

Dartmouth College  
Department of Psychological and Brain Sciences  
HB 6207 Moore Hall  
Hanover, NH, 03755

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To the editors of *Psychological Review*:

We have enclosed our manuscript entitled *Feature and order manipulations in a free recall task affect memory for current and future lists* to be considered for publication as an *Article*. The main question we explore in our manuscript is: can changing the way we present the same lists of words affect how people remember those lists and/or future lists?

All of the 452 participants in our study encountered the same 16 lists of 16 words each. The items on each list varied along two semantic dimensions (word category, size of referent), two lexicographic dimensions (word length, first letter), and two visual dimensions (text color, onscreen presentation location). Across different conditions in the experiment, we manipulated whether the visual features varied across items (i.e., each word is presented in a different font color and at a different location) or whether the visual features were held constant across items (i.e., each word is presented in black at the center of the screen). We also manipulated the presentation orders such that, across different conditions, participants studied some lists in a randomized order and other lists in an order that sorted items along one or more feature dimensions. These manipulations changed systematically across lists, enabling us to study the memory consequences of these manipulations on the manipulated lists as well as on later lists (subjected to potentially different manipulations).

We observed several particularly exciting demonstrations that how and what people remember can be influenced by the way they experience the to-be-remembered content and on their prior experiences. First, even though the visual features were incidental to the participants' task (i.e., remembering as many words as possible), and even though every participant saw exactly the same words and lists overall, some of the visual manipulations led participants to remember more words. Second, participants showed substantial variability in how "susceptible" they were to the order manipulations. Participants whose behaviors were affected most by the order manipulations also showed lingering impacts on later lists that were *not* subjected to the same order manipulations. Third, we used a real-time behavioral manipulation to change how new lists were presented, according to how individual participants had recalled earlier lists. We show that when we organize to-be-memorized lists in ways that are compatible with how participants "naturally" recalled earlier lists, the participants remember more words overall.

Our study touches on deep questions about how we learn and remember. At the core, our findings show how the same to-be-remembered content can be encoded, organized, and retrieved differently depending on how it was experienced and what other experiences happened nearby

in time. We also show that different people have different “preferences” regarding how they will encode and organize the words they study. Conforming to or violating those preferences enabled us to manipulate memory performance. If memory performance depends in part on how the to-be-remembered content is presented to us, what are the limits of our memory systems? Might *other* manipulations in some future study or application show even stronger impacts on memory? How far can the capacities of our memory systems be pushed? Are there implications of these effects on other domains, such as personalized instruction or automated tutoring systems?

We also draw several important links between our work and other recent findings related to naturalistic memory; context effects on memory performance and organization; priming effects on memory; and expectation, event boundaries, and situation models. Essentially, we see our manipulations (and findings) as helping to bridge key gaps between a large literature describing memory in “traditional” list-learning tasks, and a growing literature describing memory in more “naturalistic” settings such as real-world experiences, written narratives, movies, classrooms, and so on. For example, we designed several of our experimental manipulations to mimic several aspects of the temporal and conceptual structure that are fundamental to naturalistic scenarios. However, whereas it can be very difficult to explicitly model or formalize the temporal progression of naturalistic experiences, our paradigm is more amenable to modeling and incorporating stimulus manipulations.

We expect that this article will be of interest to readership interested in learning and memory, real-time experimental design, priming effects on memory, and more.

Thank you for considering our manuscript, and I hope you will find it suitable for publication in *Psychological Review*.

Sincerely,

Jeremy R. Manning

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