

# Event Segmentation Drives Memory Updating

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To the consternation of those of us in experimental psychology, human experience is not made up of “stimuli.” Rather, it is made of events—meaningful chunks of activity that form the units of perception, action planning, and memory. In this talk I will describe a theory of how event representations arise in perception, how they are updated, and how this affects later memory.

According to the theory, perception is oriented in time such that perceivers constantly make predictions about what will happen in the near future. These predictions are guided by actively maintained memory representations that keep information about the current event available for further processing throughout the duration of that event. The quality of prediction is monitored. When one experiences a sudden increase in prediction error, one updates one’s memory representations.

This theory makes several predictions about the relations between perception and memory. First, people will tend to perceive event boundaries at moments in time when things are changing, because changes tend to produce prediction errors. Second, recently presented information should be accessed differently depending on whether it is part of a still-ongoing event. Third, how one segments activity during perception should determine how one remembers the activity later. I will present data bearing on these predictions, focusing on the second and third. Overall, the data support the predictions of the theory. The data suggest that the perception that one event has ended and another has begun reflects the operation of a fundamental cognitive operation that drives attention and memory updating.

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## Relevant Publications

- Zacks, J. M., Speer, N. K., Vettel, J. M., & Jacoby, L. L. (2006). Event understanding and memory in healthy aging and dementia of the Alzheimer type. *Psychology & Aging, 21*, 466-482.
- Zacks, J. M., Speer, N. K., Swallow, K. M., Braver, T. S., & Reynolds, J. R. (2007). Event perception: A mind/brain perspective. *Psychological Bulletin, 133*, 273-293.
- Speer, N. K., Reynolds, J. R., & Zacks, J. M. (2007). Human brain activity time-locked to narrative event boundaries. *Psychological Science, 18*, 449-455.
- Zacks, J. M. & Swallow, K. M. (2007). Event segmentation. *Current Directions in Psychological Science, 16*, 80-84.
- Reynolds, J. R., Zacks, J. M., & Braver, T. S. (2007). A computational model of event segmentation from perceptual prediction. *Cognitive Science, 31*, 613-643.
- Kurby, C. A. & Zacks, J. M. (2008). Segmentation in the perception and memory of events. *Trends in Cognitive Sciences, 12*, 72-79.
- Yarkoni, T., Speer, N. K., & Zacks, J. M. (2008). Neural substrates of narrative comprehension and memory. *Neuroimage, 41*, 1408-1425.
- Zacks, J. M., Speer, N. K., & Reynolds, J. R. (in press). Situation changes predict the perception of event boundaries, reading time, and perceived predictability in narrative comprehension. *Journal of Experimental Psychology: General*.
- Swallow, K. M., Zacks, J. M., & Abrams, R. A. (in press). Event boundaries in perception affect memory encoding and updating. *Journal of Experimental Psychology: General*.
- Speer, N. K., Reynolds, J. R., Swallow, K. M., & Zacks, J. M. (in press). Reading stories activates neural representations of perceptual and motor experiences. *Psychological Science*.