The Vicious Cycle: Memory, Loss, and Return

Even though I am not a gamer by any stretch of the imagination, years ago I recall playing Kirby's Dreamland for the Nintendo GameBoy for days on end. Without counting the hours of Solitaire I have under my belt, Kirby is still the only video game I have ever beaten. During my quest to conquer the game, I distinctly remember dreaming about the music, the challenges, the enemies, and the mistakes I made trying to "level-up." Surprisingly, I beat Kirby's Dreamland after a few days of playing and as many days dreaming about it. While dreaming about the video game, my brain retraced and replayed that day's events not to provide me with a play-by-play, but to help me learn something new about the situation. Recent studies conducted on video gaming and dreaming have suggested that when a gamer concentrates on a certain game for long periods throughout the day and before bedtime, she awakens with a renewed ability to complete the tasks more efficiently (Stickgold, et al). During sleep, the brain revisits the pathways by which we attempted to complete the task, thus allowing the unconscious to form new connections that will help us the next morning when we pick up the game again.

To illustrate, let's say you are in your car and stuck on a snowy road, but you desire to turn around and head home. You put the car in drive, maybe go a couple of feet, get stuck and switch the car into reverse to try again. This event may occur a few times until you give-up, too exasperated to continue. A little while later, you decide to give it another go, only this time you maneuver your car into the tracks of a car that has just passed you—success! The final effort of waiting and tracing another's path represents what transpires in our brains when we are asleep. During sleep, our brain forms new

connections by reprocessing the memories we made while we were awake to help us learn new ways of completing a task even when we are not consciously participating in the learning process.

Researchers who discovered the connection between sleep, learning, and memory asked participants to play both Tetris and the downhill skiing simulation game Alpine Racer II for hours during the day while researchers noted their (oftentimes poor) performance (R. Stickgold, et al 1056). What is most interesting about this study is the majority of participants dreamed about methods by which they could increase their performance in the game ("The Sleep-Memory"). The next morning when the participants were asked to play Tetris and the ski simulator game once again, everyone's performance was dramatically improved, suggesting that the brain creates new connections and pathways based on the memories of lived events. If the possibility exists to create mental connections based on unconscious memories that we made ourselves, then what does this discovery suggest for memory studies writ large?

This is not a new question, as Freud and his contemporaries have been questioning these exact ideas for more than a century; however, these questions do attempt to connect the well-trodden Freudian theories of the unconscious to new issues in digital studies. Freud's *The Interpretation of Dreams* and *The Unconscious* investigate memories that are so deeply hidden, we do not even know they exist. Classical Freudian psychoanalysis suggests that our memories can be so deeply suppressed that we believe they are "forgotten." For Freud, the process of interpreting the unconscious is a direct indication of either memories or desires. In fact, the correlation between dreams, memories, and reality are so tightly connected, that Freud says of the unconscious: "I had

some difficulty in keeping at bay all the ideas which were bound to be provoked by a comparison between the content of the dream and the concealed thoughts lying behind it" (Freud 140). In sum, Freud is concerned with the concealed event in the dream itself—it is not an obvious memory, but one that has to be dissected by thorough interpretation. The unconscious, for Freud, highlights the combination of absence and presence. Freud argues that pushing memories deeply into the crevices of the mind does not necessarily cause one to forget the event, but instead the individual suppresses the event to the point of supposed forgetting.

Furthermore, French theorist Jacques Derrida argues that even though there is repetition in memory, it is not the memorized content that is repeated (*Archive*). In other words, a memory is only stored once, but its recollection is always an original event. Recollection will always force an original perception of the event that was stored because the path to arrive at that memory will be different. Recollection is *not* repetition. Instead, recollection is creative, not static, because the interactions between memories during the act of recollection force an individual to recreate the event in relation to all of the accrued events that occurred between the original memory and its recollection.

Think of The Wayback Machine—the Internet's digital archive wishing to hold onto all sites that have ever appeared on the Web. Digital archiving takes into consideration two questions: what do we choose to store and what do we choose to leave out? With digital archives, we have a choice to remember (by requesting our favorite sites be crawled) or to forget (some sites aren't worth the time to return to). There is one significant drawback, however. The restoration and "reactivation" of, say, my old blog does not guarantee that all the old posts will be available nor does it grant me my

administrative duties to change its appearance, moderate comments, or add new posts. Each version of the website must be crawled and archived separately. Our biological memory functions a bit differently—sometimes we repress ideas because we want to, and other times we cannot control the forgetting that is brought on by disease, injury, or age. If a memory is locked in our biological memory, it is significantly more difficult to recall an event or someone's name. Frequently, biological recollection occurs merely by chance. As we begin to think more critically about how memory will be transformed in the digital age, we must also remember to think about how quickly ideas can be "forgotten" and deleted.

However, contemporary memory studies should not only be limited to the "remembering" and "forgetting" binary, but memory studies must also consider "memory creation." One of the most interesting and important studies of memory creation is one familiar to anyone who has taken an introductory psychology course, and it illustrates the malleability of memory and the heightened possibility that our brains unconsciously fill in missing links. The basic structure of the DRM Paradigm (named after the original creators of the test Deese/Roediger/McDermott and pronounced "dream") is a list of "semantically related words, such as *sour, candy, sugar, bitter, good, taste*" which each participant is required to learn and keep in her memory for a short time (Hicks and Marsh 375). A bit later, when the participants are asked to recall as many words from the list, most will respond by naming some of the items on the list, but many will also add a "missing link" word even though it did not appear in the original string of words (Hicks and Marsh 375). For the list of words above, Jason Hicks and Richard Marsh identified "sweet" as the critical lure—the non-presented, albeit related, word that most participants

claimed to be one of the original words. This study, replicated dozens of times with various word combinations, highlights the likelihood that our memory changes and adds to our original perceptions over time. As proven by the DRM Paradigm, even though we believe we are recalling the correct information, our memory incorporates related ideas or words, filling-in-the-blanks to round out the event. Even though "sweet" was not one of the words, most participants recall it due to its relation to the other words. The DRM Paradigm is critical to understanding that memory is constantly made within our own minds, and that stable memories are actually almost impossible. Although information technologies promote stability, viewing or hearing other accounts of the event can manipulate our memory long afterwards. Studies like the DRM Paradigm indicate that we are constantly prone to the creation of false memory—even when we think we remember an event one way, our unconscious is likely to link it to other seemingly related events and it becomes remembered differently.

The results from the DRM Paradigm studies indicate that we create our own false memories. False memories are a troubling idea, especially since we believe we are in control of our own minds. Moreover, false memories are particularly prevalent in eyewitness testimony, causing many juries to wrongly convict someone based on incorrect evidence. Several studies have shown that eyewitness testimony is often tainted by interactions with others, reading about the event, or content borrowing from previous experiences. These previous experiences are not limited to the eyewitness' own past, but can be borrowed from television shows or movies in which a similar crime occurred. Content borrowing from prosthetic memory (i.e., memories created from mass media representations) are highly problematic. For example, let's say that I am in a bank while

it is being robbed. I have provided a statement for the police, and later I am called back to identify the perpetrator. However, since the robbery I have viewed an episode of *Law & Order* that involves a bank robbery, and I have also watched a local news report of the crime. The time lapse, however small, between my own experience during the bank robbery and a televised portrayal of the crime might cause me to misidentify the actual robber because I have unintentionally picked up details from others and added to or substituted them for my own.

On an even creepier note, false memories can actually be implanted in our own minds with the aid of tools such as Photoshop. In the article "A Picture is Worth a Thousand Lies," Kimberley Wade et al exposed twenty subjects to manipulated photos in which the subjects themselves were placed. Wade and the other researchers asked the subjects to provide several childhood photos from "moderately significant events" (e.g., birthday parties or family holidays) (598). The research team then scanned, cropped, and digitally inserted one of the photos into another image, creating a composite image of the subject on a hot air balloon ride as a child (Wade et al 598). After creating the composite photographs, the research team interviewed the subjects three times over a span of several weeks (Wade et al 597). During each interview, "subjects thought about a photograph showing them on a hot air balloon ride and tried to recall the event by using guided-imagery exercises" (Wade et al 597). In contrast with narrative induced false memory (i.e., making up a story in which the subject was a participant in the action), the manipulated photograph proved to increase the subjects' memory of the event because it was 'hard evidence' that they experienced the hot air balloon ride. Moreover, the results strongly indicate that, "photographs may require less constructive processing than do

narratives to cultivate a false memory" (Wade et al 602). These results suggest that photographic evidence, even manipulated photographs, tend to be more reliable and increase the possibilities of false memory creation via suggestibility. Interestingly, even though the photo was doctored and the subject never participated in a hot air balloon ride, "the subjects often said something like, 'Well, it's a photograph, so it must have happened' when looking at the hot air balloon photo" (Wade et al 602). As a result, the research team identified three possibilities for memory creation. First, the photo was largely accepted as "authoritative evidence," noted in common "it's a photo, so it must be true" responses. Second, "it is also possible that the seeming authenticity of the photograph prompted the subjects to search their memory for event-consistent information" (Wade et al 602). The doctored photograph "planted the seed" of a false memory, and over the course of the three interviews, each subject searched their memories in order to create a false memory of the event they realized they had 'forgotten' (Wade et al 602). Finally, the researchers argue that "photographs do not require less constructive processing, so much as subjects are less likely to resist the accuracy of the photograph" (Wade et al 602). This study has shown that a doctored photo will greatly increase the likelihood that anyone can be persuaded to create false memories about themselves.

In a process that Giuliana Mazzoni calls "imagination inflation," the human brain combines and reconstructs "experiences from pieces of retained information combined with knowledge, beliefs, suggestions, and the information provided by situational cues" (25-27). The result of imagination inflation is an increase in created memory—the brain actually "remembers" more that it stores because it is constantly making new memories

according to situational necessity (Mazzoni 25). With the hot air balloon experiment, the subjects created the memory of being in the balloon because the photograph was "evidence" that they had been there but merely "forgotten" the experience. Over the three interviews, the subjects likely created connections from other related memories to the main 'bone chip' in order to excavate a recollection of the fake event. Even in the presence of a photograph, "a memory is never the faithful reproduction of the original event, because in addition to the fragments of the original event, it includes also parts of the individual's pre-existing knowledge. […] From this perspective, memory errors are the rule, rather than the exception" (Mazzoni 21).

In the end, our memories might appear unreliable, inconclusive, and untrustworthy. However, with the help of interactive technologies, we might be able to rely on their stability rather than our biologically fallible and malleable memory.

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