THE TECHNOLOGY OF STORY AND HUMAN SURVIVAL AS A SPECIES(?)

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Story made us human—story made us a success as species. Ironically it will also be the very cause of our demise.

—Dr. Evelyn Singleton

AS A PROFESSIONAL ACTOR, dancer, educator, photojournalist, and writer, my life has traded purposefully in stories—in performing, reporting, teaching, and making (up) tales.

Recently, one of the characters in a play I was working on ("Dr. Evelyn Singleton"—a fictitious anthropologist) stated the following:

"Story made us human—story made us a success as species. Ironically it will also be the very cause of our demise."

Surprised by my character's pronouncement that our capacity for story may lead to our demise as a species, I took time out to research her claims. This paper is the result.

In exploring the technology of story and its bearing on both our success and possible extinction, I will be surveying the following: (1) Some basic operational features and uses of story; (2) human evolution and story; (3) and finally, why story technology may be responsible for our demise in the not so distant future.

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Some Basic Operational Features and Uses of Story

Humans beings still appear to be the only animal whose brain is hot-wired to think, interpret, evaluate, communicate, and invent through the technology of story—through ordering and managing lived experience by constructing, circulating, and responding to tales.

A story can be an internal set of guidelines one imposes on oneself, or a narrative disseminated by a community or a nation to enforce group cohesion. It can be a scoop we watch on the evening news, or an anecdote a friend tells us. It can take the shape of plays, novels, poetry, essays, law briefs, movies, docudramas, sit-coms, mysteries, romances, commercials, histories, scientific treatises, political speeches, cartoons, painting, dance, and so on—as well all kinds of white lies, regular lies, rumors, and whoppers.

Through its omnipresent manifestations, story provides us with our premier mechanism for social bonding, problem solving, explication, self-expression, and persuasion. At the same time, the stories we create and disseminate produce evermore-complex experiences, feelings, ideas, and formulations for us to ponder.

While we may be hot-wired for story use, it is simultaneously a learned experience. Consequently, many computer scientists and others working in the field of artificial intelligence have turned to the technology of story to create computers and robots that can "think" more like human beings. (1)

So how does this thing called story work? Linguists, writers, computer scientists, psychologists, primatologists, and anthropologists suggest similar variations to describe the basic operational features of story. First and foremost, a story contains or suggests a sequence of causally or associatively linked events, happenings, experiences, and ideas based on any combination of fact and fiction. Many story structures pose and answer the basic questions of journalism: who, what, when, where, why, and how? But most narratives unfold and gain momentum by posing in addition the all important, developmental questions of what next? and what if?

Stories told as stories usually center on protagonists who are in hot pursuit of specific desires and goals. These characters take various actions or tactics to obtain their desires, initially hoping for or expecting a positive result for their efforts. But instead, they rapidly discover they have provoked the forces of antagonism. They encounter more and more obstacles and conflicts that they must resolve or overcome to get what they want—to thrive and sometimes even to survive. (2)

Hollywood screenwriting guru, Robert McKee, describes story as being born in the gap between anticipation and result, between the world as conceived by the characters before taking action, and the truths they discover after the action was taken. (3) In such scenarios, the major dramatic conflict is at least partly resolved by the end of the tale through the actions of the protagonist(s), who usually undergoes a significant transformation or gains a new awareness.

In the last several decades, researchers from the literary arts, big business, national politics, and the soft and hard sciences have stepped up their interest in how the operational features of story technology relate to human nature, evolution, intelligence, psychology, propaganda, creativity, and productivity.

Business and corporate consultants employ story nets, mission rehearsal exercises, virtual teamwork scenes, and even comedy club improvisations as staff development for group cohesion and social bonding. Exploring story formats and theatre games also help employers and employees better understand the motivations and behaviors of their customers. (4)

Politicians and pundits have long been interested in producing and distributing the right kind stories to influence public opinion, increase poll ratings, and move voters. During the 2004 presidential election, the Democrats learned the hard way that a laundry list of good works simply could not stand up to a good swift-boating yarn. (5) Following the loss of that election, Democratic leaders staged a flurry of seminars that focused on how to develop and recite their party's stories more effectively.

For some time now computer scientists and robotics researchers have been analyzing how narrative thinking assists humans in predicting future outcomes based on past evidence and probability. Among other inventions, such research has produced vacuum cleaners that sweep up entire rooms at a touch of a button with very little human attendance; pet robotic dogs that develop distinctive personalities and behaviors according to their interactions with specific owners and environments; and complete story-making software programs for blocked writers.

But even the most useful and intriguing technology can have its share of quirks. As educators and students of general semantics, we know it is unlikely that any story or report can be wholly objective or complete. People may view or participate in the same event and come away telling plausible but differing tales about it. In the instant these varying tales are inscribed or related, they may already include rapidly aging facts. As that famous adage goes, no one can say all about anything.

Milton Dawes also cautions us to remember that the stories we tell about others are not *their* stories, but *our* stories *about* their stories. (6) So how can we be certain

the stories we accept and tell about ourselves are not those others have imposed on us? How can any narrative stand as a reflection of reality, when that narrative also functions as a map that shapes or even creates the reality to be seen?

With such caveats and conundrums, how and why did story technology develop in humans?

Human Evolution and Story Technology: One tale about how we came to tell tales...

Many other creatures besides *Homo sapiens* are endowed with sophisticated systems of communication. Our closest simian cousins, the chimpanzee and the bonobo, communicate through vocal calls, facial expressions, body language, and even the use of signposts such as bent twigs and bushes for their peers to "read." Chimpanzees share the precursor to our language gene, FOXP2, (7) while bonobos (considered to be predominantly bisexual and matriarchal) reportedly use sex not only for procreation, but also as their primary communication tool for social bonding and for managing conflicts between individuals and groups. (8)

Outside the primate kingdom, many other creatures communicate through complex song and dance rituals. Bees fly in choreographed patterns to share information about food. Dolphins sing and perform ballets of leaps and twists in exact synchrony with other family groups of dolphins in the wild, leading some zoologists and biologists to suggest that these displays resemble ancient tribal dances of alliance. (9)

One of the earliest forms of human storytelling was, of course, dance—hunting dances, rain dances, harvest dances, creation dances, alliance dances, mating dances, etc. Western and Eastern drama, poetry, and religion are said to have sprung from the ancient rites of the spring dance, in which our ancestors performed and worshipped the cycle of life, death, and renewal. (10) But our terpsichorean skills and brain capacity for more intricate forms of storytelling took a very different evolutionary path from that of our animal brethren.

Some primatologists and anthropologists, most notably Robin Dunbar, speculate that the brain size of our prehuman forbears literally doubled about two million years ago when they began living in larger and larger communities. (In comparison, chimpanzees and bonobos in the wild still live in groups of a few dozen members maximum.)

Larger communities offered our predecessors the most advantageous way to survive in difficult climes and times—to find mates, shelter, safety, and nourishment

as they moved from deep jungle to open savannah and beyond. As a result of living in larger and larger groups, the neocortex of their still prehuman brain also expanded to handle the increasingly complicated social relations. (11)

Like other primates, our ancestors originally engaged in physical acts of social grooming to establish and maintain clan bonds. But as the size of their communities increased, these now extra-intelligent, almost human beings were not able to maintain all the bonds necessary for group cohesion and survival through physical grooming rituals alone. According to Dunbar, as a result of natural selection, prehumans eventually developed early language skills to manage their large group social bonding issues better. The use of language, as Dunbar and others insist, in turn increased our ancestors' brain size once again almost to its modern capacity somewhere between 600,000-200,000 years ago. (12)

In the late 1990s, computer scientist Kerstin Dautenhahn offered a variation on Dunbar's social intelligence paradigm, which she dubbed the Narrative Intelligence Hypothesis (NIH). Dautenhahn also borrowed ideas from fellow computer scientists interested in narrative intelligence, or how literary theory intersects with artificial and human intelligence. (13)

Dautenhahn links the evolution of human social intelligence directly to our ancestors' storytelling capabilities, which she insists evolved right out of their physical social grooming rituals. (14) The ability to act out, dance, or otherwise tell tales as a new improved or updated form of social grooming, provided our forbears a far more efficient way to maintain their community bonds. Story as social grooming enabled early humans to reach out and touch more than one being at a time through gossip, entertainment, and instruction.

The mental images produced by the technology of story allowed our ancestors to communicate about beings and things that were not materially present. It also provided them with what Nicholas Humphrey calls a theory of the mind. Early humans now had the mental means to imagine and understand how their own fears and desires operated, which then allowed them to imagine and manipulate the desires and fears of others for their own benefit and the benefit of the group. (Individuals diagnosed with autism are said to lack a theory of the mind, hence their problems with social interactions.) (15)

Like Dunbar, Dautenhahn muses that even the most minimal mechanisms of the first storytelling animal were passed down to succeeding generations because that being was better adapted to the dynamic environment of what was quickly becoming human social relations. According to some researchers, we still spend

about 60 percent of our conversational time gossiping about relationships and personal experiences in order to bond with others. (16)

Extrapolating from Dautenhahn's narrative intelligence hypothesis, one could also speculate that human language skills were developed to support our evolutionary imperative to tell tales for efficient social grooming and social bonding, and not the other way round. That is, what we describe as spoken, sign, and written language may have evolved to enhance the storytelling abilities already manifested in our ancestors through dance, pantomime, music, drawing, painting, and even physical grooming.

Likewise, the imperative for early humans to tell more detailed and nuanced tales, to handle their increasingly complex social relations, may have had an evolutionary bearing on the anatomical and physiological changes that resulted in our ability to speak. The grunts, chatter, and cries of our forbears became infinitely more diverse and refined as their unique vocal cord-tongue-lips-teeth-brain connection developed through natural selection, which then further enhanced their storytelling abilities. (17)

To date, researchers have not been able to train other primates to talk like us because they lack the anatomical and functional combinations necessary for human-like speech. A few apes have been taught to use rudimentary sign languages or computer buttons to communicate with humans. But these primates have been able to string together only two words at a time on average—far from a clear demonstration, understanding, or application of grammar and syntax. (18) Most likely this will remain the case, because non-human primates lack the hot-wiring, via the requirements of large group cohabitation patterns, to want or need to tell tales the way we do.

Most non-human species still appear to communicate their needs almost exclusively in terms of the immediate present. But story technology, with its causal and associative event sequences, offered our ancestors an array of past and future tenses in addition to the present. It gave them the unique ability to pass down intricate systems of knowledge, packaged as causally and associatively linked events, ideas, and experiences. When our ancestors became time binders, they also became human. One could say then that *story made humans human.*

Our capacity to bind time and mind-travel equipped us with the neural circuitry to *think about thinking*; to wonder about our place in the larger scheme of things; to reflect on and communicate about people who were not present and events that occurred outside of time and place. Story technology replaced the energy-

taxing work of physical social grooming with mental images and ideas. This new adaptation for theoretical reasoning eventually encouraged modern humans to think on ever higher levels of abstraction—to contemplate ideas like astrophysics, love, loyalty, democracy, freedom, the narrative intelligence hypothesis, and even the concept of self.

Cognitive psychologist Jerome Bruner insists that the concept of the self could not exist without our continuous mental, oral, and written autobiographies. (19) Neil Postman points out that "no group of humans have ever been found without a story for who they were and how they should behave and why. (20)

Story technology—with its advancements of speech/language, time binding, and self-as-autobiography—gave us the idea of history and the actuality of civilization. Civilization—the powerhouse of hundreds of thousands of storytelling creatures, living together cooperatively and exploitatively—in turn, generated the countless hard technologies that eventually led to what some call human dominion over the earth. But thus far, this story of human dominion over the earth includes the extinction of thousands of other species; the pollution of our lands, waterways, and air; global warming and climate change; and the continued misery of more than half the world's human population due to these and other ills such as disease, war, genocide, discrimination, and the persistence of poverty.

The Minefields of Story Technology and the Possible Demise of Our Species

According to Dr. Evelyn Singleton, the protagonist of my unfinished play, we have arrived at such a sorry state in the history of humankind because we have mismanaged, almost from its inception, the very thing that made us human—our ability to tell tales. Top among our mismanagements include: (1) The age-old existential quandary about what human life means—which has led some of our breed to bolster their own significance with tales calibrated to make others (and other living things) insignificant; (2) The equally ancient problem of stories writ in stone that may offer a sense of identity, meaning, and security, but that can lead to all kinds of personal and social deadlocks; and (3) the exacerbation of the negative effects produced by these antediluvian yarns by means of the hard technologies of our modern rapid-story-delivery-systems—including radio, television, cable, satellite, Internet, cell phones, etc.

The Age Old Existential Quandary and Drive to Make Our Lives Meaningful

Story technology may have hot-wired humans to become time-binders. However, our ancestors' understanding and interest in the vast storyline of time

may also have led them to develop an additional basic drive (and anxiety) not found in the rest of the animal kingdom. For many *Homo sapiens*, the drive to make one's relatively short-lived life as significant or meaningful as possible appears to be as critical as any biological instinct for survival.

Long ago we humans divined we could extend our lives and imbue them with more significance through offspring, monuments, invention, creation, sacrifice, exploration, war and conquest, and many other shared stories—including stories about God(s), the Afterlife, and what Wendell Johnson calls clear-thinking and good will. (21)

As in times of yore, many of us continue to attempt to create "meaningful" lives through pursuits as varied as public service from midwifery to the military; any manner of tournaments and contests both physical and mental; innumerable forms of education and apprenticeships; the acquisition of land, larger and larger homes, and more and more stuff; spirituality and religion; arts, crafts, music, drama, and dance; tending to family and community; sex; exploration and adventure; and work in the "guilds" of science, medicine, auto mechanics, farming, hunting, politics, sports, fashion, business, law, sanitation, and on and on. But this potentially rosy scenario about the various quests to make our lives evermore symbolically and materially rich does indeed come with its share of thorns.

A good number of stories told as stories (including novels, plays, fairytales, movies, etc.) suggest that a person's happiness and self-worth comes as a result of someone else's misery. Win-win and love thy neighbor may sound like good plots, but as a matter of daily course, beating out the competition or getting a better deal than others to shore up one's status and self-worth (and thus to mean more than others) has always gotten a lot of play.

According to a recent study by Robert H. Frank, potential home buyers were asked (if finances were not an issue) whether they would prefer purchasing a 4000-square-foot home in a better neighborhood of mostly 6000-square-foot McMansions, or a 3000-square-foot home in a more modest neighborhood of 2000-square-foot "bungalows." Frank states that most responders chose to lord it over their neighbors, opting to buy the biggest house on a block of bungalows, rather than a larger house among even bigger ones—despite losing square footage and ignoring the real estate rule of thumb, Location, Location, Location. (22) While some potential homebuyers may have chosen the house among smaller bungalows as a protest against McMansions, Frank insists that lording it over others was the main story of the day.

In all likelihood, most of us at one time or another have resorted to bolstering

our sense of self-worth by lording it over others through teasing, braggadocio, snobberies of all kinds, put-downs of all kinds, bossiness, hoarding, greed, lies, and variations of bullying, etc. At the far end of this spectrum, some of our breed focus on making the stories of their own lives mean so much more by making the stories of many others mean so much less. Both fanaticism and fundamentalism turn on the absolute tale: "We are great (and right), and all others are insignificant (and wrong)."

Some neurologists, anthropologists, and primatologists view the conflicts between our rosy stories of desiring meaningful lives and the narcissistic or fanatical disregard of others (as well as everything else in between and overlapping) as a reflection of the continual fight for dominance between our older reptilian and mammalian brains and the higher order thinking of our human neocortex. (23) Other scientists ascribe such disparities in our thinking and behavior to conflicts between the social genes we inherited from our closest simian cousins, the chimpanzee (more aggressive and warlike), and the bonobo (more collaborative and peace-seeking). (24) But, for the nurture trumps nature crowd, including Wendell Johnson, how we manage our innate drives in practice is less a matter of genetics than how we are educated through the stories we are taught and the stories we teach others.

Getting Stuck in Stories "Writ in Stone"

As part of our early education and social grooming systems, most humans are taught powerful tales about how we are expected to behave and how we are to regard ourselves in relation to others. Such narratives become entrenched in our neural pathways through repetition. Rosy stories that encourage clear thinking and good will through curiosity, testing of data, and room for modification or updating, can serve us well. But absolute stories of ill will become even more so through their reiteration, especially for the young. ("You're so stupid;" Always 'get' those guys before they get you;" "That group is no good.")

Absolute stories of ill will can also seep into our neural circuitries as a result of traumatic experiences such as betrayal, physical injury, death of a loved one, injustice, bullying, war, etc. Sometimes negative and even untested stories that are used to explain such trauma become so ingrained that one begins to apply them to all aspects of one's life, regardless of the actual circumstances. (25)

On a macro level, communities, sects, and nations may repeat ancient and

modern tales of ill will against one another, which usually encourages more trauma-inducing actions like war and terrorism, which then produces more tales of the same, and so on. In the United States, the trauma of 9/11 inspired reruns of the stories: "The Axis of Evil," "We Have to Get Them before They Get Us" "You're Either With Us or Against Us." It also produced the new twin tales: "Wiretapping Americans Without Show of Just Cause" and "Torturing Presumed Enemy Combatants are Necessary Evils." In response to the release of this anthology of ill will, Americans received in return the much-played rerun of the ancient but to the point story: "Death to the Infidel."

Ayaan Hirsi Ali—winner of the 2005 Tolerance Prize of Madrid, praised as one of the 100 Most Influential Persons of the World by *Time* magazine, and named European of the Year for 2006 by *Reader's Digest*—persists in her campaign to rewrite ancient and modern tales of discrimination, intolerance, and hate. Hirsi Ali, a victim of religious genital mutilation herself, wrote the script and provided the voice-over for the documentary, *Submission*, directed by Dutch filmmaker Theo van Gogh. Following the film's release, Van Gogh was murdered in the streets of Amsterdam. Affixed to his body by knife was a death threat to Hirsi Ali. However, despite the trials and tribulations of her life, Hirsi Ali still insists we can change. (26)

Postman notes that history is littered with punishments inflicted on those who challenged existing narratives. The likes of Socrates, Jesus, Mohammad, Galileo, Charles Darwin, Andre Solzhenitsyn, Susan B. Anthony, Rosa Parks, Dr. Martin Luther King, Mahatma Gandhi, Nelson Mandela, and Salman Rushdie all had alternative tales to tell. As Postman puts it, "No one loves a story-buster, at least not until a new story can be found." (27)

Our ability to amend or rewrite the innumerable stories of our varying lives is not only our birthright—it has been our primary cognitive tool for success and survival as a species. Amending and rewriting the stories we choose to live by, when faced with new information or discoveries, mirrors how we build daily, rebuild, and expand the neural pathways of our brain. The protagonists of most traditional dramas metaphorically rewrite how they see themselves and the world as part of their significant change or transformation at the end of the story.

Rapid Story Delivery System Woes

Perhaps nothing in recent times has seen more change than our global

communication systems. Current communication technologies—from radio and television to computers, satellite, the Internet, and cell phones—are a far cry from the bygone days of routinely sitting around the campfire, attending public lectures, listening to scientific or philosophical debates in soirées and coffee shops, and standing in the rain to catch political speeches that ran several hours at a clip. Because our story exchanges have become so rapid, the actual tales and messages we send as part of our daily communications are often shortened to match. Text messaging, email abbreviations, sound bytes, and headline news seem to rely on fewer and fewer words and other symbols to stand for the entire story. As we continue to employ increasingly simpler symbols and phrases, it could be argued that we simultaneously may be going backwards in our communications, to some earlier forms of language.

The less detailed and specific our stories become, the more easily they are transformed into black and white, either/or issues that further limit the time we take to think about them. Our current propensity for short-hand communications may even discourage fact-checking and may turn us into less curious, less independent thinkers. Remember how quickly the majority of Americans were talked into supporting the Iraq war based on what is now regarded as misinformation. What about the relative ease with which some politicians were able to convince many of their constituents that global warming was a myth by using catchy sound bytes rather than scientific data?

Short hand yarns, like stories writ in stone, discourage us from taking the time we need to evaluate the possible short and long-term consequences of their telling. If we abdicate our responsibility as human beings to ask the what next?/what if? questions that made us a species in the first place, we may eventually lose that ability. As the saying goes, use it or lose it. Since our communications systems can deliver stories at lightning speeds, any such downward spiral in human brain function is bound to occur all the more quickly. We may be well on our way to devolving into a less intelligent form of life. But before that happens, perhaps our planet may no longer be able to support life as we know it.

Epilogue: To Be Continued...We Hope...

As Dr. Evelyn Singleton keeps telling me, perhaps the great mystical and practical task we humans face at this time is to relearn how to use our greatest evolutionary inheritance—story technology—to our best advantage as a species.

Otherwise we certainly risk misusing, to the point of no return, the hard technologies now at our disposal that have already altered the face of the earth.

General semantics offers us tools to employ story technology to our best advantage—so that we can continue to change and adapt in ways that surpass most other species. Through the help of GS narratives such as "indexing," "dating," "et cetera," and the "is of identity," we can consciously use story to refresh our own identities and to reconsider how we view and understand others through a multiordinal approach. We can check and recheck the premises of our narratives and the events and information we represent as facts.

Most stories told as stories—like this essay—usually end with some sort of conclusion or final evaluation. But almost all stories, even those with presumably closed endings such as the death of a hero, still suggest ways for the tale to continue. Witness the plethora of sequels and prequels in film and novels; consider those well-nigh universal stories of life, death, and renewal. My own drama, *On the Shoulders of Apes*, may not be completed for a very long time, because Dr. Evelyn Singleton is still kvetching—still holding out for more rewrites—still holding out for better results...

Notes

1. For essays on the intersections between literary theory, computer science, and artificial intelligence research see Michael Mateas and Phoebe Sengers, eds., *Narrative Intelligence: Advances in Consciousness Research* (Amsterdam: John Benjamins Publishing Company, 2003).
2. For discussions about operational features of story and narrative see for example, Jerome Bruner, *Acts of Meaning* (Cambridge, MA: Harvard University Press, 1990); _____, "The Narrative Construction of Reality" in Mateas and Sengers, eds., *Narrative Intelligence* 41-62; Steven Cohan and Linda M. Shires, *Telling Stories: A Theoretical Analysis of Narrative Fiction* (New York: Routledge, 1988) 52-82; Milton Dawes, "Science, Religion, and God: My Story," *ETC*, Vol. 57, No. 2 (June/Summer 2000): 149; Robert McKee, *Story: Substance, Structure, Style, and The Principles of Screenwriting* (New York: Harper Collins, 1997); Tzvetan Todorov, *The Poetics of Prose*, trans. Richard Howard (1971; Ithaca, NY: Cornell University Press, 1977) 111.
3. McKee 147-9, 179.
4. See for example, Steve Denning, *The Leader's Guide to Storytelling:*

Mastering the Art & Discipline of Business Narrative (New York: Jossey-Bass, April 2005); _____, *The Springboard: How Storytelling Ignites Action in Knowledge-Era Organizations* (Oxford: Butterworth Heinemann, 2000); John Seely Brown, Steve Denning, Katalina Groh and Larry Prusak eds., *Storytelling in Organizations: How Narrative and Storytelling Are Transforming Twenty-first Century Management* (Amsterdam: Elsevier, 2004); Stephen M. Fiore and Rudy McDaniel, "Building Bridges: Connecting Virtual Teams Using Narrative and Technology," *THEN:* Technology, Humanities, Education, & Narrative *Journal,* 95 (Published Online, 2 January 2006); Ben Hauck—general semanticist, actor, and director—currently teaches comedy improvisation for Infusion software engineers in New York City, www.benhauck.com.

5. Drew Westen, *The Political Brain: The Role of Emotion in Deciding the Fate of the Nation* (New York: Public Affairs, 2007). Westen, a psychologist and sometime stand-up comic, studied voter preferences in United States. He concluded that the majority of voters chose politicians who appealed to them emotionally (right brain thinking tendencies), rather than politicians who concentrated more on facts and figures (left brain thinking tendencies).
6. Dawes 148.
7. Diane Ackerson, *An Alchemy of the Mind* (New York: Scribner, 2004) 242-4; Frans de Waal, *The Ape and the Sushi Master* (New York: Basic Books, 2001); Jane Goodall, *Through a Window: My Thirty Years with the Chimpanzees of Gombe* (1990; New York: Houghton Mifflin Company, 2000). See also the work of my relatives, Eugen Teuber, as described by Marianne L. Teuber, "The founding of the primate station, Tenerife, Canary Islands," *American Journal of Psychology* 107 (1994): 551-581.
8. Ian Parker, "Swingers," *The New Yorker* 30 July 2007: 48-61.
9. Ackerman 241-9; M. Bekoff and D. Jamieson eds., *Readings in Animal Cognition* (Cambridge, MA: MIT Press, 1996); John R. Krebs and N.B. Davies, eds., *Behavioral Ecology: An Evolutionary Approach*, 4th ed. (Oxford: Blackwell, 1997); Clive D. L. Wynne, *Do Animals Think?* (Princeton, New Jersey: Princeton University Press, 2004).
10. Sir James George Frazer, *The Golden Bough: A Study in Magic and Religion* (1890; 1922; Dover, 2002); Jane E. Harrison, *Ancient Art and Ritual* (1913; Kessinger Publishing, 1997); Marvin Carlson, *Theories of the Theatre* (Ithaca: Cornell University Press, 1984) 336-7.

11. Robin Dunbar, "Coevolution of neocortical size, group size and language in humans," *Behavioral and Brain Sciences 16* (1993): 681-735; _____, *Grooming, Gossip, and the Evolution of Language* (London: Faber and Faber Limited, 1996). See also "The Social Intelligence Hypothesis" transcript, ABC Radio National, Airdate: 17 February 2007, with guests Robin Dunbar, Nicholas Humphrey, and Kerstin Dautenhahn et al.
12. Dunbar, "Coevolution of neocortical size, group size and language in humans," 681-735.
13. Mateas and Sengers, "Narrative Intelligence" and eds., *Narrative Intelligence*, 1-26; Marc Davis and Michael Travers, "A Brief Overview of the Narrative Intelligence Reading Group," in Mateas and Sengers eds., 27-40.
14. Kerstin Dautenhahn, "Stories of Lemurs and Robots: The Social Origin of Storytelling" in Mateas and Sengers eds., *Narrative Intelligence,* 63-90; _____, "The Narrative Intelligence Hypothesis: In Search of the Transactional Format of Narratives in Humans and other Social Animals," in M. Beynon, C.L. Nehaniv, and K. Dautenhahn, eds., *Cognitive Technology: Instruments of the Mind, Proceedings of the 4th International Conference, CT Warwick 2001* (Berlin: Springer-Verlag, 2001) 250-1.
15. Nicholas Humphrey, "The Social Function of Intellect," in R.W. Byrne and A. Whiten eds., *Machiavellian Intelligence: Social Expertise and the Evolution of Intellect in Monkeys, Apes, and Humans* (Oxford: Clarendon Press, 1988) 13-26; _____, *Consciousness Regained: Chapters in the Development of Mind* (Oxford University Press, 1983); _____, "*Cave art, autism and the evolution of the human mind*," *Cambridge Archaeological Journal*, Vol. 8 (1998): 165-191. For discussions on autism, see also Lance Strate, "Something from Nothing: Seeking a Sense of Self," *ETC*, Vol. 60, no. 1 (2003): 4-21; Dautenhahn, "The Narrative Intelligence Hypothesis," 255-7.
16. Dautenhahn, "Stories of Lemurs and Robots," 63-90; _____, "The Narrative Intelligence Hypothesis," 248-265; Dunbar, "Coevolution of Neocortical Size, Group size, and Language in Humans," 681-735.
17. Peter J. Richerson and Robert Boyd, *Not By Genes Alone: How Culture Transformed Human Evolution* (Chicago: University of Chicago Press, 2005) 193.
18. Wynne 106-138.
19. Bruner, "The Narrative Construction of Reality" in Mateas and Sengers, eds., *Narrative Intelligence*, 41-62.
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Improve Our Future (New York: Alfred A. Knopf, 1999) 101.

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22. Robert H. Frank, *Falling Behind: How Rising Inequity Harms the Middle Class* (Berkeley: University of California Press, 2007) 1-2.
23. Paul MacLean, *The Triune Brain in Evolution* (New York: Plenum Press, 1990).
24. Parker 48-61.
25. Roger Schank, *Tell Me a Story* (New York: Scribners, 1990) *73, 170.*
26. "Q & A: Ayaan Hirsi Ali, Enter the Dutch 'Infidel,' Faithful to Herself." *The New York Times, Sunday* 4 February 2004: D3.
27. Postman 101-2.