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UNIVERSITY OF CALIFORNIA,
IRVINE

How to Edit Your Past Using Lies:
Fabricating Past Experiences Influences Autobiographical Memory

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Psychology & Social Behavior

by

Steven Joseph Frenda

Dissertation Committee:
Professor Elizabeth Loftus, Chair
Professor Peter Ditto
Professor Linda Levine

DEDICATION

To

My mother, who has supported me in every conceivable way, more than anyone could reasonably expect.

Thank you, Mom.

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CURRICULUM VITAE

STEVEN J. FRENDA, Ph.D.

EDUCATION

- Ph.D. (2014) Psychology and Social Behavior
University of California, Irvine • Irvine, CA
- B.A. (2006) New School University • New York, NY.
Eugene Lang College
Concentration: Psychology

RESEARCH/PROFESSIONAL EXPERIENCE

University of California, Irvine • Irvine, CA

Doctoral Candidate, 2008—2014

- Lead investigator on research projects investigating human memory
- Instructor, Teaching assistant

Preventive Medicine Research Institute • Sausalito, CA

Research Assistant, 2006—2008

Consultant, 2008—present

- Assisted in data collection, analysis, and manuscript preparation for research projects investigating the prevention and reversal of coronary artery disease and cancers

Beth Israel Medical Center • New York, NY

Department of Biological Psychiatry

Research Assistant, 2004—2006

- Assisted in data collection, analysis and manuscript preparation for research projects in forensic psychiatry

Stuyvesant Square Chemical Dependence Treatment Center • New York, NY

Intern, Spring 2006

- Conducted intake interviews for individuals seeking inpatient detoxification

PUBLICATIONS

Frenda, S. J., Patihis, L., Loftus, E. F., Lewis, H., Fenn, K. M. (2014). Sleep deprivation and false memories. *Psychological Science*, *25*, 1674-1681.

Patihis, L., **Frenda, S. J.**, LePort, A. K. R., Petersen, N., Nichols, R. M., Stark, C. E. L., McGaugh, J. L., & Loftus, E. F. (2013). False memories in highly superior autobiographical memory individuals. *Proceedings of the National Academy of Sciences*, *10*, 20947–20952.

Frenda, S. J., Knowles, E. D., Saletan, W., & Loftus, E. F. (2013). False memories of fabricated political events. *Journal of Experimental Social Psychology*, *49*, 280-286.

Frenda, S. J., Nichols, R. M., Loftus, E. F. (2011). Current issues and advances in misinformation research. *Current Directions in Psychological Science*, *20*, 20-23.

ENCYCLOPEDIA ARTICLES AND BOOK REVIEWS

Cochran, K. J., Patihis, L., **Frenda, S. J.**, & Mogilner, T. (2014). Photographs (Altered). In T. R. Levine, J. G. Golson (Eds). *Encyclopedia of Lying and Deception*. (pp. 756-758). Thousand Oaks, CA: Sage Publications.

Newman, E. J., **Frenda, S. J.**, & Loftus, E. F. (2014). False memory. In Bruinsma, G., & Weisburd, D. (Eds) *Encyclopedia of Criminology and Criminal Law*. (pp. 1555-1563). New York, NY: Springer.

Loftus, E. F., & **Frenda, S. J.** (2010). Bad theories can harm victims. (Book Review of The Trauma Myth) *Science*, 327, 1329-1330.

ADDITIONAL PUBLICATIONS (SCHOLARSHIP IN HEALTH AND PSYCHIATRY)

Ornish, D., Lin, J., Chan, J. M., Epel, E., Kemp, C., Weidner, G., Marlin, R., **Frenda, S. J.**, Magbanua, M. J. M., Daubenmier, J., Estay, I., Hills, N. K., Chainani-Wu, N., Carroll, P. R., Blackburn, E. H. (2013). Effect of comprehensive lifestyle changes on telomerase activity and telomere length in men with biopsy-proven low-risk prostate cancer: 5-year follow-up of a descriptive pilot study. *The Lancet Oncology*, 14, 1112-1120.

Chainani-Wu, N., Weidner, G., Purnell, D. M., **Frenda, S. J.**, Merritt-Worden, T., Kemp, C., Kersh, E., Ornish, D. (2010). Relation of B-type natriuretic peptide levels to body mass index after comprehensive lifestyle changes. *American Journal of Cardiology*, 105, 1570-6.

Pischke, C. R., **Frenda, S. J.**, Ornish, D., Weidner, G. (2010). Lifestyle changes are related to reductions in depression in persons with elevated coronary risk factors. *Psychology & Health* 25, 1077-1100.

Cohen, L. J., Forman, H., Steinfeld, M., Grebchecnko, Y., **Frenda, S. J.**, Galynker, I. (2010). Comparison of childhood sexual histories in pedophiles, opiate addicts, and healthy controls: Is childhood sexual abuse a risk factor for addictions? *Journal of Psychiatric Practice*, 16, 1-11.

Frattaroli, J., Weidner, G., Merritt-Worden, T.A., **Frenda, S. J.**, Ornish, D. (2008). Angina Pectoris and atherosclerotic risk factors in the Multisite Cardiac Lifestyle Intervention Program. *American Journal of Cardiology*, 101, 911-918.

Cohen, L. J., Grebchenko, Y. F., Steinfeld, M., **Frenda, S. J.**, Galynker, I. I. (2008). Comparison of personality traits in pedophiles, abstinent opiate addicts, and healthy controls: Considering pedophilia as an addictive behavior. *Journal of Nervous and Mental Disease*, 196(11), 829-837.

Cohen, L. J., **Frenda, S. J.**, Mojtabei, R., Katsavdakis, K., Galynker, I. (2007). Comparison of sexual offenders against children to sexual offenders against adolescents and adults: Data from the New York Sex Offenders Registry. *Journal of Psychiatric Practice*, 13(6), 373-384.

COURSES TAUGHT

University of California, Irvine • Irvine, CA

<u>Course</u>	<u>Academic Term</u>
Advanced Research Methods	Spring 2014
Naturalistic Field Research (co-instructor)	Fall 2010, Spring 2012, Summer 2012, Spring 2013

TEACHING ASSISTANTSHIPS

University of California, Irvine • Irvine, CA

<u>Course</u>	<u>Academic Term</u>
Abnormal Psychology	Fall 2008, Fall 2012
Introduction to Psychology	Winter 2009, Winter 2010
The Social Animal	Spring 2009
Research Design	Fall 2009, Summer 2013
The Social Animal	Spring 2010
Violence in Society	Winter 2011
Social Epidemiology	Spring 2011
Applied Logistic Regression (Graduate)	Fall 2011
Eyewitness Testimony	Winter 2012
Human Sexuality	Winter 2013

MENTORSHIP

Research Assistants: Mentored approx. 20 undergraduate researcher assistants on various research projects (March 2009 – 2014)

Honors Students and UCI Grant Recipients: Thesis advisor (with Elizabeth Loftus) for three undergraduate researchers; Graduate Student Advisor on six undergraduate research projects awarded between \$500 and \$1000 grant funding through the UC Irvine Undergraduate Research Opportunities Program (2010 – 2014)

HONORS/AWARDS

Most Promising Future Faculty Member awarded by Graduate Division Council on Student Experience and the Teaching, Learning & Technology Center (2014) – 1-quarter dissertation fellowship and fee waiver

Outstanding Mentor Award by the UCI Department of Psychology & Social Behavior (2010, 2012) – \$200 prize awarded to graduate student mentors for excellence in advising undergraduate research assistants

PROFESSIONAL AFFILIATIONS

Association for Psychological Science
Society for Applied Research in Memory and Cognition
Society for Personality and Social Psychology

CONFERENCE PRESENTATIONS/SYMPOSIA

Association for Psychological Science 2013 Annual Conference: *False Memories of Fabricated Political Events* (Washington, D.C. – May 2013)

Society for Applied Research in Memory and Cognition 2011 Annual Conference: *False Memories of News Events: Individual Differences in Susceptibility* (New York, NY – June 2011)

POSTER PRESENTATIONS

Frenda, S. J., Lewis, H. C., Loftus, E. F., & Fenn, K. M. (2012, May). *Sleep deprivation promotes memory distortion*. Poster presented at the 2012 Association for Psychological Science 2012 Annual Convention, Chicago, IL.

Freeman, G., Frayssinet, J., **Frenda, S. J.**, Loftus, E. F. (2011, May). *False memories: Relationship to traits associated with impulsivity*. Poster presented at the 2011 Annual Undergraduate Research Symposium at University of California, Irvine.

Frenda, S. J., Berkowitz, S. R., Frayssinet, J., Nemeckay, K., Loftus, E. F. (2010, May). *To punch or be punched: False memories and predictors of suggestibility*. Poster presented at the Association for Psychological Science 2010 Annual Convention, Boston, MA.

Campo, R., Weidner, G., **Frenda, S. J.**, Ornish, D. (2008, March). *Lifestyle changes and coronary risk factors by marital status in the multisite cardiac lifestyle intervention program*. Poster presented at the Society for Behavioral Medicine 2008 Annual Meeting, San Diego, CA.

Haeri, S., Whitcomb, M. E., **Frenda, S. J.**, Mojtabai, R., Galynker, I., Cohen, L. J. (2007, May). *Comparison of sexual offenders against children to sexual offenders against adults: Data from the New York Sex Offenders Registry*. Poster presented at the American Psychiatric Association 2007 Annual Meeting, San Diego, CA.

Whitcomb, M. E., Haeri, S., Weigel, F., **Frenda, S. J.**, Galynker, I., Cohen, L. J. (2007, May). *Comparison of female and male sex offenders on the South Carolina Sex Offender Registry*. Poster presented at the American Psychiatric Association 2007 Annual Meeting, San Diego, CA.

Cohen, L. J., Grebchenko, Y., **Frenda, S. J.**, Mojtabai, R., Rothman, B., Galynker, I. (2007, May). *The Dimensional Assessment of Personality Impairment (DAPI): Preliminary reliability and validity data*. Poster presented at the American Psychiatric Association 2007 Annual Meeting, San Diego, CA.

Weidner, G., Frattaroli, J., **Frenda, S. J.**, Ornish, D. (2007, February). *Reductions in angina and risk factor changes in the Multisite Cardiac Lifestyle Intervention Program: Results from the 12-week follow-up*. Poster presented at the 47th Annual Conference on Cardiovascular Disease Epidemiology and Prevention (American Heart Association), in Orlando, FL.

Cohen, L. J., **Frenda, S. J.**, Steinfeld, M., Grebchenko, Y., Cullen, K., Galynker, I. (2006, May). *Neuropsychological impairment in pedophiles, opiate addicted subjects and healthy controls*. Poster presented at the American Psychological Association 2006 Annual Meeting in Toronto, Canada.

Steinfeld, M., **Frenda, S. J.**, Cohen, L.J., Prosser, J., Galynker, I. (2006). *Warmth detection: An alternative sensory assessment in opiate abuse*. Poster presentation at the American Psychological Association Annual Meeting in Toronto, Canada, May 20—25, 2006; and at the New School for Social Research Fall Poster Session, 2006.

ABSTRACT OF THE DISSERTATION

How to Edit Your Past Using Lies:
Fabricating Past Experiences Influences Autobiographical Memory

By

Steven Joseph Frenda

Doctor of Philosophy in Psychology & Social Behavior

University of California, Irvine, 2014

Professor Elizabeth Loftus, Chair

People lie about the past. They may lie in order to avoid consequences, to facilitate social bonding, or to make sense of their knowledge and their experiences. These reasons closely parallel proposed functions of memory flexibility, and a handful of studies have shown that under certain conditions, fabricating past events can lead to false memories and beliefs. Little research, however, has specifically examined whether lying about the personal past can alter autobiographical memory. The present studies are an investigation of how fabricating past experiences influences autobiographical memory, and the role of self-enhancing biases in guiding this influence.

Across three studies, Participants were prompted to compose written fabrications about a childhood event that was unlikely to have occurred. Specifically, they wrote stories were rich with perceptual and emotional detail and embellished with plausible false content. After a short delay, they were asked to disregard their fabrications and provide sincere memory reports. Results indicated that fabrications influenced the subsequent memory reports, especially when the fabrications were thematically self-enhancing. Study 2 was a replication of Study 1, with additional experimental conditions intended to disentangle the influence of emotional valence

from the self-enhancing features of the events, and to address the possibility that changes in mood accounted for the observed patterns. Results indicated that neither event valence, nor mood, could explain the patterns observed in Studies 1 and 2. In a third and final study, participants first completed one of three possible self-reflection tasks, which varied in their self-affirming and self-threatening characteristics. Next, they completed a fabrication task and memory questionnaire, as in Studies 1 and 2. Results indicated that self-affirming reflections yielded patterns of memory distortion similar to Studies 1 and 2, while self-threatening reflections appeared to reverse that pattern—threatened participants were less likely to incorporate self-enhancing fabrications into memory, and more likely to incorporate self-diminishing fabrications. The findings are considered in the context of theoretical questions surrounding motivational influences on how people recall past events.

CHAPTER 1

INTRODUCTION

To understand yourself: Is that a discovery or a creation?

–*Pascal Mercier, Night Train to Lisbon*

Your reality, sir, is lies and balderdash and I'm delighted to say that I have no grasp of it whatsoever.

–*Baron Munchausen, The Adventures of Baron Munchausen*

Remembering the past is the most marvelous illusion. It seems to fool us into believing that we are living, breathing computers with endless storage capacity, our cameras always set to “record.” How else could our mental reliving of past experiences feel so vividly detailed, so emotional, and so compelling? How else could seemingly arbitrary experiences spring back into our minds, sometimes for no apparent reason? Our capacity to store memories of our life experiences and later call them to mind *feels* almost limitless. There is never the sense that we are “running out of room” for new memories. How delightfully effortless it all feels, almost as if the task of processing and cataloguing records of our experience had been outsourced to an expert librarian who works around the clock and almost never makes a mistake.

What is Memory?

“Memory” is not a specific construct, but rather an umbrella term referring to “multiple systems” each with “different logic and neuroanatomy” (Kandel & Squire, 2001, p. 127). One of these systems, autobiographical memory, is commonly defined as memory for one’s personal past and life history, which occurs at “a major crossroads in human cognition where considerations relating to the self, emotion, goals, and personal meanings all intersect” (Conway & Rubin, 1993; p. 103). Certainly, autobiographical memory does not operate independently of

other major memory processes; the overlapping construct of episodic memory plays a significant role in constructing our personal past, as do a system of autobiographical beliefs and other forms of semantic knowledge, and the “current goals of the working self” (Conway & Pleydell-Pearce, 2000; p. 261). The interdependence (and conversely, the distinctiveness) of these systems present a challenge for the field, whose researchers have developed theories and methods tailored around their specific trees, often without sufficiently accounting for the forest. In the present research, I take up the topic of autobiographical and episodic memory. More specifically, I am interested in how people arrive at the conclusion that they are experiencing a memory of a meaningful episode from their past.

Questions of memory have vexed philosophers and scientists for millennia. Plato, and later Aristotle, described memory as a lump of impressionable wax that could be “stamped” with information. About a millennium later, St. Augustine wrote about his memory’s “vast palaces,”

... where [I find] the treasures of innumerable images of all kinds of objects ...

When I am in this storehouse, I ask that it produce what I want to recall, and immediately, certain things come out; some things require a longer search, and have to be drawn out as it were from more recondite receptacles. Some memories pour out to crowd the mind and, when one is searching and asking for something quite different, leap forward into the center as if saying ‘Surely we are what you want?’ ...I chase them away from the face of my memory until what I want is freed of mist and emerges from its hiding places. Other memories come before me on demand with ease and without any confusion in their order ... [Memory] is a vast and infinite profundity—who has plumbed its bottom? (trans. 2009)

Psychologists, too, have long analogized remembering as a specialized mental process that works something like a recording and storage system, which can be searched. Almost 1500 years after St. Augustine wrote about memory, William James wrote the following description of memory in his *Principles of Psychology*:

We make a search in our memory for a forgotten idea, just as we rummage our house for a lost object. In both cases we visit what seems to us the probable neighborhood of that which we miss. We turn over things under which, or within which, or along side of which, it may possibly be; and if it lies near them, it soon comes into view. (James, 1890, p.306).

Not long after, Freud referred to memories as residing in “a large ante-room, in which the various mental excitations are crowding upon one another, like individual beings” (Freud, 1924, p.305).

It is remarkable to discover the ways that theoretical approaches to understanding memory have remained static over thousands of years, even as psychology ushered in new insights that advanced our understanding of memory’s mechanics. Ebbinghaus’ (1913) pioneering of an experimental science of learning and memorization processes also presupposed memory as a kind of mental work, whereby people store information that can later be retrieved more or less intact. Later, psychologists in the Gestalt tradition subtly revised the storage metaphor in favor of the less rigid “memory traces,” in order to accommodate their conception of mental representations as context-dependent and embedded in organized systems of knowledge (c.f. Koffka, 1935). Contemporary psychology, in an era dominated by computer metaphors for the brain, has offered an abundance of proposed mechanisms, theories and methodologies for parsing the many processes associated with remembering (e.g., attention, short- and long-term

memory). In spite of these many advances, there has been surprisingly little change in the themes and metaphors underlying the theories we use to think about human memory. Today, the dominant framework for studying memory emphasizes three discreet stages: the encoding of new information, the long-term storage of that information, and its eventual retrieval or recall.

Roediger (1980) surveyed metaphors and analogies used to describe memory throughout history and observed that a majority of them were what he called “spacial storage and search metaphors.” Historians, too, have noted that people have tended to think of memory through the lens of metaphors related to writing and recording technologies of the time (e.g. Draaisma, 1985; Danziger, 2008)—from etching, engraving and inscription, to photography, tape and video recording. Roediger laments that, in his view, this way of conceptualizing memory in everyday life has contaminated and constrained psychological theorizing about memory.

The recording metaphor is especially problematic when it is applied to episodic and autobiographical memory. As I will describe in more detail later in this chapter, these types of memory in particular are characterized by their reconstructive nature and by their vulnerability to suggestive influences. Recalling one’s past is a complex interaction of multiple systems under the memory umbrella, including processes closely related to future prospection and imagination, which are by nature untethered from “the truth.” That is to say, memories of past experiences are not to be trusted in the way one might trust a video recording.

Roediger concludes his paper on a hopeful note:

In 30 years, the computer-based information processing approach that currently reigns may seem as invalid a metaphor to the human mind as the wax-tablet or telephone switchboard models do today. Unless today’s technology has somehow reached its

ultimate development, and we can be certain it has not, then we have not reached the ultimate metaphor for the human mind, either. (p.244)

In a sense, he was too optimistic; the computer metaphor is perhaps more persistent than one might have predicted, and 34 years later it is not immediately obvious what the “next” great technological metaphor ought to be. In some important regards, the discipline of psychology has not yet evolved past a conceptualization of memory as a kind of storage container. However, an exceedingly large literature points to the complexity and reconstructive nature of recalling the past. Perhaps we are approaching a point in time when new insights about memory will have rendered the storage container metaphor (whether engraved tablets, or computer hard drives) insufficient and no longer workable. The whole of this literature suggests that recalling past events is a fundamentally social behavior, its content determined as much by contextual factors as by information processing occurring within an individual.

From this perspective, memories are not “located” or “stored” anywhere in particular, but unfold anew each time they are recalled, drawing on multiple subsystems, in response to any number of social cues and contexts. This is not to say that humans do not retain information in any sense—clearly we highly efficient at doing just that. However, the information we retain is not the same as a memory for an event. Memories for the past are fluid and ephemeral—pliable and dynamic. They can be updated, edited, vandalized and fabricated. Memories are stitched together using multiple sources of internal and external information, stereotypes, scripts and other preexisting knowledge structures. They are influenced in countless ways by our goals and motivations, situational demands and social influences.

An early example of this kind of approach to memory can be traced back to Frederic Bartlett, one of the field’s most eminent memory researchers, who would reject the idea of

“memory traces” in favor of a constructionist approach to memory: “Remembering is not the re-excitation of innumerable fixed, lifeless and fragmentary traces. It is an imaginative reconstruction...” (Bartlett, 1932/1995, p. 213). In his well-known experiments investigating the social and cultural determinants of remembering, Bartlett introduced new methods and theoretical assumptions to the study of memory that were debated and largely dismissed in the years that followed (for an account of Bartlett’s mixed reception among memory researchers at the time, see Johnston, 2001). For one, Bartlett departed from previous researchers’ use of numbers, syllables, and words as experimental stimuli, instead investigating how people remembered information that had richer social significance and “might be fairly regarded as interesting and sufficiently normal” to participants in a memory experiment (p. 47). The best-known example of this move to richer material was his use of a folk tale called “War of the Ghosts,” which participants read and then attempted to reproduce across several trials. This sacrificing of “simplicity” and experimental control in favor of ostensibly stronger ecological validity is debated still today (e.g., Banaji & Crowder, 1989). While Bartlett’s contributions were controversial at the time (and remain so, apparently), memory researchers have repeatedly circled back to his ideas about the essentially social nature of remembering the past—most famously in Allport and Postman’s (1947) research on rumor, and more recently with renewed attempts to replicate and reexamine Bartlett’s most notable findings (e.g., Bergmann & Roediger, 1999).

Critics objected to Bartlett’s conclusions in part because he did not explicitly ask his participants to be accurate in their memory reports. Therefore, the criticism went, Bartlett was not studying people’s capacity to *remember*; he was studying something else entirely. In fact, when researchers have modified his instructions to emphasize the importance of accuracy, the

effects appear attenuated (e.g., Gauld & Stephenson, 1967). Ironically, these “failures to replicate” as they were sometimes called, could be interpreted as lending support to some of Bartlett’s most important themes: influences operating entirely outside the individual are sufficient to produce markedly different behaviors in response to memory prompts for the same kinds of stimuli. For example, in their “failure to replicate” Bartlett’s *War of the Ghosts* study, Gauld and Stephenson (1967) had instructed participants to “look on this *not as a test of memory*, but as an exercise in being as scrupulous and honest as you can in deciding what is and isn’t in the original story” (emphasis added). What effect might this instruction have had on participants’ tendency to use constructive approaches versus a more vigilant attention to memorization and accuracy in their responses? It seems that whatever it is people think of as “remembering” depends to some extent on our goals and appraisals, on situational pressures, and on influences that have less to do with some distinct reproductive process occurring inside the brain. According to this view, strong determinants of the content of memory may be contained within the very experimental materials that are ostensibly designed to study the structure and content of those memories. Perhaps our ability to “reproduce” learned information is impressive in situations that seem to demand factual accuracy, but surely there are also situations in which people, for whatever reason, are less preoccupied with the accuracy of their memory. A related area of research reveals another way that memory content is influenced by external factors— suggestion.

Memory Distortion

Our ability to store, catalogue and retrieve staggering quantities of information is admittedly an impressive feat—and this impression easily lends itself to the belief that for the most part, our memories are a reliable record of events. Nonetheless, the errors of memory are

numerous and varied, and often go unnoticed. Memories change over time, as some details are forgotten while other new details may be incorporated. Across hundreds of laboratory studies and real-world cases, it has been shown that people falsely recall seeing and hearing things that were only implied, they embellish the content of their memories with information they learned after the experience, and they can be led to remember whole events that never happened at all. Strikingly, people sometimes hold false memories to be true with sincerity and genuine confidence. And false memories, as it turns out, are often indistinguishable from accurate memories, so it is nearly impossible to reliably diagnose a memory as true or false. These phenomena (and the dire consequences associated with errors in certain contexts) have inspired a broad scientific literature detailing the flexibility and malleability of human memory.

Suggestion and Misinformation

Psychologists have studied memory errors and distortions for over a century (e.g., Munsterberg, 1908; Bird, 1927), but there was a renewed interest in the topic following a series of experiments by Loftus and colleagues that detailed the effects of different types of questioning on the way eyewitnesses remember and reconstruct past events. Early studies showed the suggestive influence of leading questions by showing that eyewitnesses' memories seemed to depend on the way they were asked about them. For example, Loftus & Palmer (1974) showed participants a car collision and later manipulated the type of questioning the participants responded to. For example, some participants were asked how fast the cars were going when they "smashed" into each other, while others were asked how fast they were going when they "hit" each other. Participants who got the "smashed" version of the questioning remembered higher speeds on average, and a week later they were more likely to falsely recall seeing shattered glass from a broken headlight.

Other studies tested the effects of misleading information on witnesses' later memory reports. For instance, in one study (Loftus, Miller & Burns, 1978) participants saw a car pass a yield sign and later, some were asked a question that mentioned the car at *a stop sign*. Participants who were exposed to the misleading stop sign suggestion were more likely than control participants to later identify an image of the car at a stop sign as accurate. Many studies emerged around this time showing that new, unseen elements could be inserted into people's memories with suggestive questioning (e.g., Loftus, 1975; Loftus & Zanni, 1975).

Other research showed that questions containing biased information can change people's subjective recollections of an event. For instance, participants who saw video of a nonviolent demonstration were later asked either neutral questions about the video, or a set of questions that subtly implied the demonstration was violent and aggressive. Participants who received the "aggressive" questions later reported that they remembered the demonstration as noisier, more violent, and more antagonistic than did participants who received the "neutral" questioning (Loftus, Altman, & Geballe, 1975).

'Rich' False Memories

In early 1990s, a debate surrounding the legitimacy of techniques used in "recovered memory" therapies prompted researchers to begin studying experimentally implanted memories of entire false events. Multiple studies have shown that repeated suggestive interviewing can lead people to vividly remember fabricated events: in one such study (Loftus & Pickrell, 1995), experimenters worked with participants' families to develop a list of true childhood events. They also obtained some key information that helped them to construct a plausible, yet false event about the participant getting lost in a shopping mall at the age of 5. Participants were then presented with short descriptions of four events and were asked to try to remember them. Three

of the events were true, and one was the false shopping mall event—constructed from details provided by the subject’s family members. Participants wrote down what they could remember about the events in a booklet, and several weeks later underwent two interviews. In the interviews, participants were encouraged to try to remember the events, and asked what they remembered about them. By the end of the second interview, one quarter of the participants reported some type of memory of the getting lost experience, even though family members had confirmed that it didn’t happen.

In another study using the familial informant method (Hyman, Husband & Billings, 1995), experimenters asked participants across two interviews to recall several true events, as well as one of two possible false events: a fifth birthday involving pizza and a clown, or an overnight hospital stay at the age of five. By the end of the second interview, about a fifth of the participants appeared to have incorporated suggested information into new memories of events that had been confirmed as false by family members. In a second experiment, Hyman et al. replicated these findings, this time using three interviews and three novel false events: evacuating a grocery store after the sprinkler system activated, spilling a bowl of punch on the parents of the bride at a family wedding, and releasing the parking brake in a car causing it to roll into something. By the third interview, 25.5% of participants were reporting at least partial memories of the false events.

In a later study, Hyman and Pentland (1996) had participants, across multiple interviews, work to recall true events reported to experimenters by familial informants, and a false event, spilling a punch bowl at a family wedding. When participants could not recall an event, half were asked to create a mental image of the event and to describe what they imagined. The remaining participants were asked to simply think about the event for one minute, with no explicit

instructions to use mental imagery. Compared to the control participants, those who received the mental imagery instruction were more than twice as likely to “recover” memories of the false event by the third interview. Further, the mental imagery exercise also appeared to facilitate the “recovery” of true events that they initially did not remember.

Another study revealed the power of imagination to facilitate the creation of inflated confidence that childhood events occurred. Garry, Manning, Loftus & Sherman administered a “Life Events Inventory” (LEI) to participants, which assessed their confidence that a long list of events occurred before they were 10 years old. For each item (e.g., got stuck in a tree, broke a window with your hand, had a lifeguard pull you out of the water), participants rated their confidence that the event happened to them. Participants were told that the experimenters were interested in how vividly and completely people could imagine various events, and in a follow up session 2 weeks later, they imagined and wrote about a subset of the LEI events. Finally, they completed a second version of the LEI. Participants were significantly more likely to increase their confidence that events had actually occurred for events that they imagined, compared to events that they did not imagine.

In another study, Hyman and Billings (1998) used familial informants to gather a list of true events about participants, and asked them to work at remembering those events and a false event (spilling a punch bowl at a family wedding) across multiple interviews. When participants could not remember a true or false event, they were instructed to visualize how the event could have happened in an effort to “recover” the memory. In addition, participants were given a battery of personality measures, including scales measuring creative imagination and dissociative experiences. The Creative Imagination Scale (Wilson & Barber, 1978) measures the vividness of a person’s mental imagery, as well as their responsiveness to suggestion. In this scale,

participants are asked to imagine 10 different experiences and are asked to rate the similarity of their imagined experience and the real experience. The average of their ratings reflects the vividness of their imagination and higher scores represent their responsiveness to hypnotic suggestion. The Dissociative Experiences Scale (Bernstein & Putnam, 1986) measures a person's tendency to experience lapses in memory in attention. Hyman and Billings found that participants who developed false memories across the interviews scored higher on both of these scales than those who did not.

After several studies had shown that people could be led to remember events that did not occur, some researchers and clinicians expressed skepticism that people could in fact be led to falsely remember events that were less plausible and more emotional. Specifically, they questioned the generalizability of these findings to the issue of therapeutically recovered memories of sexual abuse. For example, Pezdek and Roe (1997) reported that none of their participants accepted a suggestion that a parent administered a painful rectal enema in childhood, an event they argued was more similar to sexual abuse than the shopping malls and punch bowls of previous memory implantation studies. Subsequently, Pezdek, Finger, and Hodge (1997) reported findings suggesting that events that are personally implausible (e.g., experiencing a traditional Jewish dinner celebration for a Catholic subject) less likely to be implanted in memory than events that are deemed plausible.

A study by Porter, Yuille, and Lehman (1999) addressed these concerns by using repeated interviewing and guided imagination techniques in order to encourage participants to recover memories of relatively implausible, emotional and frightening childhood events. Specifically, participants were asked to work at remembering a series of true childhood events, as well as one of the following false events: a serious medical procedure, getting seriously

harmful by another child, a vicious animal attack, or an accident resulting in serious injury. The implantation rates for the various events ranged from 17% to 37%; interestingly, the highest success rate of any of the false events was for the vicious animal attack. This study showed that it was indeed possible to experimentally implant memories for highly emotional, even violent and traumatic false childhood events.

Other researchers have addressed the question of whether implausible events were significantly less likely to be implanted in memory than plausible events. For example, Strange and colleagues (2006) suggested to elementary school students over three interviews that two events occurred: riding in a hot air balloon and having tea with a member of the royal family (the royal family event was viewed as less plausible by another, comparable sample). While participants were initially more confident that the hot air balloon event occurred than they were about the royal family event, by the third interview participants had significantly increased their confidence in both events. Another study (Otgaar, Candel, Merckelbach, & Wade, 2008) showed that across two suggestive interviews, young children could be led to remember a highly implausible event (being abducted by a UFO), especially after being given prevalence information in the form of a fabricated news report suggesting the event was common. Interestingly, following debriefing, 39% of the participants insisted that the event had actually occurred, indicating that for a majority of the children, the memory reports were not the result of demand characteristics or social pressure—it appeared these children experienced genuine false memories.

These studies demonstrate that, at least for young children, the plausibility of an event is not of particular importance in susceptibility to false memories. However, what about adult participants? In one study (Sharman & Scoboria, 2008), participants completed a Life Events

Inventory, and later imagined a series of events that differed in terms of their plausibility (e.g., getting lost versus witnessing a demonic possession). While participants appeared to form clearer and more complete memories of high-plausibility events (e.g., getting lost), the imagination exercise caused participants to increase their confidence for the events and form memories regardless of the plausibility of the events. Other research investigated whether the perceived plausibility of an event could be changed, and in turn, whether unlikely events that had been made more plausible in the minds of participants could be more easily implanted in memory. In a study by Mazzoni and colleagues (2001), participants completed questionnaires assessing how plausible they believed it was that certain events (e.g., witnessing demonic possession) could have happened to them in childhood. They also completed a Life Events Inventory assessing whether they believed the events had actually happened. Participants who reported both low confidence that the critical event occurred, and also rated it as implausible, were invited to return for the follow up portions of the study. Several weeks later, some of these participants were asked to review a series of articles, some of which mentioned the possession event and implied that it was more common than people typically thought. Later, the participants were given bogus personalized feedback, which implied that they had very likely experienced the critical event. In a final session, participants were again given the plausibility and Life Events Inventory questionnaires they completed at the beginning of the study. The results showed that not only can people's perceptions of the plausibility of an event be changed with suggestive information; people can also be led to believe that they had experiences that they initially thought were highly implausible.

Other research had also begun to use bogus feedback in order to implant false events in the memories of participants. In one study (Mazzoni, Lombardo, Malvaggio, & Loftus, 1999),

participants completed a Life Events Inventory assessing their confidence that a number of childhood events occurred, including three critical events involving getting lost, being abandoned by their parents, and being lost and lonely in an unfamiliar place. Participants who rated these three critical events with low confidence were invited to participate in a follow up, with some of the participants invited to participate in the dream interpretation manipulation, which they were led to believe was an unrelated study. In this second study, they underwent a “therapy session” with a well-known psychologist and radio personality, in which the content of their dreams was analyzed and interpreted. Critically, the psychologist emphasized that the content of dreams are meaningful and contain important symbolic information about a person’s past experiences. He also emphasized that he had experience in interpreting the content of people’s dreams. The most important element of the session, however, was to suggest to participants that their dream content strongly indicated that they had an unpleasant childhood experience involving being abandoned by their parents and getting lost in an unfamiliar place before the age of 3 years old. Approximately 2 weeks later, participants filled out a second version of the life events inventory. Those who had been exposed to the psychologist’s suggestive dream interpretation showed significant increases on the three critical LEI items, while the control participants did not.

A number of published since then have used variants on the bogus feedback method in order to implant false beliefs and memories. For instance, one study (Bernstein, Laney, Morris, & Loftus, 2005) invited participants to participate in a study on personality and food experiences. In an initial session, participants completed a version of the Life Events Inventory designed to assess participants’ confidence that a series of food-related experiences happened to them before the age of ten. The LEI in this study contained a critical item involving getting sick after eating

strawberry ice cream. They also completed a “Food Preferences Questionnaire,” which assessed how much they liked various food items, including strawberry ice cream, and a “Party Behavior Questionnaire,” which assessed how likely the subject believed it was that they might eat various foods at an imaginary party. A week later, participants returned for a follow up session and were told that a computer program had analyzed their responses and generated a profile of likely early childhood experiences with particular foods. These profiles contained a number of events that are likely for most children (e.g., “you felt happy when a classmate brought sweets to school”), and some of them contained a false suggestion (that the subject got sick eating either a cookie or strawberry ice cream). The participants then answered a series of questions about their memories for the events presented in their profiles. Critically, participants were asked to imagine how the events might have happened if they could not remember them, and to write about what they imagined. Finally, they completed second versions of the LEI, and the questionnaires assessing food preferences and party behaviors. Participants who had been given the bogus feedback about strawberry ice cream significantly increased their confidence that the event had occurred, rated strawberry ice cream as less desirable, and indicated less willingness to try the food at a party. Interestingly, similar studies have used these procedures to implant new beliefs and memories of aversive experiences with food (e.g., hard-boiled eggs) and found that not only can these manipulations cause diminished preference ratings for foods, they can also have behavioral consequences as well (e.g., actual decreased consumption of targeted foods; Geraerts, Bernstein, Merckelbach, Linders, Raymaekers, & Loftus, 2008; also see Bernstein & Loftus, 2009).

Recently, several researchers have turned to investigating which types of false events are easiest to implant in memory. For instance, Sharman and Barnier (2008) investigated whether people are more suggestible in response to negative or positive events, and events that took place

in adulthood or childhood. In that study, participants completed a Life Events Inventory and later were asked to imagine false events from each of four possible categories (i.e., childhood/negative, childhood/positive, adult/negative, adult/positive). They found that confidence increased most for positive events that would have taken place in adulthood. More specifically, they found that for adulthood events, positive suggestions were more effective than negative suggestions, and for childhood events, there were no differences in the effectiveness of positive and negative suggestions.

Other studies have tried to more systematically manipulate event valence in comparing positive versus negative suggestions. For instance, Berkowitz and colleagues (2008) assessed participants' confidence that they had various experiences as a child at Disneyland. Later, participants received bogus personalized feedback that they had been licked on the ear by the Pluto character. Critically, the suggested event was identical in two conditions, but was presented in either a negative or a positive context (i.e., a pleasant ear-licking experience, or an unpleasant experience). Participants who received the positive version of the suggestion were significantly more likely to develop false beliefs and memories than participants who received the negative version of the suggestion.

Taken together, these studies suggest that people may be more willing to incorporate suggestions involving positive events into their memories than they are negative events. However, studies using different methods (e.g., word list tasks and memory for news events) have found conflicting results (e.g., Porter, Taylor, & ten Brinke, 2008; Brainerd, Stein, Silveira, Rohenkohl, & Reyna, 2008). Thus, researchers are still in the process of investigating these important questions about the effect of emotional valence on suggestibility.

WikiMemories

Let us return to an issue raised at the outset of this chapter: our assumptions and theoretical approaches to memory, it has been shown, are partly driven by analogies and metaphors we use to talk about the workings of human memory. Roediger (1980) concludes his account of memory metaphors through time by predicting that in 30 years, a computer metaphor for the human mind would seem antiquated and obsolete. However, if anything, we are more entrenched than ever in the era of understanding the human mind through the analogy of a computer. More than ever, it seems this metaphoric relationship of mind to computer is deeply intertwined in our understanding; for instance, consider the language we use to talk about computers—they “read” information, they have “memory” of the long- and short-term variety, they even “go to sleep” when we’re done using them for the night. Roediger was correct in his prediction, however, that we would eventually reach a point where the computer metaphor would begin to feel obsolete. In considering new possibilities, we might consider whether the discipline would be well-served by moving past a technological storage model for memory altogether. What, then, is an appropriate metaphor?

Elizabeth Loftus, in her TED talk on the “fiction of memory” (2013), concluded by acknowledging the general misconception that memory acts as a recording device, and suggested instead that it may function more like an entry in the online encyclopedia, Wikipedia: “you can change it, and so can other people.” In making this comparison, Loftus may have opened a new door toward a truer, more workable analogy for human memory (at least for now). A number of characteristics of Wikipedia, and the “Wiki” ethos more generally, correspond well to dynamic, collaborative features of human memory that have generally not corresponded well with recording and storage models.

Direct your web browser to en.wikipedia.org/ and you will be greeted with a friendly message welcoming you to “the free encyclopedia that anyone can edit.” The first thing you might notice is that nearly all of these words are clickable links, each directing you to separate articles containing detailed accounts of exactly what they meant when they wrote the words “free,” “encyclopedia,” and “anyone can edit.” Within each of these articles are walls of text and other media, full of many more clickable words and phrases—keep clicking and you will find informational worlds within worlds ad infinitum. Wikipedia feels pervasively and effortlessly cross-referenced (i.e., everything important is clickable). It is almost brain-like in its efficiency at organizing whole structures of knowledge and making them thoroughly navigable—by accessing information about a particular thing, you are then in a position to access other, related information much more quickly and easily.

Wikipedia is by design always growing and changing, absorbing new information and purging other information, and updating its already existing content. Its content originates, and is then freely edited by any one of the “more than 76,000 active contributors working on more than 31,000,000 articles in 285 languages.” According to Wikipedia, “hundreds of thousands” of people make “tens of thousands” of edits and create thousands of new entries every single day on the website. The result is a dynamic, rapidly transforming network of knowledge that should, in theory, be always improving, always becoming more comprehensive and internally consistent. As a means of achieving that goal, Wikipedia provides policies and guidelines to guide its volunteers in determining which content is suitable for inclusion.

There are three defining features of Wikipedia that I wish to call attention to, in order to expand on Loftus’ (2013) analogy for human memory. The first is Wikipedia’s **dynamic and collaborative** nature; it is always changing because everyone can edit it. Not all attempts to edit

Wikipedia's content succeed in becoming part of the permanent record, however. Other users can undo edits to articles; rejecting edits that don't meet Wikipedia's standards is an important and valued task in maintaining the Wiki ethic. Nonetheless, inaccurate edits and "vandalism" to Wikipedia's content has, on a number of occasions, gone undetected for long periods of time. For example, for more than four months in 2005, prominent American journalist John Seigenthaler's Wikipedia page contained false information suggesting that he had been involved in the assassinations of John and Robert Kennedy ("John Seigenthaler," 2014). In another fascinating instance of Wikipedia vandalism ("Edward Owens Hoax," 2014), students in a course called "Lying About the Past" at George Mason University created a fictional Wikipedia entry about a historical figure, "Edward Owens," who allegedly survived a 19th century economic depression and was forced into a career as a pirate in Chesapeake Bay. The entry, equipped with what appeared on the surface to be legitimate research and corroboration, stayed up on Wikipedia's site for several weeks in December of 2008—it's claims reported as fact by a number of media outlets—until the professor running the course acknowledged that he had assigned a project in which students were tasked with spreading "viral" misinformation on the internet. As demonstrated earlier, human memory is similarly prone to incorporating misleading information and representing it as truth. This can be the result of deliberate attempts to manipulate memory (one might call this "memory vandalism"), or it can result from accidental exposure to misleading or contradictory information. In many instances, these inaccuracies are identified and correctly rejected from memory. Other times, the inaccuracies become part of the permanent record and may have consequences, such as influencing other people's memories and behaviors.

The second feature of Wikipedia I want to call attention to is the process for creating new entries on the site. Users of the site can create candidate articles in what is called a "**Sandbox**,"

which essentially gives you all the tools you need to build and edit new entries that may eventually be officially incorporated into the encyclopedia. New proposed entries that have been flagged as candidates for deletion can sometimes be relegated to what Wikipedia calls “incubation,” a kind of purgatory for draft articles ostensibly showing some promise of eventually being published as an official entry, but which fail in some way to meet Wikipedia’s standards for published articles (more on that, soon). Alas, there is an enormous amount of “article-like” content that never actually becomes elevated to the status of an official entry. What is interesting about the “sandbox” and “incubation” idea is that it is not unlike a process related to human memory, wherein people engage mental content that is ambiguous in its origins. Just as some of Wikipedia’s content is not elevated to the status of a proper article, not all “memory-like” mental content is deemed a memory.

The Source Monitoring Framework (SMF; see Johnson, Hashtroudi, & Lindsay, 1993; cf. Tanner & Swets, 1954; McNichol, 1972) is a growing collection of observations and predictions that detail the ways that people distinguish between different sources of information. According to the SMF, people infer the origins of mental experiences by quickly, often automatically, evaluating characteristics like vividness and sensory detail. Using these features, people categorize mental content as having originated in actual experiences, imagination, counterfactual thinking, future prospection, dreams, stories told by others, or any number of potential information sources. For example, a person might recall a visual image of a particular city street in New York, and then quickly evaluate features of that image (e.g., its vividness, other perceptual details, feelings of familiarity it brings up) in order to decide whether they really visited that street or simply saw it in a photograph or a film. Remembering the past and imagining the future appear to rely on similar neurological structures (Addis, Wong, & Schacter,

2007), and a number of researchers have observed that we use memory processes for a range of cognitive activities beyond merely recalling the past (e.g., Johnson & Sherman, 1990; Neisser, 1988). As Newman et al. (2009) point out, our unique ability to mentally travel backwards and forwards in time, reimagining how the past might have happened and predicting or considering possible future scenarios, requires a memory system that is flexible enough so that we can deliberately generate false or distorted mental representations of events. This makes source monitoring a crucial necessity—we are skilled at producing “memory-like” content, so we need a system for parsing “authentic” memory content from other types of content. Without such a system, I would have no way of distinguishing, for example, between my elaborate fantasies of being an esteemed filmmaker and the realities of my career as a student and scientist.

This leads to the third feature of Wikipedia that illuminates a fact of human memory, which I have already alluded to: there are set **criteria** for determining the kinds of content that are suitable for publication. Wikipedia “covers certain kinds of subjects and not others,” and asks users to provide corroboration and references to outside material when they wish to add new factual information. Their criteria for new entries is described on an introductory help page (“Your first article,” 2014):

Gather references both to use as source(s) of the information you will include and to demonstrate the notability of your article's subject matter. References to blogs, personal websites, Facebook and YouTube are unsuitable – we need reliable sources. There are many places to find reliable sources, including your local library, but if internet-based sources are to be used, start with books and news archive searches rather than a simple web search. Extra care should be taken to make sure that articles on living persons have

reliable sources – articles about living people without reliable sources may be deleted, especially if they include negative or controversial content.

Wikipedia, like human memory, involves the global evaluation of ambiguous content in an effort to determine whether it should be included as part of the official “record.” Corroborated information, in particular “non controversial” content, is most likely to meet this criteria. This guiding principle is of major importance to the integrity of an encyclopedia (or a person’s memory, for that matter)—ideally, new information should not harm the internal consistency and reliability of the overall system of knowledge. Whenever a person says, “I’ll never forget that face,” or “I remember it happened this way,” he or she has considered the mental content related to that claim and has decided that it meets some criteria to be deemed a memory. That is, he or she has “published” it as an official entry in the Wikipedia of their mind.

Obviously, there are ways that the Wiki analogy is limited in its ability to account for all of the nuances of human memory. For one thing, a history of edits and changes to any given article is easily accessible with a single click—this is most certainly not the case with human memory, which tends to be secretive about its inner workings and edit history. The analogy also stops short of fully accounting for the complexity of recalling memories. Though Wikipedia’s inclusion criteria approximates a crude metaphor for the criteria we apply to attributing mental content to memory, the reality of applying criteria to making source determinations is much more flexible than in the case of Wikipedia (though it seems likely that Wikipedia’s inclusion standards are imposed more strictly for some topics than others). Finally, though Wikipedia is popular and obviously influential, it may be too ephemeral a technology and cultural touchstone to have lasting relevance as a memory metaphor. Nonetheless, it illuminates a number of essential features of human memory that are not well accounted for by a recording and storage

model. Wikipedia, like memory, is collaborative and dynamic, and its rule system enables the creation of proposed content that is then subject to criteria that usually, but not always, eliminates false content from its system of knowledge.

Self-Enhancement

Before turning to the possible influence of self-enhancement motives on memory, it may be helpful to provide a general summary of the research into self-esteem—generally defined as the global sum of a person’s self-evaluative attitudes (Rosenberg, 1979; Brown, 1998). The literature pertaining to these topics is such an endless smorgasbord of methods, theories, proposed mechanisms, and findings (some redundant, others contradictory) that the task of comprehensively reviewing all of it becomes incredibly daunting. Abraham Tesser, in particular, has noted the near-impossibility of coherently summarizing the menagerie of research related to self-esteem and self-enhancement, referring to it collectively as the “self zoo” (Tesser, Martin, & Cornell, 1996; Tesser, 2000).

A common theme in this literature, which can be observed in hundreds of studies using a number of methods across thousands of participant samples, is that people’s sincere impressions of themselves tend to be overly positive and self-congratulatory. According to this literature, people take too much credit when they succeed and refuse to take responsibility when they fail (e.g., Ross & Sicoly, 1979; Greenwald, 1980; Zuckerman, 1979), they attribute positive traits to themselves, but resist attributing them to others (Alicke, 1985), they mistakenly believe themselves to be “above average” on just about everything (Cambell, 1986; Marks, 1984) and they engage in a whole host of strategies for otherwise inflating their self-evaluations.

Relatedly, a robust literature documents the tendency for people to further increase their efforts to self-enhance, specifically in response to self-threatening information. Numerous

studies have shown that when study participants encounter information that they experience as threatening to their self-evaluation, they seek strategies for restoring and defending the self. For example, they may distance themselves from successful others (Pleban & Tesser, 1981), sabotage someone else's success (Tesser & Smith, 1980); evaluate others more harshly, even their friends (Tesser & Campbell, 1982), or disparage the source of the threatening information (Tesser & Paulhus, 1983; Brown, Dutton, & Cooke, 1998; see also Shrauger, 1975). They may seek ways to self-affirm (e.g., Steele, 1988), to “bask” in the glory of others' victories (Cialdini & Richardson, 1980), or compare themselves favorably with less successful others (see Wills, 1981; Wood, 1989).

Why this happens is a matter of considerable debate. Broadly, the self-enhancing bias have been theorized in a number of ways: for example, as a basic motivational drive (e.g., Maslow, 1943), as a barometer reflecting our success at pursuing social connectedness (Leary, Tambor, Terdal & Downs, 1995), as an evolved mechanism—closely intertwined with culture—for buffering the existential terror arising from awareness of our mortality (Solomon, Greenberg, & Pyszczynski, 1991), as informational bias (Miller & Ross, 1975), and as an essential component of thriving and mental health (Taylor & Brown, 1988). Others have either critically conceptualized self-esteem as a culturally bound construction (Heine, Lehman, Markus & Kitayama, 1999; cf. Solomon, et al., 1991), or have noted that historically speaking, the construction of a meaningful individual “self” in reality is a relatively recent development (Baumeister, 1987).

Heine and colleagues (1999) delivered a scathing, but persuasive critique of the conclusions being drawn from the literature on self-enhancement, noting that its empirical foundation consists mostly of studies conducted by American researchers using American

participants, and that research into self-enhancement behaviors in the context of other cultures (mostly Japan) has failed to yield similar patterns. One example of this can be seen in research related to self-affirmation. Self-affirmation theory (e.g., Steele, 1988; Steele, Spencer, & Lynch 1993) has led to a number of findings suggesting that self-affirming behaviors can reduce the aftereffects of cognitive dissonance—in other words, cognitive dissonance is more tolerable when the self is sufficiently affirmed. However, attempts to replicate these patterns in Japanese samples (e.g., Heine & Lehman, 1997) have failed. Another example is found in the research on the “better than average” effect—pervasive in American samples, but not in Japanese samples (see Markus & Kitayama, 1991; Heine & Lehman, 1997; Heine & Leman, 1999).

These contradictory findings seem to lend credence to theories of self that conceptualize the motivation to self-enhance as subordinate to higher-order motivations involving social and cultural connectedness. In concluding their case, Heine and colleagues write,

Perhaps attuning psychological tendencies with [being a meaningful member of a culture] serves to authenticate the self and can thereby define the central elements of both objective and subjective well-being. With such a formulation we may have reached the level of abstraction where we can speak of something akin to a “universal need.” We emphasize, though, how divergent the cultural mechanisms are by which people realize this sociocultural requirement. Self-enhancement within North American contexts may serve a similar purpose of authenticating the self as self-improvement does within Japanese contexts, yet these two processes each come bundled with highly distinct cognitions, emotions, and behaviors that warrant investigation in their own right. (p. 788)

In other words, to the extent that a particular culture celebrates individual achievement and rewards self-promotional attitudes and behaviors, people may appear motivated to embody those

traits and characteristics. Perhaps what once seemed like a basic drive to self-enhance was really a drive to “succeed” by according to the particular norms and standards the participants were adherent to.

Self-enhancement and Memory

In 1981, Ulric Neisser published a case analysis in which he compared John Dean’s recounting of conversations between him and Richard Nixon to actual audio recordings of those conversations. What he found was that Dean was surprisingly accurate (and honest) in conveying the gist of what had happened. However, he “dramatized” the story with exaggerations and subtle revisions that cast him in an especially flattering light. Neisser spoke of Dean’s self-enhancing nature “reorganizing” his memories:

...even when he tries to tell the truth, he can’t help emphasizing his own role in every event. A different man in the same position might have observed more dispassionately, reflected on his experiences more thoughtfully, and reported them more accurately.

Unfortunately, such traits of character are rare.

Neisser’s interpretation ultimately leaves open the possibility that some people’s memories may be biased and “reorganized” in a less self-enhancing style. Christensen and colleagues (2003) tested this hypothesis, using daily diaries to investigate whether people’s global self-evaluations were associated with different patterns of bias in autobiographical memory. Participants in that study recorded pleasant and unpleasant experiences at the end of each day for a week. For each experience, they also rated their state self-esteem (in response to the specific event), the emotionality of the event, and its valence. Later, they were shown their descriptions of the events and attempted to recall their ratings. A major finding was that individuals with high self-esteem recalled experiences as more positive than they really were,

while low self-esteem individuals showed the opposite pattern—they were biased toward recalling events negatively. A number of other studies have shown similar results (e.g., Story, 1998; also see Shrauger, 1975).

In a fascinating series of studies (Sanitioso, Kunda, & Fong, 1990), it was found that the motivation to attribute a particular trait to the self biased the recruitment of true autobiographical memories. Specifically, when participants were led to believe that either introversion or extroversion was a more desirable trait, they more easily and rapidly accessed memories that were consistent with that trait. This points to self-concerns directly influencing the availability of autobiographical memory content. The researchers ruled out alternate accounts of the findings—the patterns could not be explained by priming effects, for example. Sanitioso and colleagues argue that although motivation is a powerful influence on the kinds of memories that can be easily called to mind, these motivational effects are “constrained by the repertoire of available memories.” (pp 236-237).

In one of the few studies investigating motivational influences on the development of false beliefs (Sharman & Calacouris, 2008), researchers measured participants’ need to achieve, and had them imagine false achievement-oriented events (e.g., winning a competition). Participants categorized as strongly desiring achievement were especially likely to increase their confidence that the events had really occurred after imagining them. In other words, to the extent that the participants wanted success for themselves, they were particularly prone to incorporating false information regarding successes into their beliefs about their past.

Lying and Autobiographical Memory

A number of studies have shown that people willingly admit that they lie in everyday conversation (see, e.g., DePaulo, Kasky, Kirkendol, Wyer, & Epstein, 1996), often without

premeditation, without feelings of guilt, and without much concern for the possible consequences. Studies have also shown that people make an effort to be entertaining when reminiscing or sharing stories with others, often at the expense of accuracy (e.g., Dudukovic, Marsh, & Tversky, 2004). Interestingly, these subtle departures from accuracy, which are perhaps conscious at the time, are often later incorporated into memory.

The research on deliberate deception has focused predominantly on lie detection (e.g., Ekman, 1999; cf. Bond, 2008), while other studies have approached lying from a clinical perspective (e.g., Birch, Kelln, & Aquino, 2006), conceptualizing it in terms of mental disorder. As such, there are few studies that have investigated the social and cognitive consequences of fabricating past events, and fewer still have investigated its effect on autobiographical memory specifically. Although there is a scarcity of research into this topic, I will briefly review three areas that (at least tangentially) inform the current research questions.

Audience Tuning

There is a fascinating literature focused on a particular kind of strategic deception and its surprising effects on later memory. “Audience tuning” (see, e.g., Echterhoff, Higgins, & Groll, 2005) is the tendency people have to alter their memory reports in order to bring them more in line with what they perceive to be the preferences and evaluations of their audience¹. For instance, when speaking to a group of Republican-identified friends, a person may describe a Democratic politician’s speech as not very substantive, even when really they found it satisfactory. This becomes problematic for memory, according to these studies, because with the passage of time it becomes exceedingly difficult to distinguish authentic memory content from

¹ In this context, “audience” is taken to mean any recipient of a memory or an evaluation; for example, an audience can be a single conversational partner, a small group, or a large crowd.

“audience tuned” content. In other words, people engage in minor deceptions in an effort to initiate and maintain social bonds, and these deceptions can ultimately be mistaken for the truth.

From a source monitoring perspective, it is interesting that audience tuning seems to influence a person’s memory especially when he or she wishes to create and maintain a social bond (i.e., a “shared reality”) with the audience (e.g., Echterhoff, Higgins, Kopietz, & Groll, 2008). Put another way, people seem to engage in audience tuning with all types of audiences, but only incorporate their deceptions into memory when they *like* the audience. A fascinating implication of this finding is that source-monitoring processes may be sensitive to the social consequences (or benefits) of any given piece of information. In the face of suggestive information that might connect us more securely to others—thus ensuring our survival, perhaps—it seems memory may become more impressionable and less resistant to change.

Forced Confabulation

In other studies using what is called a "forced confabulation" paradigm, participants view an event (e.g., a video) and then are subjected to interviews in which they are made to fabricate information in their responses. In one study (Zaragoza, Payment, Ackil, Drivdahl, & Beck, 2001), interviewers either provided confirming feedback (e.g., "That is correct,"), or neutral feedback (e.g., "OK") in response to the fabrications. Participants' memories were then tested after a week, and again after 1-2 months. At both follow-up visits, participants had incorporated their fabrications into memory, and moreover, they were especially likely to do so for fabrications that had been met with confirmatory feedback.

In an extension of this paradigm, Chrobak and Zaragoza (2008) tested whether participants would incorporate entire fictitious events they had fabricated (rather than just small details) into their memory for a series of events depicted in a video. Few participants had

incorporated their fabrications into memory after 1 week, but after 2 months nearly half of the fabrications were reported as fact. Particularly surprising was how many participants did this despite having correctly rejected the fabrications a week earlier in the presence of experimenters. These studies demonstrate that non-factual content generated by the participants themselves was often incorporated into memory after a delay, strongly suggesting that telling lies poses a threat to the reliability of memory.

Fabrication Inflation

Just one study (Polage, 2012) has investigated the effect of fabricating past experiences on autobiographical beliefs. Specifically, participants completed baseline questionnaires assessing their beliefs that various childhood events happened to them. Two weeks later, they returned to the lab and wrote detailed stories about true and false events. Critically, they were told to fabricate detailed stories about events that they previously claimed had never happened to them. A week later, participants returned and were interviewed by an experimenter, who they believed was attempting to detect deception. They were encouraged to try as hard as possible to deceive the interviewer with the false events, and were offered a reward if they succeeded. Finally, they were brought back for a *fourth* session, in which they completed a second version of the questionnaires assessing their beliefs about childhood events, including the critical events.

Results from that study indicated that fabricating autobiographical content influenced participants' autobiographical beliefs and their confidence that the events had occurred. Interestingly, participants were significantly more likely to show inflated confidence in the false events if they scored high on measures of dissociation, if they reported a high frequency of lying in their everyday lives, and if they reported high levels of discomfort while lying. An interpretation of these findings is that the more often people lie, the more difficulty they may

have distinguishing their lies from the truth. Moreover, people may capitalize on the flexibility of their memory and self-knowledge in order to avoid the unpleasant reality of having lied.

This study, though related to the present research, is an investigation of the effect of fabricating past events on autobiographical belief. Belief and memory, in the autobiographical context, are thought to be distinct constructs, even as they are obviously intertwined. For example, though memories of past events appear to depend in large part on the presence of a belief that the event occurred (cf. Clark, Nash, Fincham, Mazzoni, & Andersson, 2012), many autobiographical beliefs are typically unaccompanied by any meaningful memory content (e.g., I have an autobiographical belief that I was born in Walnut Creek, California at John Muir hospital, but I do not remember it). While the influence of fabrication on beliefs is certainly important, the present research takes up the question of autobiographical memory. In other words, what factors influence whether a person experiences clear and complete memories? What leads a person to (perhaps mistakenly) come to the conclusion that they are mentally “reliving” a past event?

The Present Research

The present research circles two main questions related to the malleability of memory. First, what is influence of fabricating past events on autobiographical memory? Second, what is the role of self-enhancing biases in guiding this influence?

Many researchers interested in false memory are faced with the challenge of executing study designs that require complex (sometimes convoluted) deceptions, and multiple in-person sessions. The study conducted by Polage (2012) is a prime example of this—participants in that study returned to the lab four separate times across several weeks, and throughout the duration of the study had to remain convinced of an elaborate cover story. A secondary goal of the present

research was to develop a paradigm that could be used to quickly and efficiently study these influences. To this end, I opted to develop a procedure that could be completed in one brief session, online or in person, and required no deception.

The end result of my efforts was a paradigm in which participants are prompted to create elaborate fictions about childhood events, and to write stories about those events using plausible people, locations, and events. Critically, participants are instructed to embellish any true memory content with false content, including perceptual, emotional, and narrative detail. Their task, they are told, is to write a compelling, entertaining story with the goal of persuading a reader that the experience really happened to them. After a short delay, they complete a questionnaire—in which they are explicitly instructed to disregard earlier fabrications and answer truthfully—about their memory for various childhood events, including a critical event.

This research also takes up the issue of self-enhancing biases in patterns of memory distortion, specifically distortions caused by lying. In order to address this question, I set out to develop critical events whose self-enhancing features could be manipulated, ideally without inadvertently manipulating other features (e.g., emotionality, plausibility) of the event. I then tested a number of possible interpretations for the observed patterns. Finally, to further investigate the role of motivational influences on memory distortion patterns, I examined the effect of various self-reflection tasks (i.e., varying levels of self-affirming and self-threatening information) on later memory.

CHAPTER 2

PILOT AND STUDY 1

In Study 1, the primary aims were to establish that fabricating childhood experiences can influence later autobiographical memory reports, and to test the hypothesis that self-enhancing fabrications are especially likely to be incorporated into memory.

The first order of business was determining a critical event, which had to meet a number of important criteria. First, it had to be plausible and not too unusual, but also uncommon enough that most participants would enter the studies believing it never happened to them. It had to be flexible enough so that its self-enhancing qualities could be manipulated, without otherwise altering its content and meaning. In search of the perfect critical event, I compiled a list of candidate events, each with a self-enhancing or the self-diminishing counterparts (see Table 2.1).

Pilot Study

Method

One hundred seventy-seven UC Irvine undergraduates ($M_{\text{age}} = 19.9$, $SD_{\text{age}} = 2.0$; 69% female), completed a short survey assessing their perceptions of the events, in exchange for course credit. For each event category (e.g., Athletic competition), participants were randomly shown *either* the self-enhancing or self-diminishing version of the event, and asked to rate it on a number of dimensions. For each event, they indicated whether the event had ever happened to them before the age of 12. Then, they rated how common they believed the event was among their peers (on a 7-point scale ranging from “Very rare” to “Very common”), its emotional

valence² (on a 7-point scale ranging from “Very negative” to “Very positive”), and the intensity of emotional arousal (7-point scale ranging from “Very calm/relaxed” to “Very tense/excited”).

² For the questions pertaining to emotionality (i.e., valence and arousal), participants were told that if the event did not happen to them, they should respond by imagining how they might feel while having that experience.

Table 2.1
Candidate Life Events

Event Description	Version	
	Self-enhancing	Self-diminishing
Athletic competition	<i>I came in first place in an athletic competition</i>	<i>I came in last place in an athletic competition.</i>
Spelling bee	<i>I won a spelling bee by correctly spelling a difficult word.</i>	<i>I lost a spelling bee by misspelling an easy word.</i>
Injured animal	<i>I nursed an injured animal back to health.</i>	<i>I injured an animal and it died.</i>
Science fair	<i>I came in first place in a science fair.</i>	<i>I came in last place in a science fair.</i>
Cat in a tree	<i>I found a cat stuck in a tree, and I rescued it.</i>	<i>I found a cat stuck in a tree, and I taunted it.</i>
School lunch	<i>I shared my lunch money with a friend at school.</i>	<i>I stole a friend's lunch money at school.</i>

Results and Discussion

As shown in Tables 2.2 and 2.3, participants varied in their perceptions of the event types, reporting significantly different levels of perceived commonness, emotional valence and arousal. In other words, my attempt to manipulate *only* the self-enhancing nature of the event in most cases failed—with one exception. The “Cat in a tree” event was an ideal candidate across all criteria. First, very few participants (less than 5%) reported that the event had happened to them, even though they rated the event as moderately common among their peers. Importantly, there were no differences in perceived commonness or ratings of emotional arousal between the self-enhancing and self-diminishing versions of the event. There were, however, differences in emotional valence ratings between the self-enhancing and self-diminishing versions of the cat event. Understandably, participants rated the experience of rescuing a cat as considerably more positive than the experience of taunting one. A difficulty here is that the valence of the event unavoidably confounds any manipulation of self-enhancement, as a self-enhancing experiences tend to reflect positive emotion, and self-diminishing experiences tend to be negative. With a promising critical event in tow (save for the emotional valence issue, which will be addressed in Chapter 3), I set out to investigate whether expressively lying about the past might influence people’s memory reports.

Table 2.2
Prevalence of Candidate Life Events

Event	Version		Statistic
	Self-Enhancing	Self-Diminishing	
Athletic competition	23%	12%	$\chi^2 (1, N=177) = 6.5^*$
Spelling bee	15%	33%	$\chi^2 (1, N=177) = 8.1^*$
Injured animal	38%	6%	$\chi^2 (1, N=177) = 26.4^{**}$
Science fair	11%	2%	$\chi^2 (1, N=177) = 6.0^*$
Cat in a tree	5%	1%	$\chi^2 (1, N=177) = 1.9$
School lunch	88%	4%	$\chi^2 (1, N=177) = 126.5^{**}$

Note. * = $p < .05$, ** = $p < .001$.

Table 2.3

Life Event Characteristics

Event	Version		<i>t</i> (<i>df</i> = 175)
	Self-enhancing	Self-diminishing	
Athletic competition			
Commonness	4.2 (1.5)	4.3 (1.7)	.32
Emotional Valence	6.5 (1.2)	1.9 (1.0)	28.29**
Emotional Arousal	5.1 (1.7)	6.5 (1.1)	6.44**
Spelling bee			
Commonness	3.8 (1.5)	4.4 (1.6)	2.25*
Emotional Valence	6.4 (1.3)	2.2 (1.2)	21.83**
Emotional Arousal	6.0 (1.4)	5.0 (1.5)	4.67**
Injured animal			
Commonness	4.2 (1.5)	3.0 (1.8)	4.69**
Emotional Valence	6.1 (1.1)	1.8 (1.2)	25.39**
Emotional Arousal	4.1 (1.5)	5.1 (1.5)	3.98**
Science fair			
Commonness	3.8 (1.8)	3.3 (1.6)	2.01*
Emotional Valence	6.3 (1.3)	2.0 (1.2)	22.38**
Emotional Arousal	5.8 (1.5)	4.8 (1.5)	4.38**
Cat in a tree			
Commonness	2.8 (1.3)	3.0 (1.4)	1.13
Emotional Valence	6.0 (1.1)	2.8 (1.4)	16.48**
Emotional Arousal	5.0 (1.7)	4.7 (1.4)	1.26
Lunch money			
Commonness	6.4 (1.0)	3.0 (1.6)	17.24**
Emotional Valence	6.0 (1.0)	1.9 (1.2)	24.09**
Emotional Arousal	2.4 (1.8)	5.2 (1.5)	11.31**

Note. * = $p < .05$, ** = $p < .001$. Standard deviations appear in parentheses beside means

Study 1: Method

Participants

Participants were 61 male and 131 female undergraduates at the University of California, Irvine ($M_{age} = 20.5$, $SD_{age} = 1.9$) who volunteered to participate in a study “investigating personality, life experiences, and the effects of expressive writing” in exchange for course credit through the Social Science Research Participation Pool. About 26% of the sample identified as East Asian, 13% as Southeast Asian, 17% as Latino/a or Hispanic, 16% as European American/White, 8% as Filipino, 6% as Middle-eastern, 6% as Multi-racial, 5% as South Asian or Indian and 1% as African American/Black. Less than 2% of the sample declined to state a racial identification.

Materials

Fabrication Prompt. The fabrication prompt, developed for the purposes of the present research, is a task in which participants spend several minutes expressively writing a fictive story about a childhood experience. The task is designed to elicit elaborate narrative fabrications that are highly plausible, rich with personalized detail, and rooted in the participant’s actual autobiographical history. Three fabrication prompts were used in Study 1: self-enhancing fabrication (SEF), self-diminishing fabrication (SDF), or control (first taste of vanilla ice cream).

The self-enhancing fabrication prompt reads as follows:

“Write a story about a time that you found a cat stuck in a tree. The story should feature you, before the age of 12, as the main character. Begin your story by describing the scene. Describe what the tree looked like, and where it was. Describe the way the cat looked and sounded. **In the middle of your story, you should describe how you tried to rescue the cat, and get it down**

from the tree without hurting it. End your story by describing how the cat's owner finally arrived and retrieved the cat, and how you went about your day, satisfied that you had helped. Remember, you should try to include as many plausible details (sights, sounds, emotions) as you can. Your task is to convince a reader that this event really happened. You may include additional details and events, but you should include the elements described above. Try to spend 4-5 minutes writing the story. If you find you have run out of things to write, try to keep jotting down details as they come to you.”

The self-diminishing (i.e., cat harassment) fabrication prompt is identical to the above except for the critical bolded passage, which is modified to read:

In the middle of your story, you should describe taunting the cat, and throwing sticks at it in order to knock it from the tree. End your story by describing how the cat remained stuck in the tree, and how you went about your day, amused.

Finally, the control prompt reads as follows:

Write a story about trying vanilla ice cream for the first time. The story should feature you, before the age of 12, as the main character. Your story should start out with your anticipation of the event, and a parent or caregiver telling you that they would be serving you a delicious dessert. In the middle of your story, describe what it was like to eat the vanilla ice cream. Finally, end your story by describing what happened after you ate the ice cream. Remember, you should try to include as many plausible details (sights, sounds, emotions) as you can. Your task is to convince a reader that this event really happened.

You may include additional details and events, but you should include the elements described above. Try to spend 4-5 minutes writing the story. If you find you have run out of things to write, try to keep jotting down details as they come to you.”

Past experiences questionnaire. A questionnaire assessing autobiographical memories was adapted from previous questionnaires assessing autobiographical beliefs and memories, and autobiographical memory characteristics. Importantly, before participants begin working on this questionnaire they are encouraged to report truthfully. Specifically, they are warned, “some of the events [we will ask you about] may be ones you wrote fictional stories about earlier, but in this questionnaire, we are interested only in what you truly remember. Please answer accurately.” Participants then view a list of possible childhood events (including the critical event, “*You found a cat stuck in a tree,*” and the control event, “*I tried vanilla ice cream for the first time.*”) and rate them on a series of dimensions. For each event, participants are asked, “How clearly can you remember the event? If you believe the event never happened or you cannot remember it at all, select the left-most option to indicate ‘No memory at all.’ Otherwise, indicate how clear and complete your memory is for the event using the other points on the scale.”

Participants then indicate their memory completeness rating on a Likert-scale ranging from 1 (“No memory at all”) to 7 (“Clear and complete memory”). Next, they rate the extent to which any memory for the event is accompanied by visual, auditory, and emotional detail—each on a scale ranging from 1 (“Not at all”) to 7 (“Completely”).

Design and Procedure

Participants followed a link to an online survey, which presented a study information sheet generally describing the upcoming procedures. All participants completed the study procedures on a computer of their choice, although they were strongly encouraged to select a time and location that would minimize the likelihood of noise and other distractions.

After participants indicated they consented to participate and completed a demographic questionnaire, they proceeded to complete the fabrication prompt. For this task, participants were randomly assigned to one of three conditions: SEF ($n = 65$), SDF ($n = 64$) or control (i.e., a fabrication prompt unrelated to the critical event; $n = 63$). Following the fabrication prompt, all participants completed a filler questionnaire³ for approximately five minutes, and finally, they completed the questionnaire assessing past experiences. Completion of all study procedures took approximately 15-20 minutes.

Results

Fabrications

Participants wrote on average 221.3 words in response to the fabrication prompt ($SD = 115$, Range = 29 - 760). As can be seen in Figure 2.1, participants wrote longer stories in the SEF condition ($M = 257$, $SD = 125$) than in the SDF condition ($M = 199$, $SD = 96$), $t(127) = 2.9$, $p < .01$.

³ Across all studies, filler questionnaires were comprised of questions from the pilot phase (i.e., questions about the commonness, emotional valence and emotional arousal of non-critical hypothetical childhood events). See Appendix A for sample filler questions.

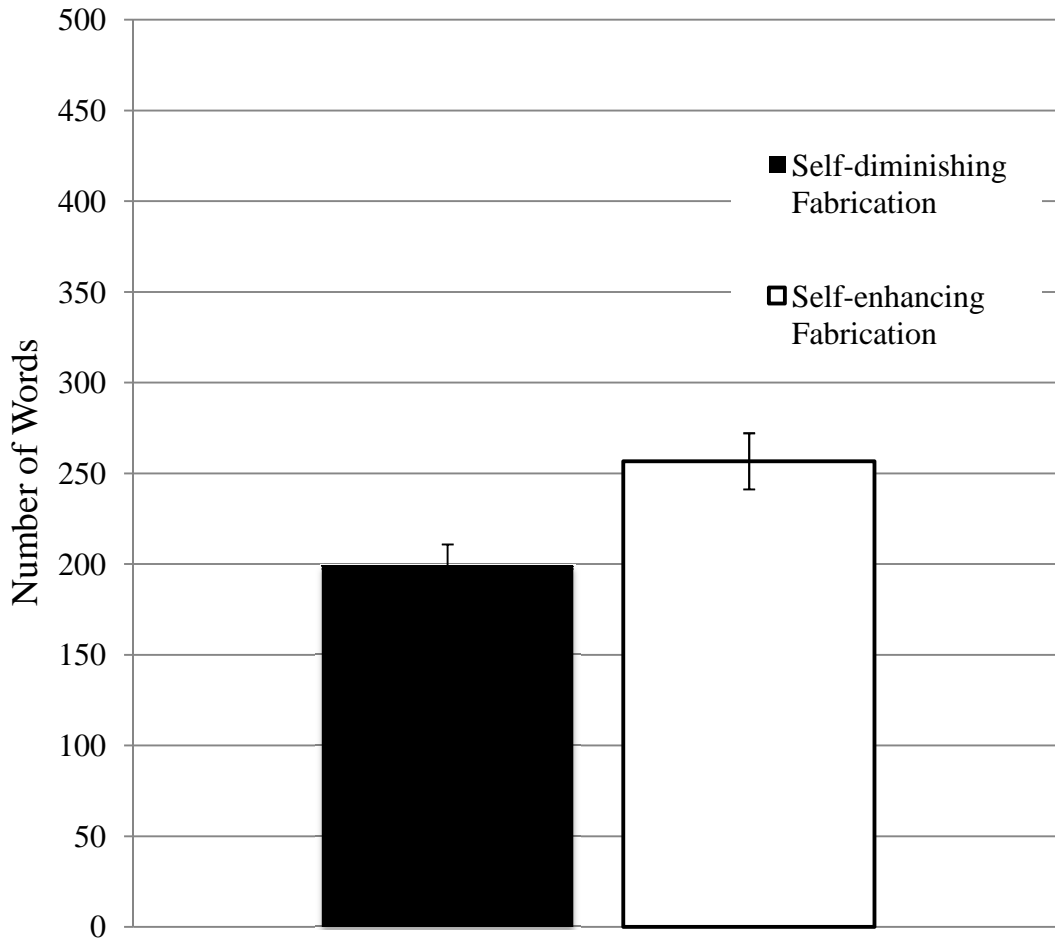


Figure 2.1. Average fabrication word count across conditions. Error bars represent standard errors of the mean.

Fabrication and Autobiographical Memory

To test the effect of fabrication on autobiographical memory, I turned to the critical portion of the Past Experiences Questionnaire. I first examined the proportion of participants who selected a value above the midpoint on the memory clarity scale, indicating that they had at least a moderately “clear and complete” memory of having found a cat stuck in a tree before the age of 12. Of the 63 control participants, who wrote about tasting vanilla ice cream for the first time, 4 participants (6%) appeared to indicate at least a moderately clear and complete memory of finding a cat stuck in a tree before the age of 12. Of the 65 participants in the SEF condition, 9 participants (14%) indicated at least a moderately clear and complete memory of finding a cat.

Lastly, of the 64 participants in the SDF condition, 4 participants (6%) indicated at least a moderately clear and complete memory of finding a cat. These differences failed to achieve statistical significance.

Next, I examined the proportion of participants who reported any memory at all for the critical event (i.e., those that indicated a rating between 2 and 7 on the 7-point scale). Eleven (or 14%) of the control participants, 24 (or 37%) of the SEF participants, and 14 (or 22%) of the SDF participants reported some memory of the critical event. Fisher's exact tests revealed that the proportion of participants reporting at least some memory was higher in the SEF condition than in the control condition, $p < .05$, two-tailed. The self-diminishing story condition had no effect on the proportion of participants who reported some memory, relative to the control group, $p > .1$.

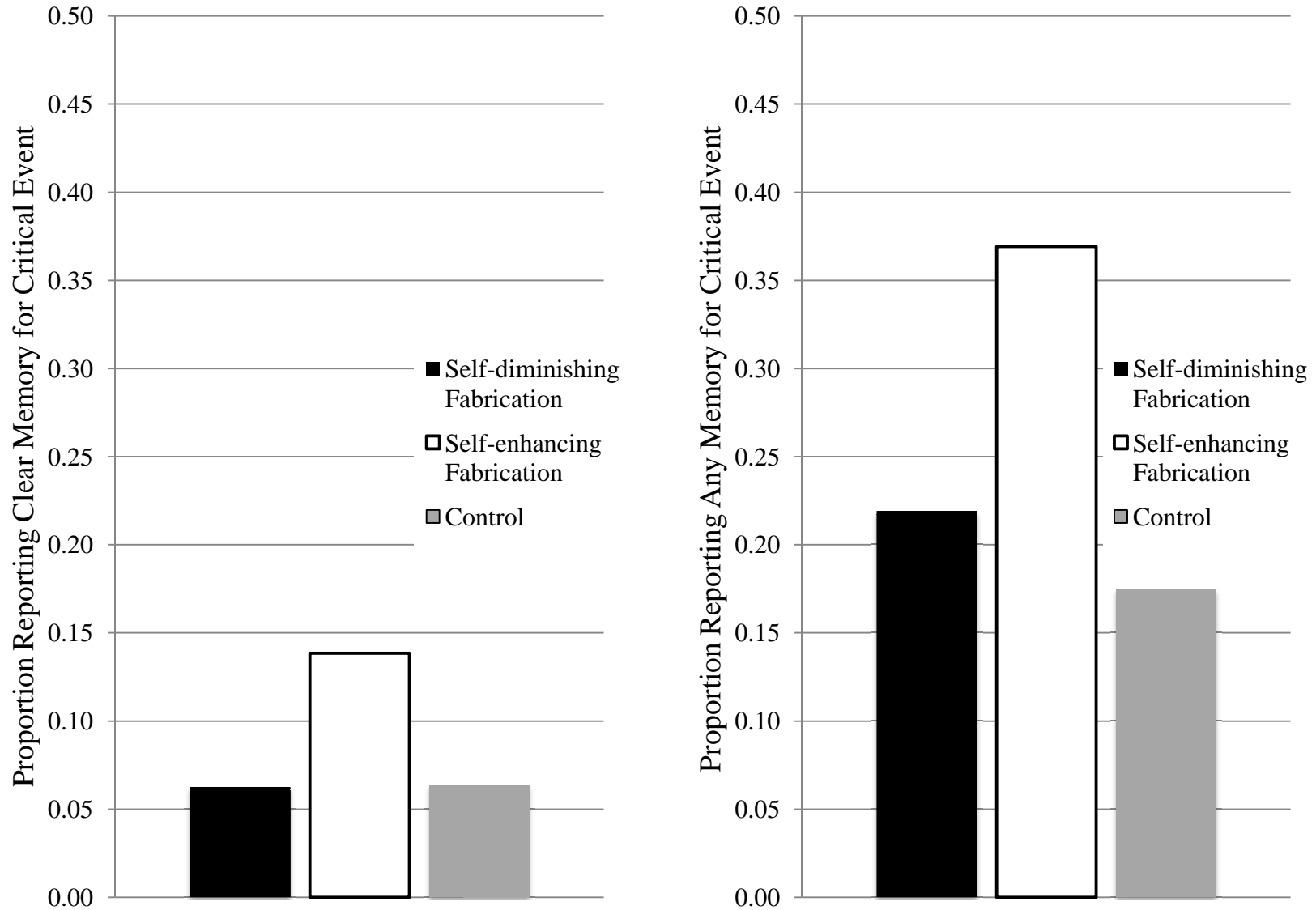


Figure 2.2. Proportion of participants reporting clear (left) and partial (right) memories of the critical event following one of three fabrication prompts.

Lastly, I compared the mean memory completeness ratings for the critical event between the three conditions, using Analysis of Variance⁴ and Bonferroni post-hoc comparisons. Analyses revealed a significant effect of condition, with the SEF group providing higher memory completeness ratings for the critical event compared to the SDF and control groups. The same pattern emerged when ratings of visual, auditory, and emotional detail were treated as dependent outcomes. See Table 2.1 for means and statistics.

⁴Of note, ANOVA may not be an ideal approach, due to the non-normal distribution of the outcome variable. To illustrate, in Study 1, 74% of the participants selected a rating of 1 (“No memory at all”) for the critical item, with the remaining 26% distributed along the remainder of the scale. With this caveat in mind, I elected to present analyses of the raw data (using ANOVA) for the sake of completeness, alongside the preferred analyses using dichotomized outcomes.

Table 2.4

Mean critical event ratings across fabrication conditions.

Variable	Fabrication Condition			<i>F</i>	η^2
	Self-diminishing	Self-enhancing	Control		
Memory completeness	1.58 _a (1.24)	2.24 _b (1.88)	1.49 _a (1.18)	5.04**	.05
Visual detail	1.67 _{ab} (1.25)	2.31 _a (1.93)	1.54 _b (1.29)	4.67*	.05
Auditory detail	1.47 _a (1.01)	2.17 _b (1.82)	1.46 _a (1.15)	5.66**	.06
48 Emotional detail	1.45 _a (1.04)	2.28 _b (1.90)	1.49 _a (1.16)	6.88**	.07

Note. * = $p < .05$; ** = $p < .01$; Means that do not share a subscript within rows are significantly different at the level of $p < .05$, using Bonferroni post-hoc comparisons. Standard deviations appear in parentheses below means.

Discussion

In summary, most participants appeared to comply with our fabrication prompt and wrote more than 200 words on average, with the SEF group writing longer fabrications than the SDF and control groups. Also, the fabrications appeared to influence participants' subsequent memory reports, increasing the likelihood that they would report some memory of the critical event, increasing their mean clarity ratings, and increasing their ratings of visual, auditory, and emotional detail. However, this was only true for the self-enhancing story condition. In other words, fabricating a story in which the participant behaved heroically tended to influence memory, whereas fabricating a story in which he or she behaved badly did not.

The patterns of results in the present research are consistent with previous studies showing that memory is biased toward self-enhancing distortions (e.g., Bahrick, Hall, & Costa, 2008). However, there are at least two other possible explanations for these patterns. First, participants who were given the self-enhancing story prompt wrote longer stories than participants who were given the self-diminishing story prompt. Longer stories include, presumably, more content. This suggests people, when prompted, may put more effort and detail into a self-enhancing fabrication than a self-diminishing fabrication. Participants who wrote especially long and detailed stories may have simply generated more available content that could be incorporated into memory, thus accounting for the observed differences between our groups. Or, they may have more effortfully generated details with strong perceptual or emotional qualities, making their stories more memory-like, and thus more easily mistaken for the remnants of an authentic past experience. However, these accounts were not supported in the present study; for example, no associations were found between the length of the fabricated story and later memory ratings for the critical event.

Another possibility is that this pattern of results reflects the tendency for participants to more readily incorporate information into memory when that information is positively valenced. This distinction, although subtle, is important—here, I am suggesting that self-enhancing fabrications (which by definition are likely to be positively valenced⁵) are more likely than self-diminishing fabrications (which are likely to be negatively valenced) to be incorporated into memory. With the data from Study 1, I am unable to disentangle these competing hypotheses: is the pattern of results being driven by the emotional valence of the event, or the extent to which the event reflects positively or negatively on the participant? This question is addressed in Chapter 3.

⁵ Although this is a natural assumption to make, it is important to note that experiences or memories that in some way exhibit failure or incompetence may in some instances be experienced as self-enhancing and/or self-affirming. This is nicely illustrated by the memory effect whereby people exaggerate their poor performance at an earlier testing stage, creating the illusion of improvement over time. Another interesting example of negatively valenced, yet self-enhancing memories may be found in 12-step culture (e.g., Alcoholics Anonymous), in which memories and stories of “hitting rock bottom” are shared, and represented as starting points for self-improvement and “rebirth.”

CHAPTER 3

STUDY 2

Study 2 attempted to disentangle the roles of general event valence and self-enhancement in the fluidity of autobiographical memory. Specifically, I set out to replicate the pattern of results in Study 1 and to rule out the possibility that event valence, not self-enhancement, is driving the differences in participants' memories observed in Study 1. To this end, I developed two additional story prompts that closely paralleled the original self-enhancing fabrication (SEF) and self-diminishing fabrication (SDF) prompts. These new prompts were identical to the self-enhancing and self-diminishing story prompts used in Study 1, with one critical difference: the good or bad behavior (i.e., rescuing or taunting the cat) is performed not by the participant but by a friend (although the participant is still present in the story). The idea behind the creation of these alternate story prompts was that by implicating a friend in the critical behaviors instead of the participant, the effect of general event valence would remain, absent any influence of self-enhancing or self-diminishing characteristics. Specifically, I predicted that although the "friend rescuing a cat" rescue event would be experienced as globally more positive than the "friend harassing a cat" event, participants would not show a strong preference for incorporating the friend cat rescue into memory, specifically because here the positive features of the event are not self-enhancing from the perspective of the participant.

Method

Participants and Design

Participants were 22 male and 78 female undergraduates at the University of California, Irvine ($M_{age} = 20.0$, $SD_{age} = 2.1$) who volunteered to participate in a study "investigating personality, life experiences, and the effects of expressive writing" in exchange for course credit

through the Social Science Research Participation Pool. Of this sample, 27% self-identified as Latino/a or Hispanic, 18% as East Asian, 15% as European American/White, 12% as Filipino, 9% as Southeast Asian, 9% as Multi-racial, 9% as South Asian or Indian, 5% as Middle-eastern and 1% as African American/Black. Two participants (2%) declined to state a racial identification.

Participants were randomly assigned to receive one of five possible fabrication prompts: self-enhancing fabrication (SEF), self-diminishing fabrication (SDF), other-enhancing fabrication (OEF), other-diminishing fabrication (ODF), or control.

Materials and Procedure

Just as in Study 1, participants followed a link to an online survey, read a study information sheet/consenting document, and completed a demographic questionnaire. Next, they completed three tasks, presented below in the order participants received them.

Memory attention check. The purpose of this task was to assess participants' ability (and willingness) to engage a somewhat complex set of instructions surrounding their autobiographical memories. This was to help ensure that participants were paying attention to our later instructions, which even in their simplest form require some attention to the nuances of autobiographical belief and memory. In the task, participants were instructed to read lists of childhood events and indicate whether each event did or did not happen by placing them in boxes labeled "Did Not Happen to Me," "Maybe Happened to Me," or "Definitely Happened to Me." Specifically, the participants read:

"In the first task, we are going to show you a list of events that can occur in childhood. Some of the events are very common, and have happened to virtually everybody. Others are less common and may or may not have

happened to you. To the right of the list are three boxes, labeled "did not happen to me," "maybe happened to me," and "definitely happened to me." Read each event in the list and consider whether it has happened to you before the age of 12. Then, click on the event and drag it to the box that best describes it. When you're done, all the events on the left should be in the boxes to the right. Let's give it a try."

Participants then encountered a list of childhood events (e.g., "I woke up in the middle of the night with a bloody nose," "I spilled a glass of milk") and categorized each into one of the three boxes. Following this, participants encountered a second list and completed the task once again. Embedded in the lists were six critical items, three that were virtually certain to have happened ("I was born," "I tied my shoes for the first time," and "I ate a strawberry for the first time"), and three that were virtually impossible ("I visited the moon," "I was on the cover of Vogue magazine," and "I was the starting quarterback for the Denver Broncos"). The test being presented to participants was: could they recognize the impossible events as belonging to the "Did Not Happen to Me" category, and the true events as belonging to the "Definitely Happened to Me" category?

Fabrication Prompt. The Fabrication task was presented as before, but this time with an initial instruction, which read as follows:

"... you will see a prompt asking you to write a story about yourself having a specific experience in childhood. Your story should have a beginning, middle, and end. It should be as detailed as possible - try to describe sights, sounds, feelings, people who were there, and where it took place. While you should try to use as many accurate details as possible (e.g., people you know and

places you remember), you should also add things that are not true. The goal is to create a story that is well written, entertaining, and compelling, with a lot of descriptive detail. **Someone who reads your story should be convinced that the event really happened to you.**”

Following this instruction, participants were given their prompt and an instruction asking them to write for 4-5 minutes. The SEF, SDF, and control prompts were identical to those described in Study 1. Two additional prompts (OEF and ODF) were used in the present study. The OEF prompt read as follows:

“Write a story about a time that you **and a friend** found a cat stuck in a tree. The story should feature you, before the age of 12, as the main character. Begin your story by describing the scene. Describe what the tree looked like, and where it was. Describe the way the cat looked and sounded. **In the middle of your story, you should describe how your friend tried to rescue the cat, and get it down from the tree without hurting it. End your story by describing how the cat's owner finally arrived and retrieved the cat, and how you and your friend went about your day.** Remember, you should try to include as many plausible details (sights, sounds, emotions) as you can. Your task is to convince a reader that this event really happened. You may include additional details and events, but you should include the elements described above. Try to spend 4-5 minutes writing the story. If you find you have run out of things to write, try to keep jotting down details as they come to you.”

The ODF prompt read:

“Write a story about a time that you **and a friend** found a cat stuck in a tree. The story should feature you, before the age of 12, as the main character. Begin your story by describing the scene. Describe what the tree looked like, and where it was. Describe the way the cat looked and sounded. **In the middle of your story, you should describe how your friend taunted the cat, and threw sticks at it in order to knock it from the tree. End your story by describing how the cat remained stuck in the tree, and how you and your friend went about your day.** Remember, you should try to include as many plausible details (sights, sounds, emotions) as you can. Your task is to convince a reader that this event really happened. You may include additional details and events, but you should include the elements described above. Try to spend 4-5 minutes writing the story. If you find you have run out of things to write, try to keep jotting down details as they come to you.”

Mood Assessment. Following the fabrication prompt, participants completed a brief assessment of their mood. Specifically, they were asked to rate “how positive or negative” they were currently feeling on a scale ranging from 1 (Very negative) to 7 (Very positive). Next, in order to assess emotional arousal, participants reported how “tense or excited” they were currently feeling on a scale ranging from 1 (Very calm/relaxed) to 7 (Very tense/excited).

Past experiences questionnaire. A questionnaire assessing autobiographical memories was nearly identical to the questionnaire described in Study 1. Participants viewed a list of possible childhood events (including the critical event, “*You found a cat stuck in a tree*”) and rated them on a series of dimensions, including memory clarity and completeness and the amount of visual, auditory, and emotional detail present. Immediately following completion of

the Past Experiences Questionnaire, participants were debriefed and thanked for their participation.

Results

Memory Attention Check

Participants, for the most part, were able to correctly categorize the critical (i.e., impossible and true) events. Of the 100 participants in the present study, only 4 (4%) miscategorized at least one of the critical events (e.g., claiming that “I went to the moon” “maybe happened”). All analyses that follow were run with and without these participants, and the patterns of significance remained the same—thus, in order to preserve statistical power, I included all participants in all subsequent reporting.

Fabrications

Participants wrote 241 words on average in response to the prompt ($SD = 110.8$; Range: 72 – 595). As can be seen in Figure 3.1, participants in the SEF condition ($M = 282$, $SD = 121$) wrote longer stories than those in the SDF condition ($M = 203$, $SD = 59$), and OEF participants ($M = 282$, $SD = 138$) wrote longer stories than those in the ODF condition ($M = 232$, $SD = 110$). Planned comparisons revealed the word counts were significantly different between the SEF and SDF conditions, $t(38) = 2.6$, $p = .01$, but no significant difference emerged between the OEF and ODF conditions, $t(38) = 1.3$, $p = .21$.

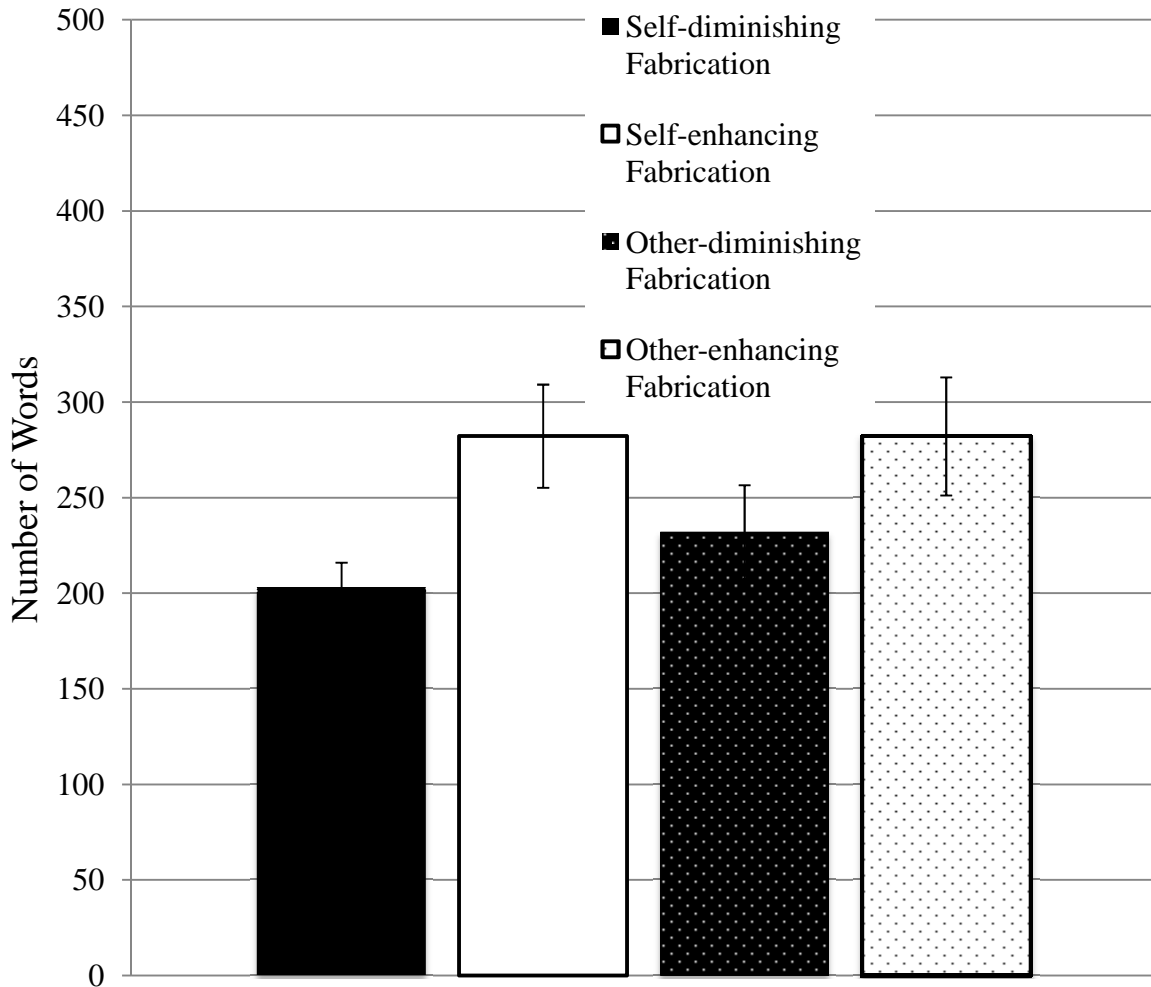


Figure 3.1. Average Fabrication Word Count Across Conditions. Error bars represent standard errors of the mean.

Fabrication and Autobiographical Memory

As in Study 1, I first considered the proportion of participants in each condition who indicated a moderately “clear and complete” memory of the critical event, finding a cat stuck in a tree before the age of 12. In the control condition, none (0%) gave a rating above the midpoint on the scale. Due to concern about low expected cell-counts, I used Fisher’s exact test to determine whether the incidence of complete memories of the critical event were significantly different from the control condition. Only the SEF condition showed a significantly different proportion of complete memories: seven SEF participants (or 35%) reported at least a moderately clear and

complete memory of the critical event, $p = .008$. One participant (5%) from the SDF condition, 2 participants (10%) from the ODF condition, and no participants (0%) from the OEF condition reported a clear and complete memory of the critical event. None of these rates differed significantly from the control group, all $ps > .50$. See Figure 3.2.

Next, I examined the proportion of participants in each group that reported any memory at all of the critical event (i.e., selected a rating higher than 2 on the 7-point memory completeness scale). A similar pattern emerged: in the control condition, 1 participant (or 5%) reported some memory. The SEF condition had the highest proportion of participants reporting some memory (8 participants, or 40%), followed by the ODF condition (5 participants, or 25%), and the SDF and OEF conditions (each with 1 participant, or 5%). Only the SEF group differed significantly from the control group, $p = .02$. The ODF condition did not significantly differ from the control group, $p = .18$, nor did any other condition, $ps = 1.0$.

Lastly, I compared the mean memory completeness ratings for the critical event between the five conditions, using Analysis of Variance, and Bonferroni post-hoc comparisons. Analyses revealed a significant main effect of condition, $F(4, 95) = 5.3$, $p < .001$. Bonferroni post-hoc comparisons revealed that the SEF group provided higher memory completeness ratings on average, compared to each of the four other groups (all $ps < .01$). No other comparisons were statistically significant. See Table 3.1.

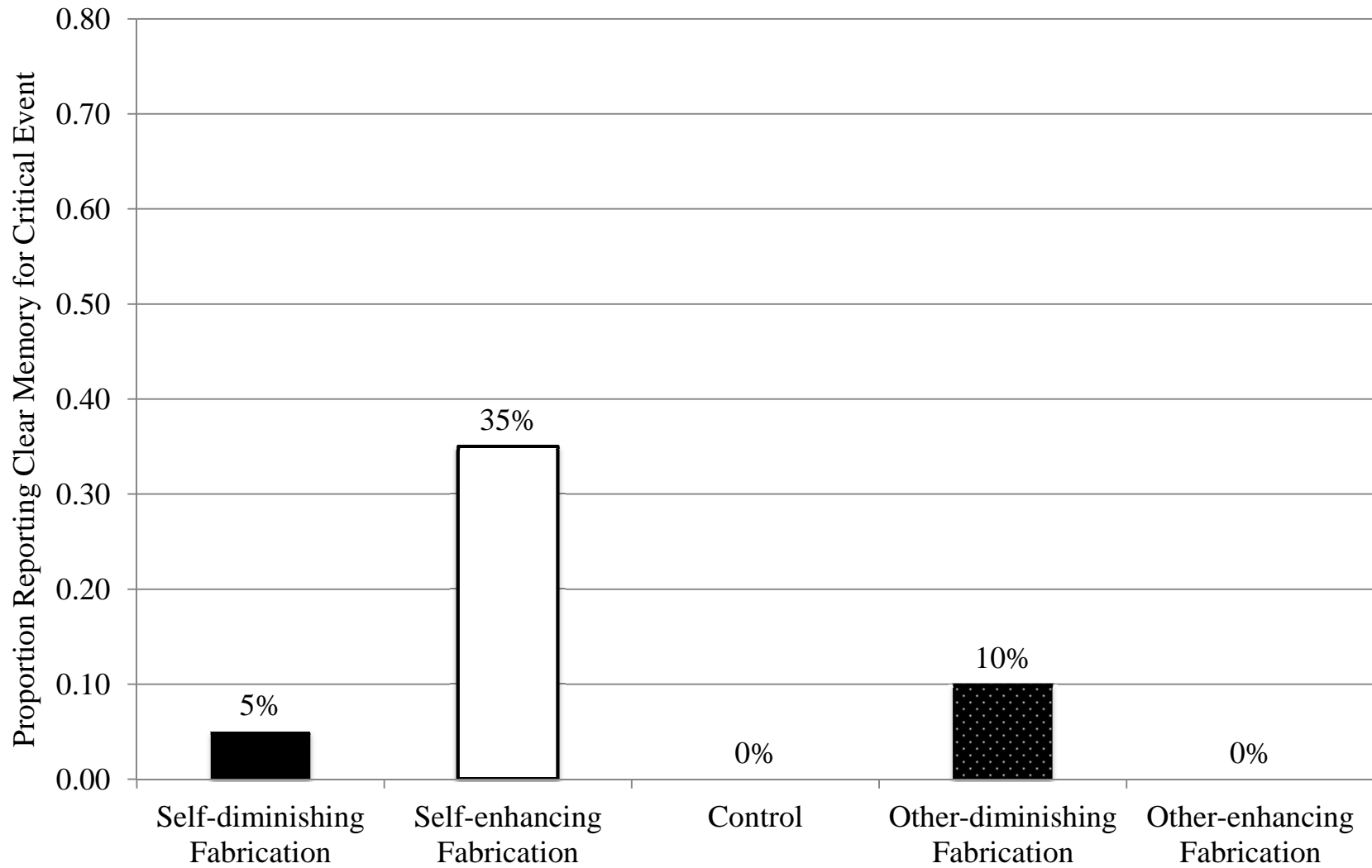


Figure 3.2. Proportion of participants reporting clear and complete memories of the critical event following one of five fabrication prompts.

Table 3.1

Mean critical event ratings across conditions.

Variable	Fabrication Condition					<i>F</i>	η^2
	Self-diminishing	Self-enhancing	Control	Other-diminishing	Other-enhancing		
Memory completeness	1.20 _a (.89)	2.75 _b (2.40)	1.05 _a (.22)	2.00 _{ab} (1.97)	1.05 _a (.22)	5.31***	.18
Visual detail	1.20 _a (.89)	2.85 _b (2.37)	1.05 _a (.22)	2.00 _{ab} (1.97)	1.20 _a (.70)	5.37***	.18
09 Auditory detail	1.20 _{ab} (.89)	2.10 _a (1.55)	1.0 _b (0)	1.75 _{ab} (1.59)	1.1 _b (.31)	3.86**	.14
Emotional detail	1.05 _a (.22)	2.20 _b (1.54)	1.10 _a (.44)	1.90 _{ab} (1.74)	1.10 _a (.31)	5.06**	.18

Note. * = $p < .05$; ** = $p < .01$; *** = $p < .001$ Means that do not share a subscript within rows are significantly different at the level of $p < .05$, using Bonferroni post-hoc comparisons. Standard deviations appear in parentheses below me

Fabrication, Mood, and Memory

Interestingly, the fabrication prompts had no discernable effect on participants' subsequent mood, neither in terms of valence nor emotional arousal. I used Analysis of Variance with Bonferroni post-hoc comparisons to test whether there were group differences in ratings of mood valence and arousal following the fabrication task. There was no main effect of condition on valence ratings, $F(4, 95) = 0.5, p = .73$, or arousal ratings, $F(4, 95) = 2.0, p = .10$. Lastly, there were no associations between ratings of memory completeness for the critical event and mood ratings ($r = -.08, p = .50$) or arousal ratings ($r = .09, p = .44$).

Discussion

To summarize, in Study 2, participants who fabricated a Self-enhancing story about finding a cat stuck in a tree were significantly more likely to claim partial, and complete memories of that event, relative to a control condition. None of the other story conditions (i.e., SDF, OEF, or ODF) showed significant differences compared to the control group. The same pattern among the groups could be observed in their mean ratings of memory completeness, visual detail, auditory detail, and emotional detail—each of these was higher, on average, in the Self-enhancing story condition relative to all other conditions.

In addition to replicating the patterns found in Study 1, recall that I included two additional groups in Study 2 in order to test the hypothesis that event valence, not self-enhancement, was driving the observed effects. More specifically, if the OEF condition had led to higher proportions of memories relative to the ODF condition, this would complicate any interpretation of differences among the SEF and SDF conditions. Interestingly, participants appeared slightly more likely to incorporate other-*diminishing* fabrications into memory (10% of participants) than other-enhancing fabrications (0% of participants), although this difference was

not statistically meaningful. This pattern of results strongly suggests that something other than generalized event valence is at play in determining what kinds of fabricated information go on to influence memory.

Another possibility is that mood can account for the observed differences. Specifically, it is reasonable to wonder whether the SEF condition in particular improved participants' moods, which in turn made them especially vulnerable to suggestive information. Taking into consideration previous research investigating the effect of mood on various forms of memory suggestibility, this is a valid concern. However, these data showed no effect of condition on subsequent mood, and mood was not associated with any of the critical memory outcomes, including the tendency to report memories for the critical event. In other words, the possibility of mood effects on suggestibility likely cannot explain the patterns observed in Studies 1 or 2.

If the patterns observed in Studies 1 and 2 are not due to general event valence effects, and they are not due to mood, what is the best way to explain them? I briefly outline two possibilities here.

Self-esteem Maintenance Account

The idea of “self-esteem maintenance” is demonstrated in a large empirical literature, the bulk of which suggests that exposure to negative, self-threatening information motivates people to seek out strategies for reaffirming or restoring self-integrity. These threats and strategies take various forms—researchers have mapped out a number of domains in which compensatory responses to threat can be observed. As described in Chapter 1, early studies in this area showed that in response to negative evaluative information, people engage in various self-affirming strategies (e.g., Baumeister & Jones, 1978; Cialdini et al., 1980). A related series of studies in the self-esteem maintenance tradition (see Tesser, 2000; Tesser, 2001) showed that the effects of

various threats (e.g., unflattering social comparisons, or cognitive dissonance) could be attenuated via a number of strategies (e.g., by affirming one's values or by engaging in a subsequent *positive* social comparison).

Other examples of self-enhancement as a strategy for redressing self-threats are found in research on "Terror Management Theory," (TMT) which posits that people seek out strategies for staving off the paralyzing existential angst associated with confronting the inevitability of death. At least a hundred studies are put forth as evidence supporting TMT, many of them demonstrating that even the subtlest reminders of death and mortality cause participants to pursue numerous self-affirmation strategies, including disparaging outgroups (Harmon-Jones, Greenberg, and Solomon, & Simon 1996), and initiating positive social interactions (Taubman Ben-Ari, Findler, and Mikulincer, 2002; Wisman and Koole, 2003). In fact, TMT researchers have proposed that self-esteem itself (which they regard as culturally situated) may have evolved as a sophisticated buffer against the otherwise debilitating terror of knowing our own mortality (Greenberg, Solomon, Pyszczynski, Rosenblatt, Burling, et al., 1992). Taken together, research in the "self-esteem maintenance" tradition envisions self-enhancement as a kind of strategic maneuver, as a built in mechanism for healing and protecting wounded egos.

Continuing with this logic, it stands to reason that in a world full of external threats (e.g., negative feedback, constant reminders that eventually we will die), we may have adapted a memory system that is sensitive to our pervasive need to buffer against those threats, and as a consequence, we more easily incorporate new information into memory when it is self-enhancing. At the theoretical level, the self-esteem maintenance account paints self-enhancement motives as directly influencing processes involved in source monitoring and false memories, as a strategy for restoring the self in the face of countless threats.

Biased Self-knowledge Account

The second possible interpretation is that these patterns are less motivational and more just a reflection of an already existing bias in participants' self-knowledge. In other words, they show a generalized tendency to welcome information into memory that corresponds to an inflated self-evaluation, only because they are already oriented toward viewing themselves in a self-enhancing style. This may contribute to overly inflated feelings of familiarity and "fit" in response to ambiguous self-enhancing content, which in turn biases source decisions.

Taking this logic one step further, it stands to reason that people who do not maintain an inflated self-view should not display the self-enhancing memory bias, and that they instead should show a general preference for incorporating into memory information that is consistent with whatever traits they believe they possess. Some evidence in support of this prediction is a study mentioned earlier (Sharman et al., 2008), which showed that people who imagined false successes increased their confidence that those events had really occurred, especially if they scored high on a scale assessing achievement orientation. Critically, the fact that less achievement-oriented individuals were less susceptible to developing false memories of success-related events suggests that the likelihood of attributing information to memory may vary as a function of how consistent that information is with prior self-knowledge. Another study mentioned earlier (Christensen et al., 2003), found that high self-esteem individuals recalled experiences with a positive bias, whereas tended toward recalling events negatively. A similar effect has been shown in comparisons of people high and low in narcissism (Hart, Sedikides, Wildschut, Arndt, Routhledge et al., 2011). Taken together, these results suggest that a self-enhancing memory bias may only affect certain individuals who are oriented toward an inflated self-view.

Taking this interpretation further, it stands to reason that fluctuations in a person's global self-evaluation should correspond to fluctuations in the kinds of suggestive information they are susceptible to. For example, a person who experiences some catastrophically self-threatening failure (e.g., a young professor who fails to win tenure) should in the aftermath be more susceptible to *self-diminishing* memory distortions than they would had they not failed. The self-esteem maintenance account, on the other hand, leads to the opposite prediction: the professor who fails to win tenure should seek to incorporate *self-enhancing* information into memory as a means of repairing their damaged self-evaluation.

If the broader literature around self-esteem is any indication, self-esteem maintenance and threat compensation are pervasive behaviors, at least in American culture. The same general pattern has been demonstrated in countless ways, using a diversity of methodologies. It seems reasonable to predict that this pattern might be observable in people's processing related to their autobiographical memories. However, looking only within the autobiographical memory literature, it appears that there is considerably more evidence to support a biased self-knowledge explanation for the patterns in Studies 1 and 2. A self-knowledge account is also more flexible to accommodate cultural differences in self-concept; that is, it does not rely on the assumption that the drive to self-enhance is universal. In Chapter 4, I address these competing hypotheses.

CHAPTER 4

STUDY 3

In Chapter 3, it was suggested that according to a self-esteem maintenance model, exposure to self-threatening information should produce increased susceptibility to self-enhancing suggestions. Further, self-affirming information should lessen the tendency to display self-enhancing memory distortions. On the other hand, according to a biased self-knowledge model, self-threatening information should lead to self-diminishing patterns of memory distortion. Further, self-affirming information should lead to even stronger patterns of self-enhancing memory distortion. In Study 3, I tested these two accounts by reproducing the method of Study 1, but with an important addition: before the fabrication task, participants were exposed to one of three self-reflection tasks, adapted from Sherman's self-affirmation procedure (see, e.g., Sherman & Cohen 2002), that varied in their threatening and affirmational qualities. The self-reflection tasks involved writing a brief (true) story about either a) a time when the participant successfully lived up to his or her most cherished value (self-affirmation), b) a time when the participant failed to live up to that value (self-criticism), or c) a time when *someone else* succeeded at living up to the value (other-affirmation). In theory, the self-affirming reflection task should activate positive memories of participants' own good behavior, and promote positive self-evaluation. The self-critical reflection task ought to be more of a mixed bag—on one hand, it should activate memories of the participant failing to live up to their most cherished value. On the other hand, in writing about a time in the past when they failed to live up to a value that is important to them today, participants might conceivably highlight self-enhancing themes (e.g., improvement over time, or lessons learned) even as they are reflecting on on self-critical content. Finally, the other-affirming reflection task should activate thoughts of

a potentially unfavorable social comparison (i.e., another person succeeding at something that is important to the participant), while at the same time limiting their ability to affirm their own attachment to the value.

Method

Participants and Design

Participants were 62 male and 238 female undergraduates at the University of California, Irvine ($M_{age} = 20.4$, $SD_{age} = 2.5$) who volunteered to participate in a study “investigating personality, life experiences, and the effects of expressive writing” in exchange for course credit through the Social Science Research Participation Pool. About 29% of the sample identified as Latino/a or Hispanic, 23% as East Asian, 14% as European American/White, 10% as Southeast Asian, 7% as Filipino, 7% as Multi-racial 4% as South Asian or Indian, 3% as Middle Eastern, and 2% as African American/Black. Two participants (<1% of the sample) declined to state a racial identification.

Participants were randomly assigned to receive one of 9 possible versions of the study materials in a 3 x 3 design, with the self-reflection task (self-affirmation, self-threat, or other-affirmation) and fabrication condition (self-enhancing fabrication, self-diminishing fabrication, or control) as between-subjects factors.

Materials and Procedure

As in Studies 1 and 2, participants followed a link to an online survey, read a study information sheet/consenting document, and completed a demographic questionnaire. Next, they completed three tasks, presented below in the order they received them.

Self-reflection task. In this task, participants first completed a questionnaire about “your perspectives and opinions,” in which they read a list of personal values and then rated their

importance on the scale ranging from 1 (“Not At All Important to Me”) to 7 (“Very Important to Me”). The list includes items such as “artistic skills,” “athletic ability,” “physical attractiveness,” “kindness to animals,” and “empathy and kindness to other people.” After advancing to the next page, participants again viewed the list of values and were asked to “select the one value that is MOST important to you. Even if you feel that several of the values are important to you, please pick only one.” On the next page, participants viewed one of the following instructions, depending on which Threat condition they were assigned to:

(Self-affirmation): Now, try to think about a time in your life when you lived up to this value. Then, write a brief story about that experience. In other words, write about a time when you showed a great deal of **empathy and kindness to other people**.⁶ Don’t worry about how well the story is written. Just focus on expressing your memory of the event and the thoughts and feelings you had at the time. Please try to write for 4-5 minutes.

(Self-criticism): Now, try to think about a time in your life when you DID NOT live up to this value. Then, write a brief story about that experience. In other words, write about a time when you showed little or no empathy and kindness to other people. Don’t worry about how well the story is written. Just focus on expressing your memory of the event and the thoughts and feelings you had at the time. Please try to write for 4-5 minutes.

⁶ The survey was programmed to embed the participant’s prior selection (i.e., the value that is most important to them) into the instructions on this page. The example presented here, represents the instruction given to any participant who selected “empathy and kindness to other people” on the previous questionnaire.

(Other-affirmation): Now, try to think about a time when someone else lived up to this value—perhaps someone you know or have heard about. Then, write a brief story about that person’s experience. In other words, write a story that shows why showing empathy and kindness to other people might be important to someone else. Don’t worry about how well the story is written. Just focus on expressing your memory of the event and the thoughts and feelings you had at the time. Please try to write for 4-5 minutes.

Fabrication Prompt and Past Experiences Questionnaire. Following a short filler questionnaire (approximately 5 minutes), participants were given one of three prompts: self-enhancing fabrication (SEF; cat rescue), self-diminishing fabrication (SDF; cat harassment), or control (first taste of vanilla ice cream). Another short filler questionnaire followed (also approximately 5 minutes), and participants then completed the Past Experiences Questionnaire, which was identical to the questionnaire used in Study 2. Finally, participants were thanked for their participation and debriefed.

Results

Fabrications

Participants wrote about 215 words on average in response to the fabrication prompt ($SD = 114.0$; Range: 32 – 837). As seen in Figure 4.1, the SEF participants wrote longer fabrications than the SDF prompt ($M = 254.9$ and 184.3 , respectively), $t(199) = 4.6, p < .001$. In order to test whether the threat manipulation had any effect on the responses to the fabrication prompt, I used Analysis of Variance with fabrication word count entered as the dependent outcome, and fabrication condition (SEF or SDF) and threat condition (self-affirmation, self-threat, or other-

affirmation) entered as between-subjects variables. The model was significant $F(3, 197) = 7.5, p < .001$, and there was a significant main effect of fabrication condition, $F(1, 197) = 20.7, p < .001$. There was no significant main effect of threat condition, nor any significant interactions, $ps > .4$.

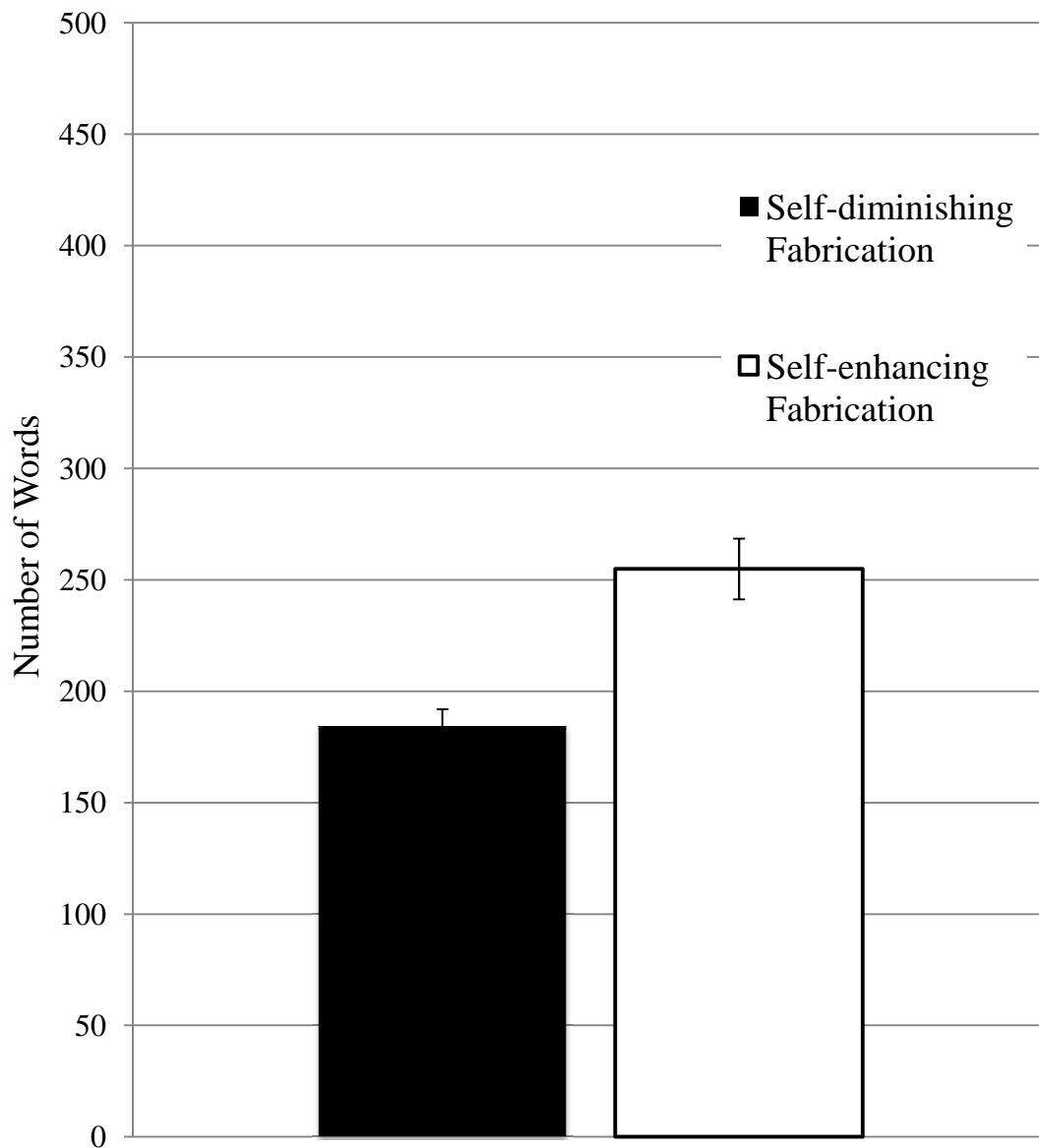


Figure 4.1. Average fabrication word count across fabrication conditions (collapsed across self-reflection tasks). Error bars represent standard errors of the mean.

Fabrication and Autobiographical Memory

Recall that Study 3 implemented the same procedure as Study 1, only here it was preceded by one of three self-reflection tasks: a self-affirmation task, a self-criticism task, and an other-affirmation task. I began by examining whether the fabrication prompts influenced memory, irrespective of the self-reflection task. To this end, I compared the critical event memory responses between participants who received one of the cat-related fabrication prompts (either SEF or SDF; $n = 203$), and the participants that received a control prompt ($n = 97$). Results indicated that those who wrote a critical event fabrication were more than twice as likely to report a clear and complete memory of the critical event, finding a cat stuck in a tree before the age of 12, $p = .03$ (Fisher's exact test, one-tailed). See Figure 4.2.

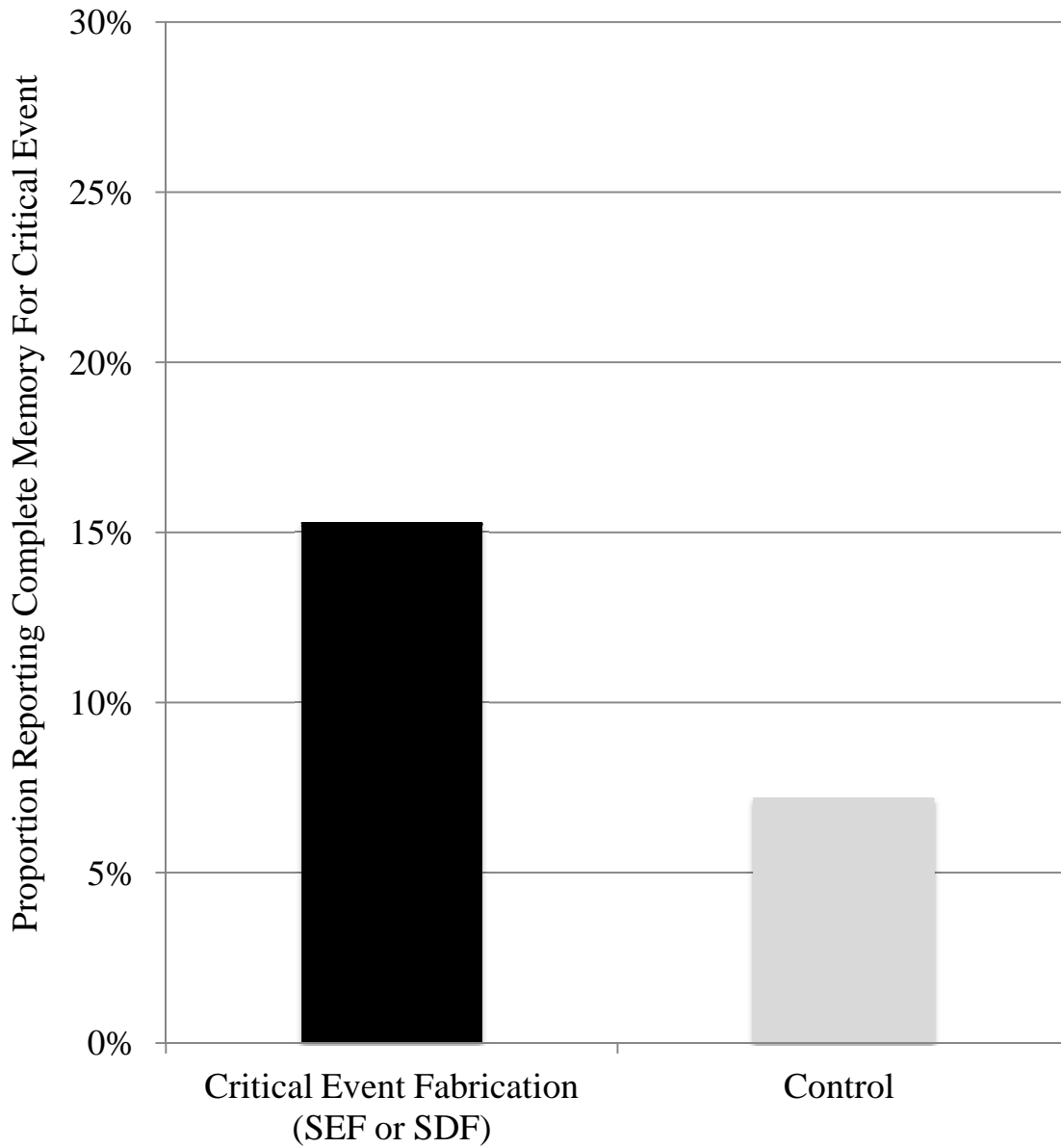


Figure 4.2. Proportion of participants reporting clear memories for the critical event following either critical or control fabrication task.

Next, I examined the memory response patterns within each of the three self-reflection conditions. Within each self-reflection group, I first considered the proportion of participants in each condition who indicated a “clear and complete” memory (i.e., responded above the midpoint of the scale) for the critical event, finding a cat stuck in a tree before the age of 12. Next, I examined the mean ratings for the critical event across the fabrication conditions. These analyses are presented below for each self-reflection condition.

Self-affirmation. One hundred six participants were assigned to complete the self-affirming reflection task. Within these participants, I compared memory ratings across the three fabrication conditions. In the control (“vanilla ice cream”) condition ($n = 34$), 2 participants (6%) reported a moderately clear and complete memory of finding a cat stuck in a tree before the age of 12. In the SEF condition ($n = 37$), 8 participants (22%) did so. In the SDF condition ($n = 35$), 2 participants (6%) reported a clear and complete memory. A comparison of the SEF condition to each of the other conditions (SDF and control) approached significance, both $ps = .09$ (Fisher’s exact test).

Next, I compared the mean memory completeness ratings for the critical event between the three conditions, using Analysis of Variance, and Bonferroni post-hoc comparisons. The overall model approached statistical significance, $F(2, 103) = 2.7, p = .07$, but post-hoc comparisons between the groups failed to achieve significance, $ps > .10$.

Self-criticism. Ninety-nine participants were assigned to complete the self-critical reflection task. Within this group, I compared memory ratings across the fabrication conditions. Of the 32 participants in the control (“vanilla ice cream”) condition, 3 (9%) reported a clear and complete memory of finding a cat stuck in a tree. In the SEF condition ($n = 33$), 5 participants (15%) did so. In the SDF condition ($n = 34$), 5 participants (15%) reported a clear and complete

memory. I compared the control condition to both the SEF condition and the SDF condition, and neither achieved statistical significance, both $ps = .4$.

As before, I compared the mean memory completeness ratings for the critical event between the three conditions, using Analysis of Variance and Bonferroni post-hoc comparisons. Here, the overall model was not significant, $F(2, 96) = 0.35, p = .70$.

Other-affirmation. Ninety-five participants were assigned to complete the other-affirming reflection task. Just as before, what follows is a comparison of memory ratings across the fabrication conditions. In the control (“vanilla ice cream”) condition ($n = 31$), 2 participants (6%) reported a clear memory of the critical event. In the SEF condition, 3 (10%) did so. In the SDF condition ($n = 33$), 8 participants (24%) reported a clear and complete memory. A comparison of the SDF group to the control group was marginally significant, $p = .05$ (Fisher’s exact test). A comparison of the SDF and SEF groups approached significance, $p = .11$, and the comparison of the SEF group and the control group was non-significant, $p = .71$.

Finally, I compared the mean memory completeness ratings for the critical event between the three conditions, using Analysis of Variance and Bonferroni post-hoc comparisons. The model was not significant, $F(2, 96) = 2.16, p = .12$. See Figure 4.3 and Table 4.1 for means and statistics.

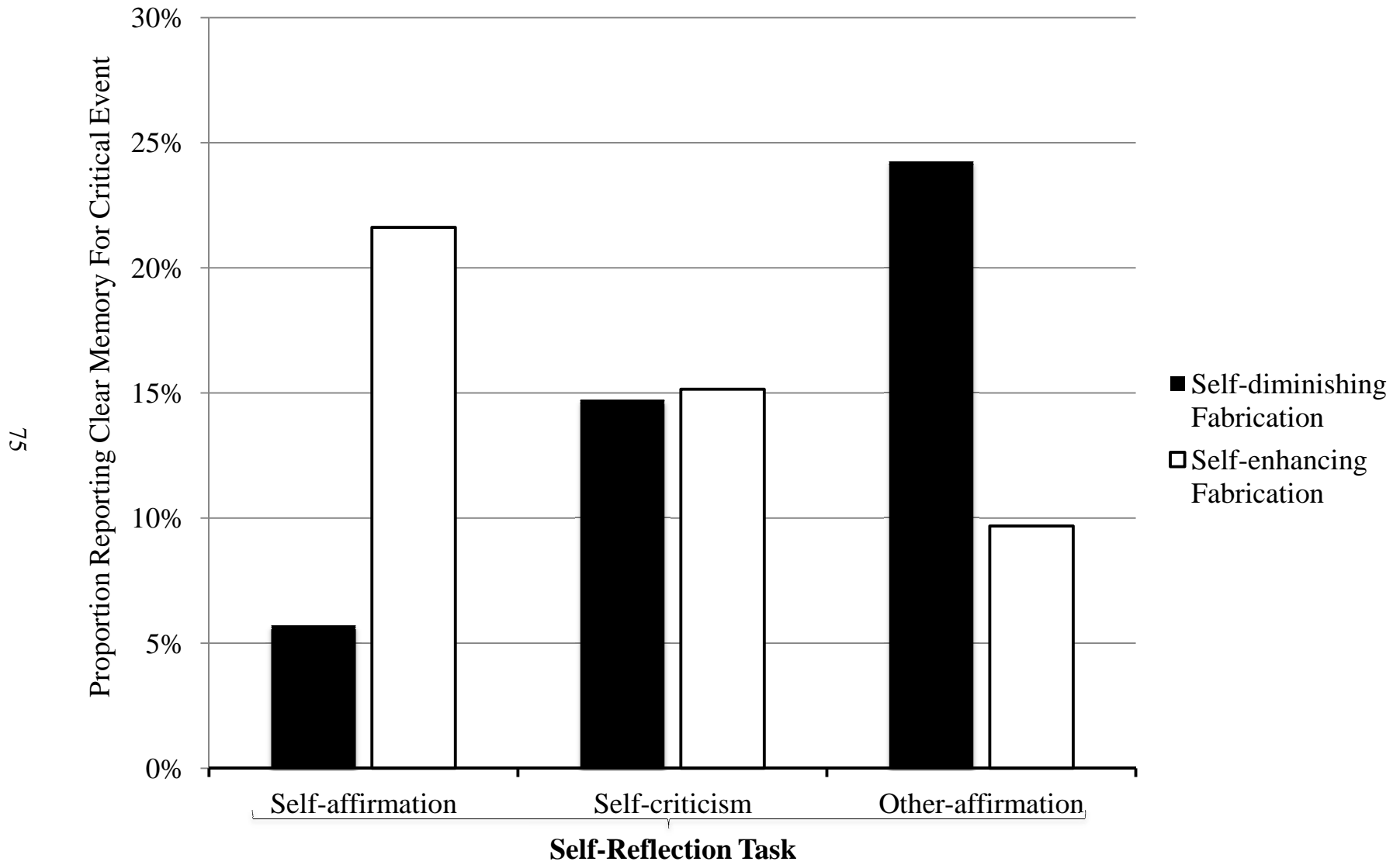


Figure 4.3. Proportion of participants reporting clear memories for the critical event following self-reflection and fabrication tasks.

Table 4.1 Mean critical event memory completeness ratings across self-reflection and fabrication conditions.

Self-reflection Task	Fabrication Condition			<i>F</i>	<i>p</i> -value	η^2
	Self-diminishing	Self-enhancing	Control			
Self-affirmation	1.54 (1.14)	2.24 (2.27)	1.41 (1.16)	2.71	.07	.05
Self-criticism	2.00 (1.69)	2.06 (2.03)	1.72 (1.46)	.35	.70	.01
Other-affirmation	2.48 (2.28)	1.81 (1.6)	1.58 (1.43)	2.16	.12	.04

Note. Standard deviations appear in parentheses below means.

Table 4.2 Mean fabrication word count across self-reflection and fabrication conditions.

Self-reflection Task	Fabrication Condition			<i>F</i>	<i>p</i> -value	η^2
	Self-diminishing	Self-enhancing	Control			
Self-affirmation	192.51 _a (80.80)	272.23 _b (135.57)	212.79 _{ab} (115.67)	4.70	.01	.05
Self-criticism	178.41 (79.13)	238.06 (123.27)	197.19 (113.87)	2.72	.07	.05
Other-affirmation	181.58 _a (73.71)	253.29 _b (148.83)	210.96 _{ab} (108.52)	3.20	<.05	.06

Note. Means that do not share a subscript within rows are significantly different at the level of $p < .05$, using Bonferroni post-hoc comparisons. Standard deviations appear in parentheses below means.

Discussion

In Study 3, participants completed one of three possible self-reflection tasks, followed by one of three possible fabrication prompts. The modified self-reflection tasks were designed to elicit various levels of self-affirmation or self-threat, which helped test two competing interpretations of the patterns in Studies 1 and 2. In brief, participants who completed the self-affirmation reflection task showed a preference for incorporating self-enhancing fabrications into memory, just as participants in Studies 1 and 2 did. Participants who completed the most potentially threatening self-reflection task (other-affirmation) showed a complete reversal of this pattern—they instead were more likely to incorporate self-diminishing fabrications into memory, and more likely to resist incorporating self-enhancing fabrications. The self-critical reflection task, conceptualized as a kind of middle ground wherein participants could reflect on self-diminishing content while drawing on self-enhancing themes, showed a mixed pattern of memory distortion.

These results are not consistent with a self-esteem maintenance account of the self-enhancing memory biases observed in Studies 1 and 2. If memory distortion can function as a strategy for maintaining self-esteem in the face of self-threats, I have not managed to capture that tendency here using these methods and these materials. However, Study 3 results do lend support to a biased self-knowledge interpretation. In Chapter 5, I discuss the implications of the findings across all three studies and place them in the context of theoretical and applied issues surrounding memory, self-enhancement, and lying.

CHAPTER 5

GENERAL DISCUSSION

The goal of this dissertation was to develop an efficient, non-deceptive paradigm for investigating the influence of fabricating false childhood experiences on subsequent autobiographical memory reports. A related goal was to examine the role of self-enhancing bias in guiding that influence. Across three studies, I found evidence that after concocting written fabrications about a particular childhood event, people were more likely to report partial and complete memories of that event. However, in Studies 1 and 2, this effect was limited to fabrications that portrayed the participant in a positive light. When the fabrications contained less flattering behaviors on the part of the participant, they resisted the urge to adopt them as true memories. Differences in the emotional valence of the events could not account for the observed patterns, nor could the participants' mood, which appeared unaffected by the fabrication prompts and showed no association with memory outcomes in Study 2. This overall pattern of self-enhancing memory bias was reversed in Study 3 when participants first completed a self-reflection task in which they wrote about another person living up to their most cherished value (and were not offered the opportunity to expound on their own attachment to that value). In that condition, participants tended to incorporate *self-diminishing* fabrications into memory and resisted the influence of the self-enhancing fabrications.

A New Paradigm

First, it appears that the aim of developing a paradigm for studying fabrications and autobiographical memory, which can be administered quickly and does not require deception, was a success. People willingly fabricated childhood experiences in response to the prompts, typically writing between 200–300 words on average. Further, evidence across three separate

studies suggested that some of the fabrications increased the likelihood that participants would report clear and complete memories of the target event.

Though the instructions given to participants were written to be as precise and easily understood as possible, an initial concern was that the task itself might have been confusing or unfamiliar. In particular, I wondered whether the lengthy instructions were too demanding of participants, and they would either neglect to read them, or worse, fail at understanding them. To address this concern, I included an “attention check” in Study 2 that was designed to test participants’ willingness and ability to read and understand complex (perhaps even convoluted) instructions for reporting their memories and beliefs. Only four participants (4% of the sample) failed to properly complete the task, suggesting that the proportion of participants who did not read (or who misunderstood) the instructions was quite low. Moreover, after excluding these participants and rerunning all analyses, the same patterns of results emerged.

My goal of establishing a paradigm that could be executed rapidly, without deception and cover stories, meant that certain methodological sacrifices were necessary, and one such sacrifice is the ability to show within-subject changes in memory over time. A related limitation involves uncertainty about whether these influences on memory persisted after the experiment was over. Of note, in other research investigating the influence of forced confabulation on memory (e.g., Chrobak et al., 2008), longer periods of time dramatically *increased* the likelihood that participants would report their fabrications as memory. In other words, there is reason to believe that longer intervals between the fabrication and the memory questionnaire could correspond to a stronger effect.

New follow-up studies are underway using more complex study designs, wherein participants’ baseline memories are assessed prior to the fabrication prompt, and follow-up

memory assessments take place both immediately, and following a 1-week delay. Although inclusion of these design features at the outset would have facilitated a clearer understanding of how these processes unfold over time, nonetheless I wish to emphasize the major advantages of brief, non-deceptive approaches to studying these influences. With simple, one-session designs, large samples providing ample statistical power can be collected quickly and from a variety of sources, enabling researchers to conduct a greater number of studies, and test a greater number of hypotheses. Participants in shorter studies are also less likely to become fatigued, whereas those who are required to return for several 1-2 hour sessions (as in Polage, 2012) may feel increasingly disinclined to put sincere thought and effort into their responses. Finally, inventing plausible deceptions and cover stories (and executing them convincingly) is a significant challenge, and can compromise the feasibility of conducting replications and follow up research. A major advantage of the simplicity of this paradigm is the ease with which other researchers can attempt replications and adapt the method to address other research questions.

Fabrication and Autobiographical Memory

Research has shown lying is a pervasive, woven tightly into the social fabric of our everyday lives. People distort the truth for a number of reasons—for example, for the purposes of entertainment, to facilitate social bonding, or to avoid negative consequences and punishment. It is therefore surprising that, aside from a popular literature on lie detection, there is so little research in the social cognitive tradition examining the functions and consequences of deliberately misrepresenting our past. The current studies add to the modest body of evidence detailing the distorting effect lying has on memory. Though a recent study tested the influence of fabricating past events on autobiographical beliefs (Polage, 2012), the present studies are the first

to demonstrate that lying about our past experiences can influence the subjective feeling of *recalling* a past experience.

Though the fabrication task influenced subsequent memory reports, the precise nature of this influence is not entirely self-evident. My interpretation of these effects is grounded in the Source Monitoring Framework, which suggests that people can mistakenly attribute various kinds of mental content to memory. However, one alternate possibility that deserves consideration is that writing the stories served as a memory retrieval cue, making obscure or ‘unimportant’ memories more easily accessible. In other words, participants who completed the stories and then reported memories of the critical events may have simply discovered (or rediscovered) true memories that they would not have reported otherwise.

This explanation is complicated somewhat by the differences observed across the story conditions. If writing the fabrication acts as a retrieval cue leading participants to recall a forgotten memory, this should be true of both story conditions in which participants write about finding a cat—after all, the critical event presented to participants in the final memory questionnaire is simply “I found a cat stuck in a tree.” However, if the experience of rescuing a cat is in fact more prevalent than the experience of taunting a cat *and* it is commonly forgotten (such that people might not report that it happened until they have sufficiently cued an obscure memory), then a “retrieval cue” account might be reconcilable with the patterns observed across the conditions. However, in the piloting of critical event candidates, participants reported a very low prevalence for both of the cat rescue events (i.e., rescuing and taunting), and participants rated both events as equally plausible and common among their peers. Thus, it would seem that so far, the bulk of the evidence points away from a “retrieval cue” account of the current findings.

It is also possible, at least for some of the participants, that the fabrication prompts simply increased the clarity and completeness of already-existing partial memories for the critical event. However, again, I was careful to select an event that was shown in the pilot phase to have a very low prevalence among my target sample, with a large majority indicating that the event “definitely never happened” to them. That being said, it would not be surprising if the fabrication prompts caused *inflated* or *augmented* memories in some participants, and entirely *false* memories in others. This raises an interesting theoretical question about what it really means for someone to develop (or recover) clear and complete memories of true past events. For example, if someone has a *belief* that something occurred in childhood, with no accompanying memory content (e.g., little or no perceptual or emotional detail, and little or no subjective sense of mentally “reliving” the experience), what would it mean if those memories came to feel more complete, more elaborated, more perceptually and emotionally rich? Is it possible to construct new (i.e., false) memories on the basis of autobiographical beliefs that happen to be true?

Self-enhancement and Patterns of Memory Distortion

In Chapters 3 and 4, I introduced two possible explanations for what appeared to be self-enhancing patterns of memory distortion. In the first proposed explanation, self-enhancing memory biases were cast as strategies for restoring and maintaining threatened self-esteem. As I described earlier, this interpretation was not supported by the present findings, particularly those in Study 3. Rather, it appeared that the self-enhancement bias was eliminated (and even reversed) following exposure to self-threat.

To explain this pattern, I have proposed a biased self-knowledge account of the self-enhancing memory distortions observed across the experiments. Specifically, I argue that the pattern of memory distortion seen in Studies 1 and 2 likely reflects these participants’ general

tendency toward an overly inflated self-evaluation, rather than self-enhancement motives directly influencing memory distortion. In this interpretation, self-enhancing fabrications were more likely to be misattributed to memory because for these participants, the fabrications felt especially familiar, by virtue of the fact that they were consistent with the participants' preexisting positive self-view (recall that according to the Source Monitoring Framework, people evaluate mental content on the basis of characteristics like familiarity in order to make decisions about the origins of that content). By this logic, it stands to reason that people with a less positive self-view (e.g., depressed individuals, or those with low self-esteem) and people whose dominant culture does not emphasize self-enhancement as a virtue (e.g., members of East Asian cultures) might show different patterns of bias.

Although the present studies were not designed with the intention of addressing cultural differences of any kind, the diversity of the student population at UCI offers an opportunity to conduct a somewhat crude, exploratory post-hoc comparison of participants who self-identify as white, with those who identified as East Asian. I selected these groups for an informal comparison in order to parallel the body of research demonstrating that Japanese participants, relative to Americans, tend not to show the same patterns of bias in measures of self-enhancement.

Collapsing across the first two studies, 36 participants identified as white, and 64 participants identified as East Asian. The white participant sample showed a dramatic pattern of self-enhancement: 27% of the self-enhancing fabrication (SEF) group and 0% of the self-diminishing fabrication (SDF) group reported clear and complete memories of the critical item. In the East Asian sample, the pattern was precisely the opposite: 7% of the SEF group, and 17% of the SDF group reported clear and complete memories. This result should be taken with a grain

of salt for various reasons, not least of which is the fact that all of the East Asian participants in this study were students at an American university, and as such, are not necessarily representative of people who reside in and fully identify with significant aspects of East Asian culture. These limitations notwithstanding, the difference in bias between these two groups appears striking, and is consistent with a number of cross-cultural investigations into self-enhancing biases (see Chapter 1).

Another issue to consider is the fact that participants wrote longer fabrications in response to the SEF prompt, compared to the SDF prompt. One interpretation of this finding is that people (particularly of the self-enhancing variety) may be especially willing to effortfully fabricate events when those events reflect positively on them. Interestingly, although the East Asian participants did not seem to show a self-enhancing bias across conditions, they were similar to the white-identified participants in that they also wrote longer stories in response to the SEF prompt, compared to the SDF prompt. This suggests that something else—perhaps general emotional valence—is driving the difference in word count between the conditions.

Limitations and Future Directions

As described above, the present data are somewhat limited in their ability to tell a complete story about the exact nature of the fabrication task's influence on memory, and about the precise mechanisms underpinning the influence of self-enhancement motives. Although I deliberately selected a critical event that most participants indicated never happened to them, there is no way to know how each individual participant changed over the course of the study. Instead, the design relies on a between-subjects comparison of the experimental and control fabrication conditions in order to measure the magnitude of the effect. These limitations represent a trade off; in sacrificing certain features, other benefits arise (such as eliminating the

need for deception and cover stories, and an increased speed of administration). These benefits are a potential boon to false memory researchers (who are frequently tasked with conducting complicated, multi-session studies with elaborate cover stories), and also to researchers interested in studying the influences of fabricating past events.

In the present studies, I found no relationship between the length of the fabrications and the likelihood of clear and complete memories for the critical event. However, this difference raises questions about differences that might be found in the content of the self-enhancing and self-diminishing fabrications. As a means of better understanding how these influences operate, content analysis of fabrications produced in response to these prompts would be a promising avenue for future research. One possibility is that the participants were better able (or more willing) to infuse the self-enhancing fabrications with rich perceptual and/or emotional detail, which made them less easily distinguishable from true memories. Regardless of the findings, exploring the content of the fabrications could lead to novel research questions, and illuminate the processes underlying the distorting influence of fabricating past events.

Another area for future research involves the influence of the self-reflection tasks on patterns of memory distortion. Why exactly should self-threatening information eliminate people's overall preference for self-enhancing fabrications? Though this finding is straightforward in its incompatibility with the self-esteem maintenance account, it is not yet clear how this process unfolds. A number of studies have shown that people's self-concept in any given moment is determined in part by the whatever autobiographical knowledge is currently most accessible (e.g., Markus & Kunda, 1986). For instance, reflecting on a particular biased subset of autobiographical memories appears to strongly influence the kinds of conclusions we draw about the self (e.g., Fazio, Effrein, & Falender, 1981). Perhaps something akin to this

process occurred in the current studies. It is possible that the self-reflection tasks elicited particular subsets of evaluative self-knowledge, which in turn biased judgments of familiarity for events that were consistent with that particular state of mind. Put another way, perhaps the other-affirming reflection task led participants to focus on ways that they have fallen short of their most beloved value. This in turn could have activated certain types of self-diminishing information, causing a temporary decrease in self-esteem. This lowered self esteem may have made self-diminishing information feel more familiar than it otherwise might, thus increasing the likelihood that it would be mistaken for a memory. Testing this interpretation against other, competing hypotheses, would bring us closer to solving these puzzles.

Concluding Remarks

After a recent visit to Wikipedia, I have learned a great deal of information about Mnemosyne, who is the representation of memory in Greek mythology. Mnemosyne was the daughter of Gaia (who represented Earth and motherhood) and Uranus (who represented the sky), and together with Zeus she birthed the nine muses on nine consecutive nights. Mnemosyne, I have learned, was the keeper of a magical pool located in Hades, which dead souls could drink from in order to remember their past lives after being reincarnated.

How accurate is the information I have just learned? After perusing approximately five years of edits and changes to Mnemosyne's Wikipedia page, I was able to identify at least 12 instances of vandalism, as well as a number of inaccurate edits that Wikipedia volunteers rejected and purged from the record. Despite their painstaking efforts, however, these volunteers cannot possibly purge all of the inaccuracies from the pages of Wikipedia. How many errors slip under the radar, and continue to go unnoticed? I am intrigued by the notion that even as I am

aware of the questionable reliability of Wikipedia, I will likely reflect on Mnemosyne's story, recalling information without being explicitly aware of where it came from.

REFERENCES

- Addis, D. R., Wong, A. T., & Schacter, D. L. (2007). Remembering the past and imagining the future: Common and distinct neural substrates during event construction and elaboration. *Neuropsychologia*, *45*, 1363-1377.
- Alicke, M. D. (1985). Global self-evaluation as determined by the desirability and controllability of trait adjectives. *Journal of Personality and Social Psychology*, *49*(6), 1621-1630.
- Bahrick, H. P., Hall, L. K., & Costa, L. A. (2008). Fifty years of memory of college grades: Accuracy and distortions. *Emotion*, *8*, 13-22.
- Banaji, M. R., & Crowder, R. G. (1989). The bankruptcy of everyday memory. *American Psychologist*, *44*(9), 1185-1193.
- Bartlett, F. C. (1932). *Remembering: a study in experimental and social psychology*. Cambridge: Cambridge University Press.
- Baumeister, R. F., & Jones, E. E. (1978). When self-presentation is constrained by the target's knowledge: Consistency and compensation. *Journal of Personality and Social Psychology*, *36*, 608-618.
- Baumeister, R. F. (1987). How the self became a problem: A psychological review of historical research.. *Journal of Personality and Social Psychology*, *52*, 163-176.
- Bergman, E. T., & Roediger, H. L. (1999). Can Bartlett's repeated reproduction experiments be replicated? *Memory & Cognition*, *27*(6), 937-947.
- Berkowitz, S. R., Laney, C., Morris, E. K., Garry, M., & Loftus, E. F. (2008). Pluto behaving badly: False beliefs and their consequences. *The American Journal of Psychology*, *121*, 643.

- Bernstein, D. M., Laney, C., Morris, E. K., & Loftus, E. F. (2005). False memories about food can lead to food avoidance. *Social Cognition, 23*, 11-34.
- Bernstein, D. M., & Loftus, E. F. (2009). The consequences of false memories for food preferences and choices. *Perspectives on Psychological Science, 4*, 135-139.
- Bernstein, E. M., & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation scale. *The Journal of Nervous and Mental Disease, 174*, 727-735.
- Birch, C. D., Kelln, B. R., & Aquino, E. P. (2006). A review and case report of pseudologia fantastica. *Journal of Forensic Psychiatry & Psychology, 17*, 299-320.
- Bird, C. (1927). The influence of the press upon the accuracy of report. *Journal of Abnormal and Social Psychology, 22*(2), 123-129.
- Bond, C. F. (2008). Commentary a few can catch a liar, sometimes: Comments on Ekman and O'Sullivan (1991), as well as Ekman, O'Sullivan, and Frank (1999). *Applied Cognitive Psychology, 22*, 1298-1300.
- Brainerd, C., Stein, L., Silveira, R., Rohenkohl, G., & Reyna, V. (2008). How does negative emotion cause false memories? *Psychological Science, 19*, 919-925.
- Brown, J. D., Dutton, K. A., & Cook, K. E. (2001). From the top down: Self-esteem and self-evaluation. *Cognition and Emotion, 15*, 615-631.
- Campbell, J. D. (1986). Similarity and uniqueness: The effects of attribute type, relevance, and individual differences in self-esteem and depression. *Journal of Personality and Social Psychology, 50*, 281-294.
- Christensen, T. C., Wood, J. V., & Barrett, L. F. (2003). Remembering everyday experience through the prism of self-esteem. *Personality and Social Psychology Bulletin, 29*, 51-62.

- Chrobak, Q. M., & Zaragoza, M. S. (2008). Inventing stories: Forcing witnesses to fabricate entire fictitious events leads to freely reported false memories. *Psychonomic Bulletin & Review*, *15*, 1190-1195.
- Cialdini, R. B., & Richardson, K. D. (1980). Two indirect tactics of image management: Basking and blasting. *Journal of Personality and Social Psychology*, *39*, 406-415.
- Clark, A., Nash, R. A., Fincham, G., Mazzoni, G., & Andersson, G. (2012). Creating non-believed memories for recent autobiographical events. *PLoS ONE*, *7*, e32998.
- Conway, M. A., Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review*, *107*, 261-288.
- Conway, M. A., & Rubin, D. C. (1993). The structure of autobiographical memory. In A. F. Collins, S. E. Gathercole, M. A. Conway, & P. E. Morris (Eds.), *Theories of memory* (pp. 103–139). Hillsdale, NJ: Erlbaum.
- Danziger, K. (2008). *Marking the mind: a history of memory*. Cambridge, U.K.: Cambridge University Press.
- DePaulo, B. M., Kashy, D. A., Kirkendol, S. E., Wyer, M. M., & Epstein, J. A. (1996). Lying in everyday life. *Journal of Personality and Social Psychology*, *70*, 979-995.
- Draaisma, D. (2000). *Metaphors of memory: a history of ideas about the mind*. Cambridge, U.K.: Cambridge University Press.
- Ebbinghaus, H. (1913). *Memory; a contribution to experimental psychology*. New York: Columbia University, Teachers College.
- Echterhoff, G., Higgins, E. T., & Groll, S. (2005). Audience-tuning effects on memory: The role of shared reality. *Journal of Personality and Social Psychology*, *89*(3), 257-276.

- Echterhoff, G., Higgins, E. T., Kopietz, R., & Groll, S. (2008). How communication goals determine when audience tuning biases memory. *Journal of Experimental Psychology: General, 137*, 3-21.
- Edward Owens (hoax). In *Wikipedia*. Retrieved August 10, 2014, from [http://en.wikipedia.org/wiki/Edward_Owens_\(hoax\)](http://en.wikipedia.org/wiki/Edward_Owens_(hoax))
- Ekman, P., O'Sullivan, M., & Frank, M. G. (1999). A few can catch a liar. *Psychological Science, 10*, 263-266.
- Freud, S. (1924/1952). *A general introduction to psychoanalysis*. New York: Washington Square Press.
- Garry, M., Manning, C. G., Loftus, E. F., & Sherman, S. J. (1996). Imagination inflation: Imagining a childhood event inflates confidence that it occurred. *Psychonomic Bulletin & Review, 3*, 208-214.
- Gauld, A., & Stephenson, G. M. (1967). Some experiments relating to Bartlett's theory of remembering. *British Journal of Psychology, 58*(1-2), 39-49.
- Geraerts, E., Bernstein, D. M., Merckelbach, H., Linders, C., Raymaekers, L., & Loftus, E. F. (2008). Lasting false beliefs and their behavioral consequences. *Psychological Science, 19*, 749-753.
- Greenberg, J., Solomon, S., Pyszczynski, T., Rosenblatt, A., Burling, J., Lyon, D., et al. (1992). Why do people need self-esteem? Converging evidence that self-esteem serves an anxiety-buffering function.. *Journal of Personality and Social Psychology, 63*, 913-922.
- Greenwald, A. G. (1980). The totalitarian ego: Fabrication and revision of personal history. *American Psychologist, 35*, 603-618.

- Harmon-Jones, E., Greenberg, J., Solomon, S., & Simon, L. (1996). The effects of mortality salience on intergroup bias between minimal groups. *European Journal of Social Psychology, 26*, 677-681.
- Hart, C. M., Sedikides, C., Wildschut, T., Arndt, J., Routledge, C., & Vingerhoets, A. J. (2011). Nostalgic recollections of high and low narcissists. *Journal of Research in Personality, 45*, 238-242.
- Heine, S. J., & Lehman, D. R. (1999). Culture, self-Discrepancies, and self-satisfaction. *Personality and Social Psychology Bulletin, 25*, 915-925.
- Heine, S. H., Lehman, D. R., Markus, H. R., & Kitayama, S. (1999). Is there a universal need for positive self-regard?. *Psychological Review, 106*, 766-794.
- Heine, S. H., Lehman, D. R., Markus, H. R., & Kitayama, S. (1999). Is there a universal need for positive self-regard?. *Psychological Review, 106*, 766-794.
- Heine, S. J., & Lehman, D. R. (1997). The cultural construction of self-enhancement: An examination of group-serving biases. *Journal of Personality and Social Psychology, 72*, 1268-1283.
- Hyman, I. E., & Pentland, J. (1996). The role of mental imagery in the creation of false childhood memories. *Journal of Memory and Language, 35*, 101-117.
- Hyman, I. E., Husband, T. H., & Billings, F. J. (1995). False memories of childhood experiences. *Applied Cognitive Psychology, 9*, 181-197.
- Hyman, I. E., & Billings, F. J. (1998). Individual differences and the creation of false childhood memories. *Memory, 6*, 1-20.
- James, W. (1890). *The principles of psychology*. New York: Dover Publications.

John Seigenthaler. In *Wikipedia*. Retrieved August 10, 2014, from

http://en.wikipedia.org/wiki/John_Seigenthaler

Johnson, M. K., & Sherman, S. J. (1990). Constructing and reconstructing the past and the future in the present. In E. T. Higgins, & R. N. Sorrentino (Eds.). *Handbook of motivation and cognition: foundations of social behavior*. (2 ed., pp. 482-526). New York: Guilford Press.

Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological Bulletin*, *114*, 3-28.

Johnston, E. B. (2001). The repeated reproduction of Bartlett's Remembering. *History of Psychology*, *4*, 341-366.

Kandel, E. R., & Squire, L. R. (2001). Neuroscience: Breaking down scientific barriers to the study of brain and mind. In A. R. Damasio, A. Harrington, J. Kagan, B. McEwen, H. Moss, & R. Shaikh (Eds.), *Annals of the New York Academy of Science: Vol. 935. Unity of knowledge: The convergence of natural and human sciences* (pp. 118–135). New York: New York Academy of Science.

Koffka, K. (1935). *Principles of gestalt psychology*. New York: Harcourt, Brace and Co.

Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The Sociometer hypothesis. *Journal of Personality and Social Psychology*, *68*, 518-530.

Loftus, E. F. (2013, June). Elizabeth Loftus: The fiction of memory [Video file]. Retrieved from http://www.ted.com/talks/elizabeth_loftus_the_fiction_of_memory/

Loftus, E. F., Altman, D., & Geballe, R. (1975). Effects of questioning upon a witness' later recollections. *Journal of Police Science and Administration*, *3*, 162-165.

- Loftus, E. F. (1975). Leading questions and the eyewitness report. *Cognitive Psychology*, 7, 560-572.
- Loftus, E. F., & Pickrell, J. E. (1995). The formation of false memories. *Psychiatric Annals*, 25, 720-725.
- Loftus, E. F., & Zanni, G. (1975). Eyewitness testimony: The influence of the wording of a question. *Bulletin of the Psychonomic Society*, 5, 86-88.
- Loftus, E. F., Miller, D. G., & Burns, H. J. (1978). Semantic integration of verbal information into a visual memory. *Journal of Experimental Psychology: Human Learning & Memory*, 4, 19-31.
- Marks, G. (1984). Thinking one's abilities are unique and one's opinions are common. *Personality and Social Psychology Bulletin*, 10, 203-208.
- Markus, H. R., & Kitayama, S. (1994). A collective fear of the collective: Implications for selves and theories of selves. *Personality and Social Psychology Bulletin*, 20, 568-579.
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50, 370-396.
- Mazzoni, G. A., Lombardo, P., Malvagia, S., & Loftus, E. F. (1999). Dream interpretation and false beliefs. *Professional Psychology: Research and Practice*, 30, 45-50.
- Mazzoni, G. A., Loftus, E. F., & Kirsch, I. (2001). Changing beliefs about implausible autobiographical events: A little plausibility goes a long way. *Journal of Experimental Psychology: Applied*, 7, 51-59.
- McNichol, D. (1972). *A Primer of Signal Detection Theory*. London: George Allen & Unwin.
- Miller, D. T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction?. *Psychological Bulletin*, 82, 213-225.

- Miller, D. T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction?. *Psychological Bulletin*, 82, 213-225.
- Münsterberg, H. (1909). *On the witness stand*. New York: Doubleday, Page.
- Neisser, U. (1981). John Dean's memory: A case study. *Cognition*, 9, 1-22.
- Neisser, U. (1988). Five kinds of self-knowledge. *Philosophical Psychology*, 1, 35-59.
- Newman, E. J., & Lindsay, D. S. (2009). False memories: What the hell are they for?. *Applied Cognitive Psychology*, 23, 1105-1121.
- Otgaar, H., Candel, I., Merckelbach, H., & Wade, K. A. (2009). Abducted by a UFO: Prevalence information affects young children's false memories for an implausible event. *Applied Cognitive Psychology*, 23, 115-125.
- Palmer, E. F., & Palmer, J. C. (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behavior*, 13, 585-589.
- Pezdek, K., & Roe, C. (1997). The suggestibility of children's memory for being touched: Planting, erasing, and changing memories. *Law and Human Behavior*, 21, 95-106.
- Pezdek, K., Finger, K., & Hodge, D. (1997). Planting childhood false memories: The role of event plausibility. *Psychological Science*, 8, 437-441.
- Pleban, R., & Tesser, A. (1981). The effects of relevance and quality of another's performance on interpersonal closeness. *Social Psychology Quarterly*, 44, 278.
- Polage, D. C. (2012). Fabrication inflation increases as source monitoring ability decreases. *Acta Psychologica*, 139, 335-342.

- Porter, S., Yuille, J. C., & Lehman, D. R. (1999). The nature of real, implanted, and fabricated memories for emotional childhood events: Implications for the recovered memory debate. *Law and Human Behavior, 23*, 517-537.
- Porter, S., Taylor, K., & Brinke, L. t. (2008). Memory for media: Investigation of false memories for negatively and positively charged public events. *Memory, 16*, 658-666.
- Roediger, H. L. (1980). Memory metaphors in cognitive psychology. *Memory & Cognition, 8*, 231-246.
- Rosenberg, M. (1979). *Conceiving the self*. New York: Basic Books.
- Ross, M., & Sicol, F. (1979). Egocentric Biases In Availability And Attribution.. *Journal of Personality and Social Psychology, 37*, 322-336.
- Sanitioso, R., Kunda, Z., & Fong, G. T. (1990). Motivated recruitment of autobiographical memories.. *Journal of Personality and Social Psychology, 59*, 229-241.
- Sharman, S. J., & Barnier, A. J. (2008). Imagining nice and nasty events in childhood or adulthood: Recent positive events show the most imagination inflation. *Acta Psychologica, 129*, 228-233.
- Sharman, S. J., & Scoboria, A. (2009). Imagination equally influences false memories of high and low plausibility events. *Applied Cognitive Psychology, 23*, 813-827.
- Sharman, S. J., & Calacouris, S. (2010). Do people's motives influence their susceptibility to imagination inflation?. *Experimental Psychology (formerly "Zeitschrift für Experimentelle Psychologie")*, 57, 77-82.
- Sherman, D. K., & Cohen, G. L. (2002). Accepting threatening information: Self affirmation and the reduction of defensive biases. *Current Directions in Psychological Science, 11*, 119-123.

- Shrauger, J. S. (1975). Responses to evaluation as a function of initial self-perceptions. *Psychological Bulletin*, *82*, 581-596.
- Snyder, C. R., & Forsyth, D. R. (1991). Terror management theory of self-esteem. *Handbook of social and clinical psychology: the health perspective* (pp. 21-40). New York: Pergamon Press.
- Solomon, S., Greenberg, J., & Pyszczynski, T. (1991). Terror management theory of self-esteem. In C. R. Snyder and D. R. Forsyth (Eds.). *Handbook of social and clinical psychology: the health perspective* (pp. 21-40). New York: Pergamon Press.
- Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.). *Advances in experimental social psychology* (21 ed., pp. 261-302). San Diego, CA: Academic Press.
- Steele, C. M., Spencer, S. J., & Lynch, M. (1993). Self-image resilience and dissonance: The role of affirmational resources. *Journal of Personality and Social Psychology*, *64*, 885-896.
- Story, A. L. (1998). Self-Esteem and memory for favorable and unfavorable feedback. *Personality and Social Psychology Bulletin*, *24*, 51-64.
- Strange, D., Sutherland, R., & Garry, M. (2006). Event plausibility does not determine children's false memories. *Memory*, *14*, 937-951.
- Tanner, W. P., & Swets, J. A. (1954). A decision-making theory of visual detection. *Psychological Review*, *61*, 401-409.
- Taubman-Ben-Ari, O., Findler, L., & Mikulincer, M. (2002). The effects of mortality salience on relationship strivings and beliefs: The moderating role of attachment style. *British Journal of Social Psychology*, *41*, 419-441.

- Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, *103*, 193-210.
- Tesser, A., Martin, L. L., & Cornell, D. P. (1996). On the substitutability of self-protective mechanisms. In P. M. Gollwitzer and J. A. Bargh (Eds.). *The psychology of action: linking cognition and motivation to behavior* (pp. 48-68). New York: Guilford Press.
- Tesser, A., & Smith, J. (1980). Some effects of task relevance and friendship on helping: You don't always help the one you like. *Journal of Experimental Social Psychology*, *16*, 582-590.
- Tesser, A., & Campbell, J. (1982). Self-evaluation maintenance and the perception of friends and strangers. *Journal of Personality*, *50*, 261-279.
- Tesser, A., & Paulhus, D. (1983). The definition of self: Private and public self-evaluation management strategies. *Journal of Personality and Social Psychology*, *44*, 672-682.
- Tesser, A. (2000). On the confluence of self-esteem maintenance mechanisms. *Personality and Social Psychology Review*, *4*, 290-299.
- Tesser, A. (2001). On The Plasticity Of Self-Defense. *Current Directions in Psychological Science*, *10*, 66-69.
- Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin*, *90*, 245-271.
- Wilson, S. C., & Barber, T. X. (1978). The Creative Imagination Scale as a measure of hypnotic responsiveness: Applications to experimental and clinical hypnosis. *American Journal of Clinical Hypnosis*, *20*, 235-249.

- Wisman, A., & Koole, S. L. (2003). Hiding in the crowd: Can mortality salience promote affiliation with others who oppose one's worldviews?. *Journal of Personality and Social Psychology, 84*, 511-526.
- Wood, J. V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin, 106*, 231-248.
- Your first article. In *Wikipedia*. Retrieved August 10, 2014, from http://en.wikipedia.org/wiki/Wikipedia:Your_first_article
- Zaragoza, M. S., Payment, K. E., Ackil, J. K., Drivdahl, S. B., & Beck, M. (2001). Interviewing witnesses: Forced confabulation and confirmatory feedback increase false memories. *Psychological Science, 12*, 473-477.
- Zuckerman, M. (1979). Attribution of success and failure revisited, or: The motivational bias is alive and well in attribution theory. *Journal of Personality, 47*, 245-287.

APPENDIX A—STUDY MATERIALS

Pilot Materials (See Table 2.1 for list of events)

Prevalence:

Next, we are going to show you a list of events that can occur in childhood. Some of the events are very common, and have happened to virtually everybody. Others are less common and may or may not have happened to you. To the right of the list are three boxes, labeled "did not happen to me," "maybe happened to me," and "definitely happened to me." Read each event in the list and consider whether it has happened to you before the age of 12. Then, click on the event and drag it to the box that best describes it. When you're done, all the events on the left should be in the boxes to the right.

Commonness:

Next, we would like you to think about your peers - other college students who are about your age. Read each event in the list and consider how common it is for people like you to have this experience before the age of 12. Then, select an answer choice on the scale ranging from "Very rare" to "Very common."

Very rare (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Very common (7)
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Emotional valence:

Next, we would like you to think whether these events would be emotionally positive or negative. Read each event in the list and consider how you would feel if you had this experience before the age of 12. Then, select an answer choice on the scale ranging from "Very negative" to "Very positive." If the event never happened to you, provide your best guess of how the event would make you feel.

Very negative (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Very positive (7)
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Emotional arousal:

Next, we would like you to think about how tense or excited these events would make you feel. Read each event in the list and consider how you would feel if you had this experience before the age of 12. Then, select an answer choice on the scale ranging from "Very calm/relaxed" to "Very tense/excited." If the event never happened to you, provide your best guess of how the event would make you feel.

Very calm/relaxed (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Very tense/excited (7)
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APPENDIX A—STUDY MATERIALS

Gender and Ethnicity (Studies 1-3)

What is your gender?

- Male
- Female

What is your race/ethnicity?

- European American/White (non-hispanic)
- African-American/Black (non-hispanic)
- Latino/a or Hispanic
- Middle Eastern
- East Asian (Chinese, Korean Japanese)
- Southeast Asian (Vietnamese, Laotian, Cambodian, etc.)
- South Asian, Indian
- Filipino
- Bi-racial/Multi-racial (please specify) _____
- Other (please specify) _____

APPENDIX A—STUDY MATERIALS

Fabrications Prompts

Pre-prompt Instruction (Studies 2-3):

Next, you will see a prompt asking you to write a story about yourself having a specific experience in childhood. Your story should have a beginning, middle, and end. It should be as detailed as possible - try to describe sights, sounds, feelings, people who were there, and where it took place. While you should try to use as many accurate details as possible (e.g., people you know and places you remember), you should also add things that are not true. The goal is to create a story that is well written, entertaining, and compelling, with a lot of descriptive detail. **Someone who reads your story should be convinced that the event really happened to you.** Try to spend about 4-5 minutes writing the story. If you find that you have run out of things to write, try to keep jotting down details as they come to you. Press next when you are ready to start.

Self-enhancing Prompt (Studies 1-3):

Write a story about a time that you found a cat stuck in a tree. The story should feature you, before the age of 12, as the main character. Begin your story by describing the scene. Describe what the tree looked like, and where it was. Describe the way the cat looked and sounded. **In the middle of your story, you should describe how you tried to rescue the cat, and get it down from the tree without hurting it. End your story by describing how the cat's owner finally arrived and retrieved the cat, and how you went about your day, satisfied that you had helped.** Remember, you should try to include as many plausible details (sights, sounds, emotions) as you can. Your task is to convince a reader that this event really happened. You may include additional details and events, but you should include the elements described above. Try to spend 4-5 minutes writing the story. If you find you have run out of things to write, try to keep jotting down details as they come to you.

Self-diminishing Prompt (Studies 1-3):

Write a story about a time that you found a cat stuck in a tree. The story should feature you, before the age of 12, as the main character. Begin your story by describing the scene. Describe what the tree looked like, and where it was. Describe the way the cat looked and sounded. **In the middle of your story, you should describe taunting the cat, and throwing sticks at it in order to knock it from the tree. End your story by describing how the cat remained stuck in the tree, and how you went about your day, amused.** Remember, you should try to include as many plausible details (sights, sounds, emotions) as you can. Your task is to convince a reader that this event really happened. You may include additional details and events, but you should include the elements described above. Try to spend 4-5 minutes writing the story. If you find you have run out of things to write, try to keep jotting down details as they come to you.

APPENDIX A—STUDY MATERIALS

Other-enhancing Prompt (Study 2):

Write a story about a time that you **and a friend** found a cat stuck in a tree. The story should feature you, before the age of 12, as the main character. Begin your story by describing the scene. Describe what the tree looked like, and where it was. Describe the way the cat looked and sounded. **In the middle of your story, you should describe how your friend tried to rescue the cat, and get it down from the tree without hurting it. End your story by describing how the cat's owner finally arrived and retrieved the cat, and how you and your friend went about your day.** Remember, you should try to include as many plausible details (sights, sounds, emotions) as you can. Your task is to convince a reader that this event really happened. You may include additional details and events, but you should include the elements described above. Try to spend 4-5 minutes writing the story. If you find you have run out of things to write, try to keep jotting down details as they come to you.

Other-diminishing Prompt (Study 2):

Write a story about a time that you **and a friend** found a cat stuck in a tree. The story should feature you, before the age of 12, as the main character. Begin your story by describing the scene. Describe what the tree looked like, and where it was. Describe the way the cat looked and sounded. **In the middle of your story, you should describe how your friend taunted the cat, and threw sticks at it in order to knock it from the tree. End your story by describing how the cat remained stuck in the tree, and how you and your friend went about your day.** Remember, you should try to include as many plausible details (sights, sounds, emotions) as you can. Your task is to convince a reader that this event really happened. You may include additional details and events, but you should include the elements described above. Try to spend 4-5 minutes writing the story. If you find you have run out of things to write, try to keep jotting down details as they come to you.

APPENDIX A—STUDY MATERIALS

Past Experiences Questionnaire (Studies 1-3)

Lastly, we would like to ask you some questions about a few childhood events. Some of the events may be ones you wrote fictional stories about earlier, but now we are just interested in what you actually remember.

EVENT: You tried Vanilla ice cream for the first time. How clearly can you remember this event happening to you before the age of 12? If the event did not happen, or you cannot remember the event at all, select the left-most option to indicate "No Memory At All." Otherwise, indicate how clear and complete your memory is for the event.

- No Memory At All (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- Clear and Complete Memory (7)

How much does your memory for this event include sights, or visual information?

- Not at all (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- Very much (7)

How much does your memory for this event include sounds, or auditory information?

- Not at all (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- Very much (7)

APPENDIX A—STUDY MATERIALS

How much does your memory for this event include feelings, or emotional information?

- Not at all (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- Very much (7)

List of events:

You found a cat stuck in a tree. (Critical event)

You tried vanilla ice cream for the first time.

You went to a friend's birthday party.

You found a lizard in a creek.

You spilled a glass of milk.

You stepped on a snail.

APPENDIX A—STUDY MATERIALS

Self-reflection Task (Study 3)

Value ranking:

You will now be answering some questions about your ideas, your beliefs, and your life. It is important to remember that there are no right or wrong answers. Please read the following list of personal values. Then, rate how important each one is to you on the scale ranging from 1 (Not At All Important to Me) to 7 (Very Important To Me).

	1 (Not At All Important To Me) (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (Very Important To Me) (7)
Artistic skills/aesthetic appreciation (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of humor (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relations with friends/family (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spontaneity/living life in the moment (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social skills (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Athletic ability (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Musical ability/appreciation (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical attractiveness (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX A—STUDY MATERIALS

Creativity (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business/managerial skills (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Romantic values (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kindness to animals (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Empathy and kindness to other people (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Political awareness (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX A—STUDY MATERIALS

Value selection:

Next, from the list of personal values, select the one value that is MOST important to you. Even if you feel that several of the values are important to you, please pick only one.

- Artistic skills/aesthetic appreciation
- Sense of humor
- Relations with friends/family
- Spontaneity/living life in the moment
- Social skills
- Athletic ability
- Musical ability/appreciation
- Physical attractiveness
- Creativity
- Business/managerial skills
- Romantic values
- Kindness to animals
- Empathy and kindness to other people
- Political awareness

Self-affirmation Prompt:

Now, try to think about a time in your life when you lived up to this value. Then, write a brief story about that experience. In other words, write about a time when you showed a great deal of [selected value]. Don't worry about how well the story is written. Just focus on expressing your memory of the event and the thoughts and feelings you had at the time. Please try to write for 4-5 minutes.

Self-criticism Prompt:

Now, try to think about a time in your life when you DID NOT live up to this value. Then, write a brief story about that experience. In other words, write about a time when you showed little or no [selected value]. Don't worry about how well the story is written. Just focus on expressing your memory of the event and the thoughts and feelings you had at the time. Please try to write for 4-5 minutes.

Other-affirmation Prompt:

Now, try to think about a time when someone else lived up to this value—perhaps someone you know or have heard about. Then, write a brief story about that person's experience. In other words, write a story that shows why showing [selected value] might be important to someone else. Don't worry about how well the story is written. Just focus on expressing your memory of the event and the thoughts and feelings you had at the time. Please try to write for 4-5 minutes.