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The Science and Fiction of Memory Removal.

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**Abstract:**

*Eternal Sunshine of the Spotless Mind* (ESSM) is a film that deals with the concept of erasing unwanted memories, a theme that goes back to Homer's (2000) *Odyssey*, in which the drug nepenthe induced forgetfulness and eased a troubled mind. Hollywood has popularized the nuances of human memory--as well as its impairments--in a number of other movies. Increased longevity has associated memory lacunae with dementia, Alzheimer's disease, and amnesia. However, ESSM's notion of young people seeking memory removal as a way of dealing with romantic hardship is a novel variation. Memory impairments afford writers the development of irregular temporal storylines, and writer Charlie Kaufman starts ESSM's plot at the end and lets it unfold via flashes of past and present that culminate in the beginning. He tells the story of Joel (Jim Carrey) and Clementine (Kate Winslet), a couple whose relationship turned from sweet to sour. After yet another fight, Joel finds that his partner treats him like a complete stranger. Distraught, he discovers that Clementine has erased him permanently from her mind--a service offered by Lacuna Inc. Joel then decides he too must use the good services of Lacuna Inc. to free his mind of the upsetting memories of Clementine. Although it takes more than one viewing of the film to do all the details justice, what transpires is a clever regression-digression-progression describing the emotional vicissitudes of the two lovers. Unwanted romantic memories aside, if Lacuna Inc. were to exist, it would offer a life-changing opportunity for many clinical populations. Neuropsychology provides fascinating accounts of superior memorists who would have loved to forget. An example is Luria's (1968) report of Mr. S., a synesthete (i.e., an individual in whom stimuli in one sensory domain evoke perceptions in multiple domains) who had a uniquely and astoundingly retentive memory but who was haunted by his involuntary ability to register everything around him. Less anecdotal is posttraumatic stress disorder, whereby afflicted individuals do not respond to many kinds of therapy as they struggle to let go of distressing events and memories. Research findings indicate that when stress hormones such as adrenaline and norepinephrine are elevated, new memories are formed more efficiently. Memories of stressful events, therefore, are more vivid and more difficult to forget. Propranolol, a type of beta blocker, interferes with the activity of stress hormones in the brain and, if given soon after trauma, may lessen the stronghold of emotional memories (Pitman et al., 2002). However, propranolol is a far cry from Lacuna Inc., and even behavioral interventions that have been around for more than 2 centuries may be as, if not more, effective. Using neuroimaging

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techniques that, at least in appearance, are on par with the brain accoutrements seen in ESSM, a recent study reported findings from imaging the living brain of highly hypnotizable individuals, showing that suggestion could modulate brain activity in specific neural circuits (Raz et al., 2005). Although it seems a stretch that the kind of memory loss that Joel and Clementine undergo in ESSM could be achieved through hypnotic suggestion, cognitive neuroscience is beginning to unravel how suggestion influences focal brain activity. These findings may be highly relevant to memory research, including memory removal. The creators of ESSM may well be tapping into a niche that is not just on the cusp of science's reach but within the acceptance of society. There is little doubt that Lacuna Inc. would be a popular place: After all, what we cannot remember might have never happened. (PsycINFO Database Record (c) 2009 APA, all rights reserved)

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# The Science and Fiction of Memory Removal

Review By: [Amir Raz](#)

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**Review of:** *Eternal Sunshine of the Spotless Mind*

**By:** Michel Gondry (Director), (2004).

*Eternal Sunshine of the Spotless Mind (ESSM)* is a film that deals with the concept of erasing unwanted memories, a theme that goes back to Homer's (2000) *Odyssey*, in which the drug nepenthe induced forgetfulness and eased a troubled mind. Hollywood has popularized the nuances of human memory—as well as its impairments—in a number of other movies, such as *The Manchurian Candidate* (Frankenheimer, 1962), *Total Recall* (Verhoeven, 1990), and *Memento* (Nolan, 2001). Increased longevity has associated memory lacunae with dementia, Alzheimer's disease, and amnesia. However, *ESSM's* notion of young people seeking memory removal as a way of dealing with romantic hardship is a novel variation.

Memory impairments afford writers the development of irregular temporal storylines, and writer Charlie Kaufman starts *ESSM's* plot at the end and lets it unfold via flashes of past and present that culminate in the beginning. He tells the story of Joel (Jim Carrey) and Clementine (Kate Winslet), a couple whose relationship turned from sweet to sour. After yet another fight, Joel finds that his partner treats him like a complete stranger. Distraught, he discovers that Clementine has erased him permanently from her mind—a service offered by Lacuna Inc. Joel then decides he too must use the good services of Lacuna Inc. to free his mind of the upsetting memories of Clementine. Although it takes more than one viewing of the film to do all the details justice, what transpires is a clever regression–digression–progression describing the emotional vicissitudes of the two lovers.

Reminiscent of the early work of such giants as Wilder Penfield (1975), the Canadian neurologist whose work in the 1930s suggested that particular memories reside in specific brain locations, when Joel inquires about memory removal, he is informed that the process is “technically... brain damage.” Whereas Penfield's neurosurgical explorations with epileptic patients revealed that crude stimulation of the temporal lobes rekindled feelings of past experiences, *ESSM's* Joel is fitted with a futuristic cap that can locate and erase specific undesired memories. Although modern research findings suggest that memories are not localized to specific brain locations but rather are encoded within neural networks governed by complex distributed dynamics, *ESSM's* simplistic approach is compelling, albeit unscientific.

Unwanted romantic memories aside, if Lacuna Inc. were to exist, it would offer a life-changing opportunity for many clinical populations. Neuropsychology provides fascinating accounts of superior memorists who would have loved to forget. An example is Luria's (1968) report of Mr. S., a *synesthete* (i.e., an individual in whom stimuli in one sensory domain evoke perceptions in multiple domains) who had a uniquely and astoundingly retentive memory but who was haunted by his involuntary ability to register everything around him. Less anecdotal is posttraumatic stress disorder, whereby afflicted individuals do not respond to many kinds of therapy as they

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struggle to let go of distressing events and memories. Research findings indicate that when stress hormones such as adrenaline and norepinephrine are elevated, new memories are formed more efficiently. Memories of stressful events, therefore, are more vivid and more difficult to forget. Propranolol, a type of beta blocker, interferes with the activity of stress hormones in the brain and, if given soon after trauma, may lessen the stronghold of emotional memories (Pitman et al., 2002). However, propranolol is a far cry from Lacuna Inc., and even behavioral interventions that have been around for more than 2 centuries may be as, if not more, effective.

Recent studies have reported that hypnotic suggestion can deautomatize certain processes that had been considered involuntary and automatic within the human brain (Raz, 2004; Raz, Fan, & Posner, 2005; Raz, Shapiro, Fan, & Posner, 2002). Memory may well be one such process. Indeed, there are multiple accounts documenting that hypnotic suggestions can alter and even remove memories. Using neuroimaging techniques that, at least in appearance, are on par with the brain accoutrements seen in *ESSM*, a recent study reported findings from imaging the living brain of highly hypnotizable individuals, showing that suggestion could modulate brain activity in specific neural circuits (Raz et al., 2005). Although it seems a stretch that the kind of memory loss that Joel and Clementine undergo in *ESSM* could be achieved through hypnotic suggestion, cognitive neuroscience is beginning to unravel how suggestion influences focal brain activity. These findings may be highly relevant to memory research, including memory removal.

From Luria's (1968) Mr. S. to mainstream contemporary scientific reports, the mechanisms of human memory are yet to be disentangled. Despite our limited knowledge of the neural substrates subserving aspects of focal memory activations, it has been documented that the effects of certain drugs, traumas, and suggestions can alter—indeed, even remove—specific memories. Moreover, technologies that allow us to image the living human brain in such unusual contexts as following a posthypnotic suggestion may make custom deletions of specific memories less far fetched than heretofore believed. In this regard, the creators of *ESSM* may well be tapping into a niche that is not just on the cusp of science's reach but within the acceptance of society. There is little doubt that Lacuna Inc. would be a popular place: After all, what we cannot remember might have never happened. Go see the film, before you forget!

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