their task using the practice movie. Movie presentation order was counterbalanced. As in the previous studies, the primary dependent measures were recall and recognition performance, and segmentation for the event segmentation group.

Data Preparation—Data preparation procedures were the same as in Experiment 1. From the sample, 145 participants were excluded for not having valid data on one or more of the memory measures. In addition, 56 participants were identified as being outliers on at least one of the memory measures and were excluded from analyses. The final sample for the experiment consisted of 575 participants (192 segmentation, 194 intentional encoding, and 189 timing).

Results and Discussion

Analysis procedures were the same as in Experiments 1, 2A and 2B. We treated participant and movie as random effects in constructing the linear mixed models.

Recall—Averaging across delay conditions, the segmentation group recalled the most information from the movies (*M*

For response time, the timing group responded significantly faster (M = 4164 ms, SD =

dual-task interference with the encoding of detailed perceptual features suppresses performance of the segmentation group on the initial test.

We also found that individual differences in segmentation predicted memory in both the immediate and 10 min delay conditions. This replicates what was observed in the previous segmentation agreement subsequently remember more: they have formed more adaptive event representations.

The finding that performing the segmentation task leads to better memory also is consistent with EST, though it is not so clearly entailed by the theory. According to EST, the process of event segmentation is not typically part of conscious awareness. This proposal is supported by data showing that, with little training, viewers are able to segment activity with good agreement across observers (Bailey et al., 2013; Sargent et al., 2013; Zacks et al., 2006) and within observers across time (Speer, Swallow, & Zacks, 2003), and by data showing that some parts of the cortex increase in activity during event boundaries when observers are simply watching movies or reading stories without the intention of segmenting them (Speer, Zacks, & Reynolds, 2007; Whitney et al., 2009 elaboration (Craik & Lockhart, 1972), or survival processing (

the current living situation of the client. Future studies should investigate the efficacy of adapting the event segmentation task as a clinical intervention for use in dementia populations.

Bousfield WA, Cohen BH. The occurrence of clustering in the recall of randomly arranged words of different frequencies-of-usage. The Journal of General Psychology. 1955; 52(1):83–95.

Bower GH, Black JB, Turner TJ. Scripts in memory for text. Cognitive Psychology. 1979; 11(2):177–220.

Bower GH, Clark-Meyers G. Memory for scripts with organized vs randomized presentation. British Journal of Psychology. 1980; 71(3):369–377.

Bransford JD, Barclay JR, Franks JJ. Sentence memory: A constructive versus interpretive approach. Cognitive Psychology. 1972; 3(2):193–209.

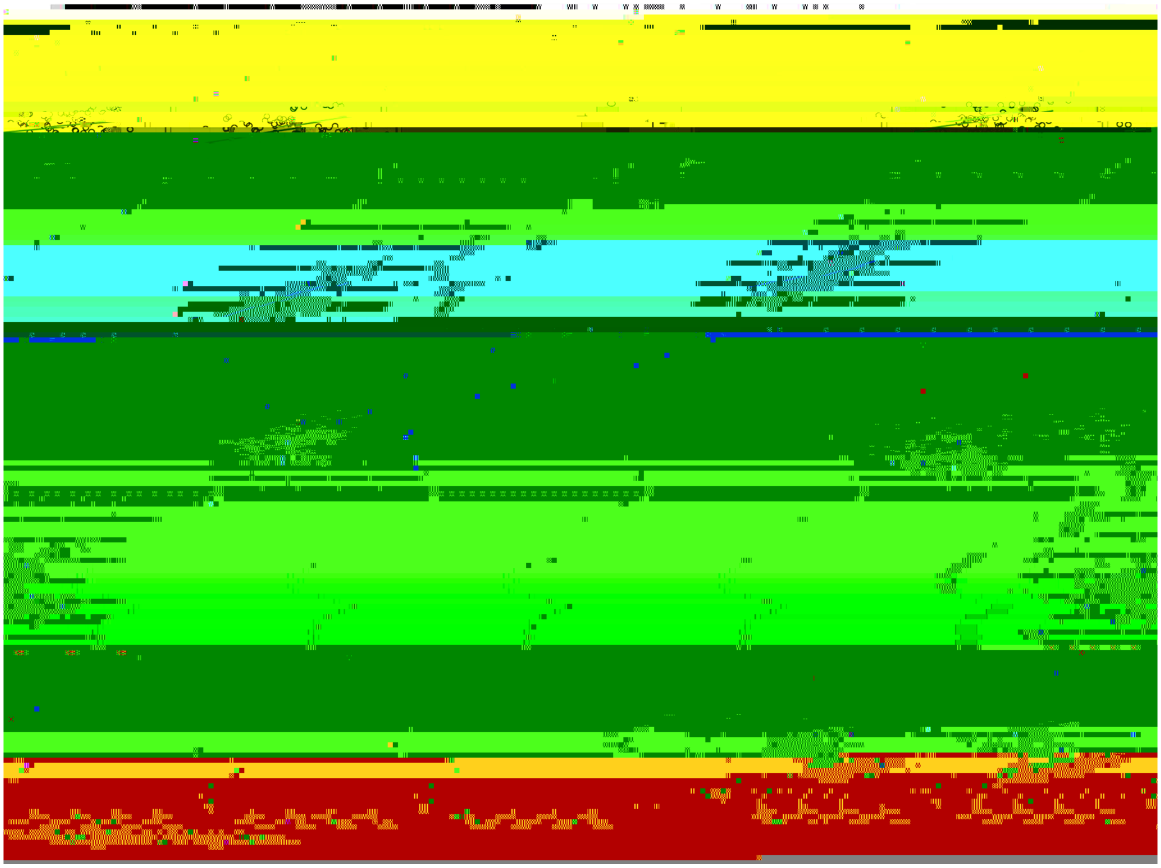
Brewer WF, Dupree DA. Use of plan schemata in the recall and recognition of goal-directed actions. Journal of Experimental Psychology: Learning, Memory, and Cognition. 1983; 9(1):117–129.

Jenkins JJ, Russell WA. Associative clustering during recall. Journal of Abnormal Social Psychology. 1952; 47(4):818–821.

Jorm AF, Jacomb PA. The informant questionnaire on cognitive decline in the elderly (IQCODE): Sociodemographic correlates, reliability, validity and some norms. Psychological Medicine. 1989; 19(4):1015–1022. [PubMed: 2594878]

R Core Team. R: A language and environment for statistical computing (Version 3.0.2). Vienna, Austria: R Foundation for Statistical Computing; 2013. Retrieved from

Figure 5.



Relationship between segmentation agreement and recall memory at each delay for all six