Constructive Memory and Imagining the Future

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Bartlett, influenced by observations of memory distortions, proved to be right about memory as a constructive process, i.e., linking bits and pieces of information from different sources; elements of an episode, prior general knowledge.

What are the functions of a constructive memory?
*Functions of a constructive memory:* What functions are served by a constructive, rather than rote/reproductive, memory system?

**Promote retention of meaning and general themes:** we typically don’t need to remember every detail of every experience; sometimes we’re better off remembering the gist.
False Recognition of Semantic Associates
(Deese, 1959; Roediger & McDermott, 1995)

• Participants study semantic associates that all converge on a non-presented theme word:
  candy, sour, sugar, bitter, good, taste, tooth, nice, honey, soda, chocolate, heart, cake, eat, pie

• Tested with words from the study list (taste), unrelated words that were not presented (point), and associative related theme word or critical lure (sweet).

• Extremely high levels of false alarms to theme word, accompanied by high confidence
True and False Recognition

Proportion Old Responses

Young
Old

True Target  False Target

Norman & Schacter, 1997
*Functions of a constructive memory:* What functions are served by a constructive, rather than rote/reproductive, memory system?

**Promote retention of meaning and general themes:** we typically don’t need to remember every detail of every experience; sometimes we’re better off remembering the gist.

**One of several adaptive features of memory distortion/constructive memory** (for further examples and discussion, see Schacter, Guerin, & St. Jacques, *TICS*, 2011).
Basis for the current approach: Episodic memory – initially defined as the ability to recollect specific past experiences – is important for the future as well as the past.
Amnesic Patient KC
<table>
<thead>
<tr>
<th><strong>Remembering the Past and Imagining the Future: Similarities</strong></th>
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<td><em>For a recent review:</em> Schacter, Addis, Hassabis, Martin, Spreng, &amp; Szpunar (<em>Neuron</em>, 2012)</td>
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- **Amnesic patients:** Some amnesics have difficulties imagining personal futures/novel scenes.

- **Cognitive studies:** A variety of experimental manipulations similarly influence remembering the past and imagining the future.

- **Aging and psychopathology:** Reduction in retrieval of episodic detail for past events also observed for imagined future events in normal aging, abnormal aging, depression, schizophrenia, & PTSD.

- **Neuroimaging:** Similar areas active when remembering past and imagining future.
Past/Future fMRI Paradigm
Remembering Past Experiences and Imagining Future Experiences Recruit Many of the Same Brain Regions

Core Network Involved in Remembering Past Events, Imagining Future Events, and Related Mental Simulations

Schacter, Addis, & Buckner (2007)
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Constructive episodic simulation hypothesis
(Schacter & Addis, 2007, Phil. Trans. Royal Society; Nature)

Episodic memory – which is traditionally associated with recollection of past personal experiences – plays a key role in imagining possible future scenarios (episodic simulation): supports flexible retrieval and recombination of elements of stored episodes to construct possible future episodes.
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Episodic memory – which is traditionally associated with recollection of past personal experiences – plays a key role in imagining possible future scenarios (episodic simulation): supports flexible retrieval and recombination of elements of stored episodes to construct possible future episodes.

Such flexibility is adaptive when attempting to use memory for future simulation, but can also result in memory errors when elements of past experiences are miscombined.
Episodic Simulation: An Adaptive Process?

The constructive episodic simulation hypothesis holds that the ability to flexibly recombine elements of past experience into simulations of novel future events is highly adaptive - sufficiently beneficial that is worth the cost of resulting memory errors.

But is episodic simulation an adaptive process? Some evidence reveals pitfalls of simulation: e.g., limitations of episodic simulations can contribute to mispredictions of future happiness (Gilbert & Wilson) and errors in planning (Dunning).
Several lines of evidence point toward adaptive functions of episodic simulation (for detailed review, see Schacter, *American Psychologist, 2012*).

Planning and problem solving

Psychological well being and empathy

Farsighted decision making

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Farsighted decision making

Enhancing episodic simulation/retrieval

**Planning and problem solving**

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Simulation can Enhance Planning and Problem Solving

*Future simulations can help college students to plan and prepare for upcoming exams when their simulations include specific information about the steps they need to take to prepare for the exam (Taylor et al., American Psychologist, 1998).
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*Generating detailed simulations of hypothetical social scenarios enhances social problem solving (Sheldon et al., *Neuropsychologia*, 2011).

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Simulations can Enhance Psychological Well-Being

*Women with first-time pregnancies were asked to simulate going into labor and arriving at the hospital on-time; more detailed and coherent simulations were correlated with increased subjective probability of a positive outcome and decreased amounts of worry related to the future event (Brown et al., 2002, Anxiety, Stress, & Coping).
Simulations can Enhance Psychological Well-Being

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*Mentally simulating encounters with members of an “outgroup” (e.g., different race, age, or sexual orientation) produces more positive attitudes toward and less anxiety about the outgroup represented in simulated contact (Crisp & Turner, 2009, *American Psychologist*).
Episodic Simulations can Enhance Empathy

*Mentally simulating helping a person in need increases prosocial intentions (willingness to help) (Gaesser & Schacter, *PNAS*, 2014).*
Episodic Simulation and Willingness to Help

*Participants read brief stories concerning people in need (e.g., locked out of house, dealing with storm damage) that they were told came from various online media and were then given 1 minute to:

Expt. 1

Consider journalistic style/source of story (source)

Visualize website and comments that would be posted concerning ways in which person could be helped (estimate)

Imagine act of helping the person in need (imagine)
Episodic Simulation and Willingness to Help

*Participants read brief stories concerning people in need (e.g., locked out of house, dealing with storm damage) that they were told came from various online media and were then given 1 minute to:

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Consider journalistic style/source of story (source)

Try to remember a related past experience of helping (memory)

Imagine act of helping the person in need (imagine)
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Expt. 2

Consider journalistic style/source of story (source)

Try to remember a related past experience of helping (memory)

Imagine act of helping the person in need (imagine)

After the completing the three conditions in each experiment, participants were re-presented with each story, and rated willingness to help the person in need, emotional responses, and for the estimate, imagine, and memory conditions sensory detail and coherence.
Willingness to Help
(1=unwilling; 7=very willing)
across conditions in Expt. 1 (A) and Expt. 2 (B)
Vividness of episodes predicts willingness to help. Correlations between willingness to help and sensory vividness for (A) Estimate Helping and (B) Imagine Helping conditions in Expt 1 and (C) Remember Helping and (D) Imagine Helping conditions in Expt 2. Sensory detail and coherence predicted willingness to help when participants imagined or remembered a helping episode but did not predict willingness to help when estimating ways the person could be helped by visualizing comments posted on a Web site. Thus only vividness of imagined or remembered helping episodes predicted willingness to help.

Planning and problem solving

Psychological well being and empathy

**Farsighted decision making**

Enhancing episodic simulation/retrieval
Episodic simulation of the affective qualities of future experiences can support farsighted decision making:

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But if you imagine/simulate an episode involving the reward, preference for a larger delayed reward, vs. smaller immediate reward, is increased.

FMRI evidence shows that reduction in temporal discounting produced by episodic simulation is associated with increased coupling between hippocampus and ventromedial prefrontal cortex (e.g., Benoit et al., *J. Neuroscience*, 2011)
Core Network Involved in Remembering Past Events, Imagining Future Events, and Related Mental Simulations

Schacter, Addis, & Buckner (2007)
For a recent meta-analysis, see Benoit & Schacter (2015, Neuropsychologia)
Ventromedial PFC may contribute importantly to functional aspects of episodic simulations:

*Consistently activated during episodic simulation.

*vmPFC linked with beneficial effects of prior knowledge/schemas on subsequent memory (e.g., van Kesteren et al., *TINS*, 2012).
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* vmPFC also implicated in coding of emotional value (e.g., Winecoff et al., *J. Neuroscience*, 2013).
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* vmPFC also implicated in coding of emotional value (e.g., Winecoff et al., J. Neuroscience, 2013).

* Recent evidence indicates that vmPFC supports processes that integrate knowledge of the elements of a possible future episode in order to simulate the episode’s overall affective quality.
Ventromedial prefrontal cortex supports affective future simulation by integrating distributed knowledge

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Although the future often seems intangible, we can make it more concrete by imagining prospective events. Here, using functional MRI, we demonstrate a mechanism by which the ventromedial prefrontal cortex supports such episodic simulations, and thereby contributes to affective foresight: This region supports processes that (i) integrate knowledge related to the elements that constitute an episode and (ii) represent the episode’s emergent affective quality. The ventromedial prefrontal cortex achieves such integration via interactions with distributed cortical regions that process the individual elements. Its activation then signals the affective quality of the ensuing episode, which goes beyond the combined affective quality of its constituting elements. The integrative process further augments long-term retention of the episode, making it available at later time points. This mechanism thus renders the future tangible, providing a basis for farsighted behavior.

If the vmPFC augments new memories by supporting integration of prior knowledge, it may support a similar function during episodic future simulations. Specifically, the vmPFC should particularly enhance simulations that can draw on richer knowledge about the episode’s elements. Recent observations are consistent with this account: the vmPFC is more strongly activated when people imagine episodes in familiar rather than unfamiliar contexts (21), when they simulate episodes that are personally relevant rather than those that are not personally relevant (22, 23), and when they think about themselves and similar others (24). The vmPFC may thus support flexible episodic simulations by merging prior knowledge about diverse elements of a possible future episode.

On the other hand, there is also considerable evidence for a contribution of the vmPFC to the computation of emotional and subjective value (25–29). Activation in the medial PFC and adjacent anterior cingulate cortex is greater during the simulation of positive rather than negative episodes (30, 31), and it is coupled with the anticipated reward magnitude of imagined experiences (6, 7). The vmPFC may support such value representations by acting as a hub that links information about the simulated episodic details with associated affective responses (15, 32). Based on these lines of research, we hypothesize that this region is critical for the simulation and evaluation of possible future experiences. Specifically, we suggest that the vmPFC supports processes that integrate arbitrary combinations of knowledge structures to simulate the emergent affective quality that a possible future episode may hold.

To test this hypothesis, we designed a procedure that examines blood-oxygen level-dependent signal changes during episodic simulation as a function of both (i) the degree of knowledge
Episodic simulations can serve useful functions.

Planning and problem solving

Psychological well being and empathy

Farsighted decision making

Enhancing episodic simulation/retrieval
New approach: Use of an episodic specificity induction
Episodic Specifcity Induction

• Episodic specificity induction: brief training in recollecting details of a past experience.

• We used the Cognitive Interview (Fisher & Geiselman, 1992), a forensic protocol which has been shown to increase accurate episodic retrieval in eyewitnesses.

• Logic: Specificity induction should enhance performance on subsequent memory and simulation/imagination tasks that draw on episodic memory while having no effect on subsequent tasks that do not draw on episodic memory.
Constructive Episodic Simulation: Dissociable Effects of a Specificity Induction on Remembering, Imagining, and Describing in Young and Older Adults

Kevin P. Madore, Brendan Gaesser, and Daniel L. Schacter
Harvard University

According to the constructive episodic simulation hypothesis (Schacter & Addis, 2007), both remembered past and imagined future events rely heavily on episodic memory. An alternative hypothesis is that observed similarities between remembering and imagining reflect the influence of broader factors such as descriptive ability, narrative style, or inhibitory control. We attempted to distinguish between these 2 hypotheses by examining the impact of an episodic specificity induction on memory, imagination, and picture description in young and older adults. In Experiment 1, participants received the specificity induction or a control induction prior to the memory, imagination, and description tasks. Older adults provided fewer internal (i.e., episodic) and more external (i.e., semantic) details than young adults across the 3 tasks irrespective of induction. Critically, however, the specificity induction selectively increased internal but not external details for memory and imagination in both age groups compared with the control induction. By contrast, the induction did not affect internal (or external) details for picture description. Experiment 2 replicated these results in young adults using a different control induction. Our findings point to a dissociation between episodic processes involved in memory and imagination and nonepisodic processes involved in picture description.

Keywords: episodic specificity induction, autobiographical memory, imagination, picture description, aging

Much recent research has revealed striking cognitive and neural similarities between remembering past events and imagining future events. For example, remembering past events and imagining future events include many similar phenomenological features, exhibit parallel declines in various neuropsychological and neuropsychiatric populations, and draw to a large extent on a common underlying cognitive mechanism. According to the constructive episodic simulation hypothesis (Dudai & Carruthers, 2005; Schacter & Addis, 2007), which holds that (a) the constructive episodic simulation hypothesis stems from studies with young and older adults showing that age-related changes in remembering the past and imagining the future have also been documented (see Schacter & Addis, 2007, for review), the striking similarities that have been documented (see Schacter & Addis, 2007, for review) could result from a specific way of mentally simulating and describing the future. Although a number of experiments have provided evidence for the simulation hypothesis (e.g., Schacter et al., 2011), the mechanism by which it occurs remains unclear. The constructive episodic simulation hypothesis holds that (a) a construct in addition to real events can sometimes result in memory distortions, such as confusions between imagined and actual events (for further discussion, see Schacter & Addis, 2007). An alternative hypothesis is that episodic memory can sometimes result in memory distortions, such as confusions between imagined and actual events (for further discussion, see Schacter & Addis, 2007).
Method

• 24 younger adults ($M = 19.9$ yrs, $SD = 1.6$, 13 female) and 24 older adults ($M=76.2$ yrs, $SD = 6.9$, 10 female)

• Two sessions, spaced 7 days apart

• Session 1:
  
  Short video $\rightarrow$ Induction $\rightarrow$ Mem, Imag, Desc tasks

• Session 2:

  Short video $\rightarrow$ Induction $\rightarrow$ Mem, Imag, Desc tasks
Inductions

**Specificity Induction (Cognitive Interview)** | **Control Induction**
--- | ---
Mental imagery probes | Thoughts
Tell me more probes | Impressions
Temporal order probes | Feelings

“I want you to close your eyes and get a picture in your head about the people in the video you saw. I want you to think about what they looked like and what they were wearing. Once you have a really good picture I want you to tell me everything you remember about the people in the video. Try to be as specific and detailed as you can.”

“What were your impressions of the people in the video?”

“Did you like the video?”

“When do you think the video was made?”
Main Tasks

Participants have three minutes to:

**Remember** past experience related to the picture (episodic-dependent)
**Imagine** possible future experience related to the picture (episodic-dependent)
**Describe** the picture (episodic-independent)
Independent raters coded these trials for internal (Cronbach’s $\alpha = .98$) and external details ($\alpha = .90$) based on Levine et al.’s (2002) Autobiographical Interview Memory & Imagination

<table>
<thead>
<tr>
<th>Internal detail</th>
<th>Who, what, where, when</th>
<th>Details from the picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>External detail</td>
<td>Commentary, inferences, related semantic information</td>
<td>Commentary, inferences, related semantic information</td>
</tr>
</tbody>
</table>
In both age groups:
• More internal details for memory and imagination after the specificity induction than the control induction.
• Picture description was not affected by induction type.
In both age groups:

- Type of induction did not affect the number of external details reported in memory, imagination, or picture description.
Conclusion: The specificity induction dissociates the retrieval of episodic details during remembering and imagining from both semantic retrieval (external details) and non-episodic narrative processes (picture description). May do so by inducing a task/retrieval orientation that encourages constructing detailed events/scenes.

Implication: We can use the specificity induction to identify/enhance the contribution of episodic retrieval/simulation to cognitive tasks that are not typically characterized as “episodic memory tasks” but may benefit from detailed episodic simulation/retrieval.

Example: Means-end social problem solving
“J noticed that her friends seemed to be avoiding her. J wanted to have friends and be liked. The story ends when J’s friends like her again. You begin the story where J first notices her friends avoiding her.”

- **Relevant step:** step or event that moves protagonist toward goal
  - J asked one of her friends what was wrong.

- **Irrelevant step:** step or event that moves protagonist away from goal
  - J joined a new club to make new friends.

- **No step:** repeat information, commentary, etc.
  - J realized her friends were avoiding her.
  - It’s sad J’s friends don’t like her anymore.
Episodic Memory and Means-End Problem Solving

Previous evidence suggests that people rely on episodic memory/simulation to provide solution steps: older adults generate fewer relevant steps and less episodic detail in their problem solutions than young; deficit correlated with reduced episodic details in autobiographical memory (Sheldon, McAndrews, & Moscovitch, 2011, *Neuropsychologia*).
An Episodic Specificity Induction Enhances Means-End Problem Solving in Young and Older Adults

Kevin P. Madore and Daniel L. Schacter
Harvard University

Episodic memory plays an important role not only in remembering past experiences, but also in constructing simulations of future experiences and solving means-end social problems. We recently found that an episodic specificity induction—brief training in recollecting details of past experiences—enhances performance of young and older adults on memory and imagination tasks. Here we tested the hypothesis that this specificity induction would also positively impact a means-end problem-solving task on which age-related changes have been linked to impaired episodic memory. Young and older adults received the specificity induction or a control induction before completing a means-end problem-solving task, as well as memory and imagination tasks. Consistent with previous findings, older adults provided fewer relevant steps on problem solving than did young adults, and their responses also contained fewer internal (i.e., episodic) details across the 3 tasks. There was no difference in the number of other (e.g., irrelevant) steps on problem solving or external (i.e., semantic) details generated on the 3 tasks as a function of age. Critically, the specificity induction increased the number of relevant steps and internal details (but not other steps or external details) that both young and older adults generated in problem solving compared with the control induction, as well as the number of internal details (but not external details) generated for memory and imagination. Our findings support the idea that episodic retrieval processes are involved in means-end problem solving, extend the range of tasks on which a specificity induction targets these processes, and show that the problem-solving performance of older adults can benefit from a specificity induction as much as that of young adults.

Keywords: episodic specificity induction, means-end problem solving, autobiographical memory, imagination, aging

Supplemental materials: http://dx.doi.org/10.1037/a0038209.supp
Problem Solving Study Design

- 48 young adults ($M = 20.1$ yrs, $SD = 1.6$, 34 female) and 48 older adults ($M = 72.2$ yrs, $SD = 5.6$, 34 female, $MMSE = 28.6/30$)

Two sessions, spaced one week apart
Induction and the MEPS: Steps

- Induction x Step type interaction significant
- In both age groups, more relevant steps but not more other steps following the specificity induction than the control induction.
Episodic Specificity and Worrisome Future Events

• Worry about the future can be disruptive to psychological functioning (e.g., Borkovec et al, 1998)
Episodic Specificity and Worrisome Future Events

- Imagining a worrisome future event can be beneficial for emotion regulation, and correlational evidence suggests that more detailed simulations are associated with improved subjective well being (Brown et al., 2002)

- We manipulated simulation detail with an episodic specificity induction and predicted a beneficial effect on several outcome measures (Jing, Madore, & Schacter, under review)
Methods

• Participants: 26 healthy Harvard undergraduate students

• 3 sessions (6.5 hrs total)
Session 1

• List 30 specific, concrete problems/events that are highly worrisome

  “I am worried about doing poorly on the final for my psychology class because that would bring down my GPA.”
Session 1

• List 30 specific, concrete problems/events that are highly worrisome

  “I am worried about doing poorly on the final for my psychology class because that would bring down my GPA.”

• (1) What is the positive outcome you hope will happen for this event?

  “I get an A on the final.”
Session 1

• List 30 specific, concrete problems/events that are highly worrisome

  “I am worried about doing poorly on the final for my psychology class because that would bring down my GPA.”

• (1) What is the **positive outcome** you hope will happen for this event?

  “I get an A on the final.”

• (2) What is the **negative outcome** you fear will happen for this event?

  “I fail the final and it brings down my grade in the class.”
Sessions 2 and 3

Within-subjects design, Sessions 2 and 3 were spaced 1 week apart.

- Short Video
- Specificity Induction
- Problem solving, Reappraisal Tasks

- Short Video
- Control Induction
- Problem solving, Reappraisal Tasks
Sessions 2 and 3

• Personal MEPS Task:
  • 6 personal problem stories
  • 5 minutes to generate steps to reach positive outcome

“You would like to do well on your upcoming psychology final. The story begins with you worrying about your psychology final. The story ends with you getting an A on your psychology final. Please fill in the middle of the story.”
Sessions 2 and 3

- **Episodic Reappraisal Task** (adapted from Goldin et al., 2008):
  - 6 bad-outcome scenarios
  - 5 minutes to reframe negative outcome:

  “Please imagine a scenario in which you just found out that you did very poorly on your psychology final exam. Please now imagine and tell a story of how you are able to reinterpret and reframe the situation so that it feels less negative to you.”
Sessions 2 and 3

• Ratings (1 – 9 scale):
  1. Anxiety
  2. Likelihood of good outcome
  3. Likelihood of bad outcome
  4. Difficulty to cope with the problem

• Changes in these ratings (from Session 1 to Sessions 2/3) indicate shifts in subjective well-being towards the imagined events
Coding

• Responses to MEPS task were scored for:
  • (1) Relevant steps: Help to achieve positive outcome
  • (2) Other steps: Irrelevant/no steps

• Responses to both tasks were scored into Internal and External details
  (Autobiographical interview, Levine et al., 2002)

• High inter-rater reliability (all standardized Cronbach’s $\alpha > 0.92$)
Change in Steps - MEPS

- Specificity induction increased the number of relevant steps and decreased the number of no-steps

- Induction x Step Type interaction is significant
Change in Details - MEPS

- Specificity induction increased the number of internal details and decreased the number of external details

- Induction x Detail interaction is significant
Change in Details - Reappraisal

- Specificity induction increased the number of internal details and decreased the number of external details

Details in Reappraisal Task

- Induction x Detail interaction is significant
Changes in Ratings of Subjective Well-being

- Anxiety
- Perceived likelihood of a bad outcome
- Perceived likelihood of a good outcome
- Perceived difficulty to cope with the problem

- Graphs: **Difference scores** of changes in ratings from initial session to post-simulation
Anxiety (Pre- to Post-Simulation)

- Larger reduction in anxiety in specificity condition (i.e., more detail) than in control condition in both tasks

**MEPS**

- **Control**
- **Specificity**

**Reappraisal**

- **Control**
- **Specificity**

- Induction x Pre-/Post-simulation anxiety ratings interaction is significant in both tasks
Likelihood of Bad Outcome (Pre- to Post-Simulation)

- Larger reduction in perceived likelihood of a bad outcome in specificity condition than in control condition in both tasks

**MEPS**

- **Control**
- **Specificity**

**Reappraisal**

- **Control**
- **Specificity**

- Induction x Pre-/Post-simulation likelihood ratings interaction is significant in both tasks
Likelihood of Good Outcome (Pre- to Post-Simulation)

- Larger increase in perceived likelihood of a good outcome in specificity condition (than in control condition in MEPS task only)

- Induction x Pre-/Post-simulation likelihood ratings interaction is significant in MEPS task

- Significant interaction by task (MEPS, reappraisal)
Perceived Difficulty to Cope (Pre- to Post-Simulation)

- Larger reduction in perceived difficulty to cope with bad outcome in specificity condition (i.e., more detail) than in control condition in reappraisal task only

![Bar chart showing change in difficulty between control and specificity conditions for reappraisal task.]

- Induction x Pre-/Post-simulation difficulty ratings interaction is significant in reappraisal task
Specificity Induction: Other Recent Findings

*Specificity induction boosts performance on a task that taps *divergent creative thinking*: the ability to generate creative ideas by combining diverse types of information in novel ways.
Creativity and Memory: Effects of an Episodic-Specificity Induction on Divergent Thinking

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Abstract
People produce more episodic details when imagining future events and solving means-end problems after receiving an episodic-specificity induction—brief training in recollecting details of a recent event—than after receiving a control induction not focused on episodic retrieval. Here we show for the first time that an episodic-specificity induction also enhances divergent creative thinking. In Experiment 1, participants exhibited a selective boost on a divergent-thinking task (generating unusual uses of common objects) after a specificity induction compared with a control induction; by contrast, performance following the two inductions was similar on an object association task thought to involve little divergent thinking. In Experiment 2, we replicated the specificity-induction effect on divergent thinking using a different control induction, and also found that participants performed similarly on a convergent-thinking task following the two inductions. These experiments provide novel evidence that episodic memory is involved in divergent creative thinking.

Keywords
episodic-specificity induction, episodic memory, creativity, divergent thinking, convergent thinking, imagination
Specificity Induction: Other Recent Findings

*Specificity induction boosts performance on a task that taps *divergent creative thinking*: the ability to generate creative ideas by combining diverse types of information in novel ways.

*FMRI evidence indicates that activity in hippocampus and other core network regions is increased after specificity vs. control induction (Madore, Szpunar, Addis, & Schacter, in preparation).
Specificity Induction: Summary

*The results from the specificity induction studies support the hypothesis that episodic retrieval contributes to autobiographical memory, future imagining, means-ends problem solving, episodic reappraisal, and divergent creative thinking.

*We have suggested that the induction biases the retrieval orientation of participants to focus on episodic details related to places, people, and actions that comprise an event and that this increased focus impacts performance on subsequent tasks that involve constructing mental events or scenes (Schacter & Madore, in press, Memory Studies).

*Previous research as well as the present work indicates a positive association between episodic specificity and measures of well being. Constructing more detailed mental simulations linked with more effective problem solving and capacity to reappraise, which in turns reduces worry and promotes increased well being.
Take Home Messages

1) Despite some pitfalls, both cognitive and neuroimaging evidence support the conclusion that episodic simulation and the brain network on which it depends serve adaptive, goal-directed functions.

2) An episodic specificity induction can both target and enhance episodic retrieval/simulation mechanisms that support remembering, imagining, problem solving, creative thinking, and subjective well being.
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Karl Szpunar

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