HOW STORIES MAKE US SMARTER

Narrative theory and cognitive semiotics

David Herman[1]

1. Introduction

In everyday life people incorporate stories into a wide range of activities. Stories enable humans to carry out spontaneous conversations, make sense of news reports in a variety of media, produce and interpret literary texts, create and assess medical case histories, and provide testimony in court. In the present essay, I build on the interdisciplinary research tradition that has grown up around the study of "cognitive artifacts"[2] –that is, material as well as mental

[1] English Department, North Carolina State University.

[2] D. HERMAN, "Framed narratives and distributed cognition" (under review) ; D. HERMAN, "Stories as a tool for thinking", in D. HERMAN (ed.), *Narrative Theory and the Cognitive Sciences* (under review) ; D. HERMAN and B. CHILDS, *Narrative and Cognition in* Beowulf Style (forthcoming) ; E. HUTCHINS, *Cognition in the Wild*, Cambridge, Ma, MIT Press, 1995 ; E. HUTCHINS, "How a cockpit remembers its speeds", *Cognitive Science*, n° 19, 1995, pp. 265-288 ; E. HUTCHINS, "Cognitive artifacts", in R.A. WILSON and F.C. KEIL (eds.), *The MIT Encyclopedia of the Cognitive Sciences*, Cambridge, Ma, MIT Press, 1999, pp. 126-128 ; D.A. NORMAN, *Things That Make Us Smart*, Reading, MA, Addison-Wesley, 1993 ; B. SHORE, *Culture in Mind : Cognition, Culture and the Problem of Meaning*, New York, Oxford University Press, 1996.

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objects that enable or enhance cognition– in an effort to account for the pervasiveness of stories as a resource for problem solving. The program for inquiry outlined here, with its dual focus on narrative viewed as a semiotic system and on the cognitive representations and processes supported by that system, also works to situate narrative theory within the broader enterprise of cognitive semiotics.

The basis for my approach can be traced back to Lev Vygotsky's concept of "psychological tools"[1]. For Vygotsky, such tools include, among other semiotic systems, "'language, various systems for counting ; mnemonic techniques ; algebraic symbol systems ; works of art ; writing ; schemes, diagrams, maps, and mechanical drawings ; all sorts of conventional signs ; and so on"'[2]. Later researchers in fields ranging from developmental psychology[3] to cognitive anthropology (e.g., Hutchins'and Shore's work) have built on Vygotsky's ideas, which stress the social mediation of thought. From a Vygotskyean perspective, individual mental functioning is a form of activity continuous with and premised upon social activity, because the psychological tools needed for thought grow out of social institutions and also out of interactions with others. My argument is that narrative, too, can be characterized as a (socially embedded) psychological tool or cognitive artifact.

Blending insights from several areas of inquiry, including narratology, discourse analysis, phenomenology, and artificial intelligence, I use as case studies two literary texts that afford narratives of transformation : Apuleius's *The Golden Ass* (2nd century CE)[4] and Franz Kafka's *The Metamorphosis* (1915)[5]. Both of these narratives explore the problem of identity over time, and thus how to reconcile constancy and change, stability and flux. Along the way, Apuleius's and Kafka's texts suggest how stories provide important

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[1] L.S. VYGOTSKY, *Mind in Society : The Development of Higher Psychological Process*, M. COLE, V. JOHN-STEINER, S. SCRIBNER and E. SOUBERMAN (eds.), Cambridge, MA, Harvard University Press, 1978.

[2] Quoted in J. WERTSCH, *Vygotsky and the Social Formation of Mind*, Cambridge, MA, Harvard University Press, 1985, p. 79.

[3] B. ROGOFF, *Apprenticeship in Thinking : Cognitive Development in Social Context*, New York, Oxford University Press, 1990

[4] APULEIUS, *The Golden Ass*, trans. Jack Lindsay, Bloomington, Indiana University Press, 1962.

[5] F. KAFKA, *Die Verwandlung*, in *Gesammelte Schriften*, Bd I, *Erzählungen und kleine Prosa*, 2d ed., M. BROD (ed.), New York, Schocken Books, 1946, pp. 69-130 ; F. KAFKA, *The Metamorphosis*, trans. S. Corngold, New York, Bantam Books, 1986.

representational tools for humans –tools that facilitate a number of problem-solving activities. Moreover, despite their surface similarity, these two stories of transformation reveal considerable variability in the way narrative can be exploited as a tool for thinking, suggesting that its prevalence as a means for cognition stems from its essential flexibility, its adaptability vis-à-vis the most diverse objects, situations, and events. By comparing and contrasting how Apuleius's and Kafka's texts bear on five core problem-solving abilities, I hope to provide a blueprint for further research on stories as a resource for cognition. Although the present paper draws on literary data to make its case, my aim is to sketch out a theoretical model that will be applicable to the full range of narrative subtypes, including stories told during face-to-face interaction[1], films, computer-mediated narratives, nonliterary narratives in print, and so on.

2. Five problem-solving activities supported by narrative

In this section I detail the five (overlapping) problem-solving activities for which, arguably, the representational tools bound up with narrative furnish crucial support. The problem-solving activities at issue include "chunking" experience into workable segments, imputing causal relations between events, managing problems with the "typification" of phenomena, sequencing behaviors, and distributing intelligence across groups. One of my working assumptions is that theorists can gain insight into narrative as process by studying instituted narrative products, in the same way that linguists arrive at hypotheses concerning the human language faculty by studying attested linguistic behavior. Thus my overall aim is to characterize Apuleius's and Kafka's accounts of transformation as tools for problem solving in their own right, but also to characterize the more general representational processes that subtend and make possible all such narrative accountings.

[1] Cf. D. HERMAN, *Framed narratives and distributed cognition, op. cit.*

2.1. "Chunking" experience into workable segments

From early on, the notion of "chunking" –i.e., the process by which the stream of experience is segmented into units that are bounded, classifiable, and thus more readily recognized and remembered– has played an important role in cognitive-scientific research. For instance, what Marvin Minsky[1] called *frames*, or structures for representing and remembering stereotypical situations (e.g., being in a classroom or an art gallery), constitute a means of organizing knowledge of the world into discrete, manageable chunks. It is easier to organize knowledge and behavior if the vast realms of experience are subdivided ; indeed, the world would quickly become unmanageable if I had to sort through every possible concept and potential course of action at every given moment. Minsky's idea of frames was designed to explain how knowing what one typically does when in a classroom can be separated from knowing what one typically does in an art gallery. That way, one can avoid staring at a school desk as if it were a sculpture by Archipenko and, inversely, refrain from using a piece of chalk to annotate a Renaissance painting in a museum.

Likewise, narrative affords representational tools for addressing the problem of how to chunk the ongoing stream of experience into bounded, cognizable, and thus usable structures. Stories organize experience by enabling people to select from among the total set of sequentially and concurrently available inputs ; preprocess those inputs into internally differentiated chunks with (as Aristotle[2] put it) a beginning, middle, and end ; and then use those temporally structured segments as a basis for further cognitive operations on new experiential inputs. Indeed, by marking off a point on the temporal continuum and assigning it the role of origin or beginning, decisions about where to begin a story not only constrain the design and interpretation of the narrative itself, but also index competing ways of understanding the world –i.e., alternative strategies for tracing current states of affairs back to a point of origin. By the same token, narrative is a resource for closure. Any particular telling of a narrative has to

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[1] M. MINSKY, "A framework for representing knowledge", in P. WINSTON (ed.), *The Psychology of Computer Vision*, New York, McGraw-Hill, 1975, pp. 211-277.

[2] H. ADAMS (ed.), ARISTOTLE, *Poetics. Critical Theory Since Platon*, San Diego, Harcourt Brace Jovanovich, 1971, pp. 48-66.

end, even if the narrative being told is presented as unfinished or unfinishable.

2.2. Imputing causal relations between events

As I discuss in subsequent sections of this essay, both Apuleius's and Kafka's narratives focus on the problem of how something can be identified as "the same" entity despite changes over time. To establish identity over time, producers and interpreters of narrative must use a cause-and-effect algorithm to map storyworld occurrences onto more or less radical changes in the nature, appearance, or behavior of participants in the situations and events being recounted. Indeed, given that narrative prototypically roots itself in causal-chronological relations—in sequences of happenings in which earlier happenings are at least causally necessary for, though not fully determinative of, later ones[1] –the problem of identity over time would seem to be one for which stories are ideally suited. Narrative can be construed as both reflecting and supporting a cognitive predisposition to find causal links between entities, states, and events in a sequentially presented array.

2.3. Managing problems with the "typification" of phenomena

Under this heading, I include ways in which stories provide tools for solving the problem of how to balance expectations against outcomes, general patterns against particular instances—in short, the typical against the actual. Bruner discusses related issues under the rubric of "canonicity and breach," noting that "to be worth telling, a tale must be about how an implicit canonical script has been breached, violated, or deviated from in a manner to do violence to... the "legitimacy" of the canonical script"[2]. In this connection, Alfred Schutz's concept of typification—his notion that "[a]ll our knowledge of the world, in common-sense as well as in scientific thinking, involves constructs, i.e., a set of abstractions, generalizations,

[1] N. CARROLL, "On the narrative connexion", in W. VAN PEER and S. CHATMAN, *New Perspectives on Narrating Perspective*, Albany, SUNY Press, 2001, pp. 21-41.

[2] J. BRUNER, "The narrative construction of reality", *Critical Inquiry*, n° 18, 1991, p. 11.

formalizations, idealizations specific to the respective level of thought organization"[1] –can be brought productively into play.

For Schutz, human beings

> have preselected and preinterpreted this world by a series of common-sense constructs of the reality of daily life, and it is these thought objects which determine their behavior, define the goal of their action, the means available for attaining them –in brief, which help them find their bearings within their natural and socio-cultural environment and to come to terms with it[2].

From this perspective, typification facilitates a broad variety of cognitive tasks—from the organization of objects into classes and members-of-classes, to the learning of the lexical and syntactic patterns of a language, to the ascription of motives to others during social interaction[3]. If assimilated to pre-existent types, any encountered object, situation, or event can be placed within a "horizon of familiarity and pre-acquaintanceship which is, as such, just taken for granted until further notice as the unquestioned, though at any time questionable stock of knowledge at hand. The unquestioned pre-experiences are...at hand as *typical*, that is, as carrying open horizons of anticipated similar experiences"[4].

Crucially, stories fill the breach when typification fails; in line with Bruner's[5] remarks about transgressions of canonicity, narrative is a means of redressing problems that arise when anticipated similar experiences do not materialize. More than this, however, stories can be told prior to or in the absence of any real failure of expectation, in order to question the explanatory limits of expectation-inducing and –sustaining typifications. Indeed, when juxtaposed with Bruner's ideas, Schutz's account suggests that the concept of typification actually encompasses two, rather different processing strategies supported by narrative. On the one hand, stories can be used to engage

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[1] A. SCHUTZ, "Common-sense and the scientific interpretation of human action", in M. NATANSON (ed.), *Collected Papers*, vol. 1, The Hague, Martinus Nijhoff, 1962, p. 5.

[2] *Ibid.*, p. 6 ; L. LANDGREBE (ed.), E. HUSSERL, *Experience and Judgement*, trans. J.S. Churchill and K. Ameriks, Evanston, Northwestern University Press, 1973, pp. 321-338.

[3] A. SCHUTZ, *op. cit.*, pp. 7-23.

[4] *Ibid.*, p. 7.

[5] J. BRUNER, *op. cit.*

in "problem-raising," i.e., to throw into relief ways in which situations and events depart from the typical or the expected. On the other hand, received stories about the world provide a context of typicality in terms of which unexpected occurrences can be interpreted, enabling various modes of problem-solving. Section 5 below explores ways in which Kafka's and Apuleius's texts at once detach themselves from and anchor themselves in dominant typification practices —thereby facilitating both problem-raising and problem-solving —but do so in distinct ways thanks to their very different contexts of production, generic profiles, and thematic foci.

2.4. Sequencing behaviors

What exactly should one do, where, when, and in what order ? As intractable as it sometimes seems, this too is a problem for whose solution narrative provides important tools. When it comes to stories, the problem manifests itself at two different levels : at the level of narrative communication, and also at the level of the storyworlds[1] that get constructed and reconstructed during narrative communication.

2.4.1. Narrative and communicative behavior

On the one hand, stories help organize the turn-taking behavior of the parties engaged in narrative communication –whether in the context of face-to-face interaction or that of reading a literary narrative. As Mary Louise Pratt noted, in both "natural" and literary narrative the role structure of participants in the speech situation remains similarly marked vis-à-vis "the unmarked situation among peers, in which all participants have [in principle] equal access to the floor"[2]. Apuleius's and Kafka's readers, like a storyteller's interlocutor(s), assume the role of an audience ceding its floor rights to discourse producers who must as a result live up to "increased expectations of delight"[3]. In both settings, in other words, there is an overall preference for a current speaker's turn at talk to continue, and

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[1] D. HERMAN, *Story Logic : Problems and Possibilities of Narrative*, Lincoln, University of Nebraska Press, 2002, pp. 9-17.

[2] M.L. PRATT, *Toward a Speech Act Theory of Literary Discourse*, Bloomington, Indiana University Press, 1977, p. 113.

[3] *Ibid.*, p. 116.

a dispreference for potential next speakers to truncate that turn by self-selecting. In the case of literary narratives, requests for such extended turns can be accomplished by a variety of textual as well as paratextual cues, e.g., the startling first sentence of Kafka's narrative or the publication of a story in a volume containing other texts by the author or by other fiction writers. In this sense, producers and interpreters of literary narrative are caught up in a sociointeractional nexus that remains anchored at essential points to the communicative dynamics of face-to-face storytelling[1].

2.4.2. Narrative representations of behavior

On the other hand, narratives also support the sequencing of behaviors by modeling, in the storyworlds they encode, what, how, where, and when a particular course of action can or should be pursued. This representational function can accrue to storyworlds no matter what their modality status, whether fictional, actual, or indeterminate. Hence commentators as diverse as Horace, Samuel Johnson, and Tipper Gore have assumed the power of fictional worlds to impinge on –provide models for– actual human conduct.

But this aspect of stories viewed as a tool for thinking can be studied more microanalytically, suggesting ways narrative provides templates for behavior in physical as well as moral-cultural worlds. For example, stories typically feature a protagonist orienting herself in space as well as time. In this respect, narratives of all sorts can function to support human navigational abilities, representing how agents might pursue a particular trajectory through a complex, dynamically emergent spatial environment. Putting the same point another way, narrative supports "cognitive mapping"[2], i.e., the process by which things and events are mentally modeled as being located somewhere in the world.

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[1] D. HERMAN, "Story logic in conversational and literary narratives", *Narrative*, n° 9-2, 2001, pp. 130-137 ; IDEM, "Toward a transmedial naratology", in M.-L. RYAN (ed.), *Narrative across Media : The Languages of Storytelling*, Lincoln, University of Nebraska Press (forthcoming).

[2] R.M. DOWNS and D. STEA, *Maps in Minds : Reflections on Cognitive Mapping*, New York, Harper and Row, 1977 ; P. GOULD and R. WHITE, *Mental Maps*, 2nd ed., Boston, Allen and Uwin, 1986 ; D. HERMAN, "Spatial reference in narrative domains, *TEXT*, n° 21-4, 2002, pp. 515-541 ; S. OSTROFF, "Maps on my past : Race, space, and place in the life stories of Washington D.C. area teenagers", *Oral History Review*, n° 22, 1995, pp. 33-53.

2.5. Distributing intelligence across groups

Narrative at once reflects and reinforces the supra-individual nature of intelligence—i.e., the inextricable interconnection between *trying to make sense of* and *being within* an environment that extends beyond the self[1]. Grasping this self-environment nexus means thinking against the grain of explanatory schemes that posit a central, controlling intelligence that stands out like a foreground against a backgrounded context for mental and other forms of activity. What is required instead is some concept of agents-within-an-environment –a "molar" notion greater than the sum of its "molecular" components– to explain how individual as well as collective cognitive processes are organized[2]. Narrative, arguably, is at once a vehicle for and target of such distributed cognition, which is *enabled* by the shared construction and revision of stories, but which also *eventuates* in the fashioning and refashioning of accounts of how the world is, might be, or should be. By the same token, the methods and stakes of narrative theory change when the object of analysis is neither tellers, nor tales, nor interpreters of tales, but rather the combined product of all of these factors bearing on stories viewed as a resource for collaborative problem-solving.

3. Stories as a source of structure : transformation and chunking in Apuleius and Kafka

I turn now from my general account of the five problem domains to a comparison and contrast of how Apuleius's and Kafka's texts bear on each domain. The present section explores how stories can be viewed a source of structure in humans' (shared) attempts to make sense of experience. More specifically, it examines how stories of transformation afford a means of chunking experience into (more or less) bounded, cognizable segments in both Apuleius and Kafka.

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[1] J. GIBSON, *The Ecological Approach to Visual Perception*, Boston, Houghton-Mifflin, 1979 ; E. ROSCH, "«If you depict a bird, give it space to fly» : Eastern psychologies, the arts, and self-knowledge", *SubStance*, n° 94/95, pp. 236-253.

[2] J. WERTSCH, *Mind as Action*, New York, Oxford University Press, 1998, pp. 20-21 ; cf. L. VYGOTSKY, *Mind in Society : The Developement of Higher Psychological Processes*, *op. cit.*

3.1. The functions of (reversible) metamorphoses in Apuleius

Lucius, the narrator of *The Golden Ass,* undergoes a transformation from human to animal, before being re-transformed from ass to human thanks to the intervention of the goddess Isis. In addition, this "Milesian tale" contains multiple embedded narratives involving a variety of literal as well as figurative metamorphoses–including shapeshifts from human to animal, and from mortal to god. The theme of transformation thus provides the "glue" connecting the various anecdotes and tales to the frame provided by Lucius's odyssey.

More than this, the one-way and two-way metamorphoses in Apuleius's text furnish a way of segmenting the stream of events into bounded structures each with an inception and a terminus, or rather a source state and a target state which are, respectively, the initiation and the end-point of the transformative process. In other words, tales of transformations extract from time's flow a definite span of events, providing a source of structure for understanding other, analogous event-spans. Relevant in this context is Mark Turner's[1] notion of "parabolic projection", whereby a familiar source story is projected onto happenings in the world in order to make sense of those happenings. Specifically, in Apuleius, transformation is the template used for assigning change-of-state predicates to participants in the narrated world—for tracking identities-in-flux[2]. Even the most radical changes of state (from human to ass, from the hairs of goats to dancing wineskins animated by magic) can be made sense of in terms of metamorphosis. Experience can be chunked into spans of time during which Entity X acquires, displays, and then loses predicates, instead of being encountered as an undifferentiated stream without beginning, middle, or end. The difference is that between a world in which a finite number of entities undergo changes emergent in time

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[1] M. TURNER, *The Literary Mind*, Oxford, Oxford University Press, 1996.

[2] G. BROWN, *Speakers, Listeners ans Communication : Explorations in Discourse Analysis*, Cambridge, Cambridge University Press, 1995 ; G. BROWN and G. YULE, *Discourse Analysis*, Cambridge, Cambridge University Press, 1983 ; C. EMMOTT, *Narrative Comprehension : A Discourse Perspective*, Oxford, Oxford University Press, 1997.

and an innumerable set of successively presented entities, between which no real conceptual links can be established.

3.2. Gregor's cataclysmic and irreversible transformation

In Kafka, the tale of Gregor Samsa's transformation from travelling salesman to dung beetle structures and delimits the stream of experience in a different way. Readers are privy only to the end-point of the metamorphic process. Further, there is no suggestion in the story that a two-way transformation –from human to insect and from insect back to human– is within the sphere of possibility. Whereas Apuleius represents metamorphosis as a durative process, capable of being reversed, Kafka represents Gregor's transformation as instantaneous, cataclysmic, and final.

Unlike Lucius's, Gregor's is a post-Freudian world in which difficult-to-interpret legacies of past trauma live on in the present and jeopardize the future. Transformations of the self can be traced back to these traumatic hinge points, but there can be no moving back beyond the intervening mediations of time, language, and experience to arrive at an original trauma that must instead be hypothesized as given. Rather than trafficking in transformative processes with a beginning, middle, and end, with the end-point sometimes coinciding with a reverse metamorphosis back to the pre-transformed self, experience is structured into a before that is radically distinct from and inaccessible to the after-time of the present. (Hence, Gregor loses consciousness when, in a version of the primal scene, his mother embraces his father in complete union with him and pleads for her son's life[1]). This tale of transformation still constitutes a source of structure ; but in a manner paralleling the use of the concept of "half-lives" by Kafka's compatriot and successor, Milan Kundera, Gregor's existence is segmented into that of an earlier self that, for the self of the present, figures as only a fading memory[2].

For both Apuleius and Kafka, then, tales of metamorphosis afford a means of chunking the stream of experience into pre- and post-transformation segments or phases. However, the two narratives ascribe different modes and degrees of interconnectedness between

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[1] F. KAFKA, *op. cit.*, p. 39.

[2] See P. STEINER, "Ironies of history : *The Joke* of Milan Kundera", C.-A. MIHAILESCU and W. HARMANEH (eds), *Fiction Updated : Theories of Fictionality, Narratology, and Poetics*, Toronto, University of Toronto Press, 1996.

the source and target phases that are the input and output of the transformative process, respectively. Apuleius's and Kafka's texts thus recruit from a common stock of representational resources –a stock grounded in narrative viewed as a cognitive style as well as a discourse genre– but they draw on those resources in distinctive ways and with distinctive results.

4. Narrative, transformation, and causality

This section further explores how narratives of transformation support humans' efforts to structure and comprehend their experience. Specifically, it characterizes "transformation" and "causality" as interlinked notions, but suggests that different kinds of metamorphic narratives cue interpreters to impute different sorts of causal relations between events. Conversely, different species of causality are the hallmark of different genres within the same historical epoch, as well as indexing changes in narrative technique across historical periods.

4.1. Metamorphoses as effects of actions in Apuleius

Apuleius' tales of transformation represent those metamorphoses as more or less durative processes triggered by attitudes and actions of characters. In other words, the narratives of transformation situate the characters in causal networks, whereby cause-and-effect relationships can be established between actions and occurrences that might otherwise figure as localized or isolated incidents. Lucius is transformed into an ass because of his overweening curiosity about magic, and a re-transformation becomes possible only when that inquisitiveness gives way to faith in Isis, who then appears to Lucius in a vision and tells him how to become human again. The goat-hairs taken by Fotis are transformed into dancing wineskins through the magical practices of her employer, Pamphile ; and the debacle that results for Lucius is in turn the effect of Fotis's attempt to deceive Pamphile, who wanted to turn human hairs into lovers for herself. Through Cupid's intervention with Jupiter, Psyche is transformed into a deity –after she, like Lucius, learns the hard way about the dangers of unbridled curiosity. Hence, in Apuleius, story-enabled representations of metamorphosis are not only a way of carving structure out of the stream of experience, but also a way of operating

on that structure to create coherent episodes, in which states, events, and actions are bound together causally to create unified wholes.

4.2. The difficulty of discerning a cause for Gregor's change

Meanwhile, by segmenting Gregor's existence into a span of years leading up to his metamorphosis and a span of months following it, Kafka's tale of transformation enables different sorts of causal linkage. In effect, interpretation of Kafka's text prompts the search for two independent cause-and-effect algorithms, ranging over different elements of the narrative. One algorithm is of the same sort used to interpret *The Golden Ass* as a series of (interconnected) episodes. In the early pages of the story, readers construe the backpedaling of the office manager into the vestibule as an effect of his horror at Gregor's new appearance and of his eagerness to escape the apartment. Later, when Gregor clings to the picture on the wall of his room and glares defiantly at his sister and mother, attributing to Gregor the motive of hanging on to his human past allows this action to be integrated into the larger attempted-furniture-removal episode in which it occurs.

But the narrative also cues the search for a different species of causal linkage—one that would connect Gregor's current condition and activities to the situations and events that preceded his insectoid change. Whereas the causal links between Gregor's and his family members' local actions are readily discovered, Kafka frustrates the search for more global cause-and-effect relations between Gregor's past and present. Is Gregor's current mode of existence a literalization of the life he led more figuratively before, as mere "vermin" for his family –particularly for his father ? Did the treatment he received from his family "cause" his change, in this sense ? Or did superfamilial forces contribute to his metamorphosis as well– for example, the constant distrust of his supervisors at work, or Gregor's decline from the proud demeanor he wore as a member of the military, to the civilian obscurity of his later years, when his free time is spent framing pictures cut out of magazines ? Or do these and other factors jointly conspire to effectuate Gregor's change ? The exact causal mechanism is, of course, left underspecified.

5. Transformation and typification

Both of the texts under study suggest how narrative is not only a resource drawn upon when the limits of more or less dominant typifications are exposed, but also a strategy for building new and different typifications, with stories then serving a re-typifying or rather meta-typifying function. In particular, both *The Golden Ass* and *The Metamorphosis* question the coherence of standard membership criteria for the classes "human" and "animal." But they do so in different ways and, arguably, with different consequences.

5.1. Transformation and typification in Apuleius

Building on the precedents set by ancient Greek myth and by Ovid, Apuleius's Milesian tale begins from the premise that the boundary between the human and animal worlds is porous rather than impermeable. Not only does Pamphile use her magical arts to occupy the form of an owl, and Fotis misuse magic to bring about Lucius's metamorphosis into an ass. More than this, the possibility of such shapeshifts figures as a generalized condition of existence. In the embedded narrative by Aristomenes that occurs early in the text, Aristomenes' friend Socrates stresses the supernatural powers of Meroe, the tavernkeeper with whom he has consorted. She changed one lover into a beaver, a rival tavern owner into a croaking frog, and a lawyer into a horned ram, butting and rebutting in a different way than previously. Later on, in telling the story of his night-watch over a corpse, Telephron recounts the deceptive practices of Thessalian wise-women. Telephron is warned by the man who hires him : "these abandoned slidder-skins can change themselves into any beast and creep up so secretly as to cheat the eyes of the Sun and of Justice as soon as to look at you. They disguise themselves as birds, and sometimes as dogs or mice or even –true it is– as flies"[1]. Given that humans can either voluntarily or willy-nilly assume the form of beavers, birds, frogs, and flies, the distinction between human and animal must be retypified as gradient and fuzzy rather than binary and clear-cut.

[1] APULEIUS, *op. cit.*, pp. 63-64.

It is hard to determine which of these two ways of typifying the human-animal relation was actually more robust during the culture and period in which the pagan Apuleius wrote. Greek and Roman mythology relied crucially, of course, on all sorts of metamorphoses, and in the century before Apuleius, Ovid had used shapeshifts to question and repudiate an Augustan emphasis on order –to dissolve the fixed hierarchies of Virgil's Rome-centered epic, for example, into a mosaic of transformations, a blending of kinds and categories. But in Apuleius's case, debatably, human-animal blends are yoked to a different overall purpose. True, Lucius's ass's-eye perspective enables him to witness firsthand the deplorable conditions in which slaves were kept, thereby exposing the dark underbelly of the Roman Empire. Insofar as the trajectory of the narrative leads towards Lucius's conversion to the priesthood of Isis and then Osiris, however, the tale's human-animal interchanges can be viewed as an instrument for questioning the relation between the spiritual and material realms. Reminding humans of their proximity to and even interchangeability with animals, the text suggests the need for reorganizing human behavior around new typifications –typifications that would enable humans to detach themselves more effectively from the material world to which they remain all too bound. In that way, they, like Lucius, might more successfully aspire to the immaterial world of the gods.

5.2. Transformation and typification in Kafka

Kafka's text also involves a blending of types or kinds, such that the categories "human" and "insect" must likewise be viewed as located on a continuum rather than separated by an absolute divide. However, Kafka's 1915 narrative was written in the wake of Freud's theories about the consciousness-disrupting Id as the repository of humans' "archaic heritage". The story also came in the midst of the global conflict of WWI, when modern technological advancements were put in service of combatants irrational in their disregard for human life and their refusal to learn from history. Thus, although Kafka's text parallels Apuleius in forcing a retypfication of experience –a rethinking of the division of "human" and "animal" into natural kinds– *The Metamorphosis* prompts interpreters to move in the opposite direction along the human-animal continuum.

In other words, *The Metamorphosis* suggests the need to reorganize human behavior around the recognition that human beings are irreducibly embedded in concrete, material circumstances—that humans share with animals and insects not only the same overarching environment but also the same sorts of drives, anxieties, and aims. The story reveals the need for a retypification of experience such that people see themselves as more, not less, firmly anchored in the material reality of their bodies, their physical environments, their material constraints. From the very inception of Kafka's story, Gregor is bound to learn the new constraints imposed by his dung-beetle's body –what portion of his carapace is most vulnerable, what to make of his itchy white spots, how best to use his thin, multiple legs, which disposition of objects in space makes him feel the most at ease. Whereas Lucius is a human temporarily condemned to an ass's form, Gregor is a dung-beetle with an ever dimmer memory of the experience of being human. Lucius craves the same old foods and imposes his old moral standards on others ; Gregor finds himself repulsed by what he used to like to eat and at times has to struggle to remember the exact familial connection between himself and his mother and sister. *The Golden Ass* takes both Lucius and the reader on a journey toward purification and de-materialization ; *The Metamorphosis* leads toward the putrefaction and then dessication of Gregor's wasted body. Indeed, the family's growing neglect of their son and brother stems in part from their failure to retypify the human-animal nexus in the way that Kafka's protagonist and readers are forced to do as the story proceeds.

6. Sequencing behaviors : communicative and representational protocols

6.1. Communicative protocols in Apuleius and Kafka

In its form as well as it themes, *The Golden Ass* bears the stigmata of spoken narrative –of the classical world's equivalent of folk tales. Although Apuleius's Milesian tale contains multiple embedded narratives, whose intradiegetic narrators sometimes tell stories about characters who in turn tell stories, thus evoking hypo-hypodiegetic narratives, shifts between all these diegetic levels are clearly and explicitly marked. Thus, Aristomenes prefaces his story

about Socrates and Meroe with the comment that "I'll be pleased to begin my story all over again for you [Lucius]"[1], and Lucius cues the reader to "pop" this embedded narrative off the stack of diegetic levels by remarking "[h]ere ended the tale of Aristomenes"[2]. The inclusion of these level-indicating devices is a reflex of the text's origins in oral traditions, where storytellers are under an imperative to mark shifts between levels, participants, and time-frames with as little ambiguity as possible, so that recipients can construct on-the-fly interpretations of what is being communicated by narrators. Without benefit of a written text, interlocutors rely on such cues to coordinate their interpretive activities, i.e., to fashion the appropriate mental models for situations and events recounted in particular stretches of the narrative.

Kafka's tale, though perhaps farther removed from folk-tale traditions, likewise differs from the communicative imperatives of conversational storytelling in degree rather than kind. The story's first sentence functions much like what William Labov[3] described as the "abstracts" used in conversational narratives, pre-announcing the subject of the tale and signalling the need for an extended "turn at talk" to convey what happened : "When Gregor Samsa woke up one morning from unsettling dreams, he found himself changed in his bed into a monstrous vermin"[4]. Yet this textual cue triggers a mode of communicative behavior that is not tantamount to activity on the part of the teller and passivity on the part of an interlocutor (or group of interlocutors). Instead, literary texts like Kafka's require a dovetailing of sequencing strategies by interpreters as well as producers of narrative. All parties must actively enable the production of the narrative via an intercalated sequence of behaviors performed and behaviors withheld.

6.2. Representational protocols in Apuleius and Kafka

What is more, *The Golden Ass* and *The Metamorphosis* furnish representational protocols for the sequencing of behaviors. For

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[1] *Ibid.*, p. 34

[2] *Ibid.*, p. 44.

[3] W. LABOV, "The transformation of experience in narrative syntax", in *Language in the Inner City*, Philadelphia, University of Pennsylvania Press, 1972, pp. 354-396.

[4] F. KAFKA, *op. cit.*, p. 3.

example, both Lucius and Gregor Samsa are represented as following paths of motion through a range of spatial environments. Lucius begins his journey travelling toward Thessaly, then navigates the city of Hypata to find his host's house as well as the house of a famous magician, then follows the paths prescribed for him by his various owners when Lucius becomes an ass. For its part, Kafka's tale furnishes highly microanalytic representations of Gregor's movements to and fro through the Samsas' apartment –for example, Gregor's initial struggle to identify and follow a path from his bed through his bedroom door into the living room, or his circuitous, multi-legged flight from the revenge-minded father. More generally, an important difference between types of story artifacts is the relative degree of detail attaching to their representations of characters' manners and paths of motion as they unfold in time and space[1]. Perhaps because Gregor's sphere of movement is more narrowly circumscribed than Lucius's, his manner of motion receives more meticulous attention in Kafka, whereas Apuleius, recounting an epic journey of sorts, charts a richer variety of paths of motion.

7. Distributing intelligence : from monads to societies

Marvin Minsky[2] describes the workings of intelligence in terms of a society of mind. Intelligence, in other words, is socially distributed, such that a group or team of experts is "smarter" than any one individual could ever be. More than this, though, intelligence is distributed not just socially, but also between humans and non-humans—i.e., between people and artifacts. Another way of putting this would be to say that intelligence must be characterized in terms of functional gestalts in which intelligence is distributed between two or more agents (whether human, computational, or other) making a coordinated effort to come to grips with a problem in their environment –via a complex interweaving of individual and shared

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[1] L. TALMY, "Lexicalization patterns : Semantic structure in lexical forms", in T. SHOPEN (ed.), *Language Typology and Syntactic Description*, vol. 3, Cambridge, Cambridge University Press, 1985, pp. 57-149 ; D. HERMAN, "Toward a transmedial narratology", *op. cit.*

[2] M. MINSKY, *The Society of Mind*, New York, McGraw-Hill, 1986.

representations[1]. As both Apuleius's and Kafka's texts suggest, narrative provides an optimal environment in which to synthesize and propagate multiple representational states ; stories thus afford a cognitive and communicative context supporting the shift from monads to societies as the essence of intelligence.

Narrative helps distribute intelligence by facilitating more or less sustained and far-reaching blends between the individual and his or her environment. Described by Erving Goffman[2] as a fundamental resource for 'laminating' experience –that is, a tool for embedding imagined or noncurrent scenarios within a current context of talk– stories also afford a basis for various forms of imaginative projection, including those required for empathetic identification with others. It is not just that, by narrating the experiences of fictional characters, writers like Apuleius and Kafka can extend the focus of concern to places, times, events, and participants beyond those that lie within their own or their interpreters' personal acquaintance. Further, building on their understanding of the "social mind in action"[3], i.e., drawing on the same sociocognitive processes of attribution they use to make inferences about their cohorts' unstated feelings, motives, and dispositions, readers of literary narrative have no trouble accepting the fiction writer's premise that other minds can be dipped into, reported on, even quoted verbatim[4] –whether by a homodiegetic or first-person narrator vastly different from his earlier self, or by a heterodiegetic or third-person narrator capable of probing the fears and aspirations of a dung-beetle.

In characterizing stories as an instrument for distributing intelligence, one thereby shifts from the individual mind to the narrative situation as the primary unit of analysis. If thinking can be characterized in terms of a functional gestalt in which tools, tasks, and

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[1] In the same vein, Hutchins (E. HUTCHINS, *Cognition in the Wild, op. cit.*) defines cognition as computation taken in a broad sense –such that the idea of "computation" is "as applicable to events that involve the interaction of humans with artifacts and with other humans as it is to events that are entirely internal to individual persons... For our purposes, 'computation' will be taken... to refer to the propagation of representational state[s] across representational media" (p. 118).

[2] E. GOFFMAN, *Frame Analysis : An Essay on the Organization of Experience*, New York, Harper and Row, 1974 ; IDEM, *Forms of Talk*, Philadelphia, University of Pennsylvania Press, 1981.

[3] A. PALMER, "The construction of fictional minds", *Narrative*, n° 10, 2002, pp. 28-46.

[4] Cf. D. COHN, *Transparent Minds : Narrative Modes for Presenting Consciousness*, Princeton, Princeton Universty Press, 1978.

users are less basic than the larger whole in which they jointly participate, in the case of stories, too, tellers, tales, and interpreters of tellings are less basic than the transpersonal narrative situation which they collectively constitute. Apuleius represents the telling and interpreting of stories as the mechanism by which knowledge of the past as well as the present is transmitted. Kafka uses figural narration[1] to blur the boundary between the narrator's telling and Gregor's experiencing of the metamorphosis. In this way, the form of the tale enables the propagation of representational states across a society of minds and furthermore suggests the inextricable link between narration and knowledge. Thus, whether consciously or not, both authors root their texts in the etymological heritage of the very term *narrative*, which derives from a Sanskrit root meaning "to know."

8. Conclusion

The approach outlined here provides a framework for studying how stories enhance core problem-solving abilities in a variety of communicative contexts, nonliterary as well as literary. While sketching basic and general principles by virtue of which narrative supports human understanding, my approach also suggests that those principles are implemented differently in different kinds of story artifacts, and even within stories ostensibly falling under the same descriptive category (e.g. "narratives of transformation"). Future research, drawing on the work of theorists in a number of fields, needs to continue this investigation, exploring how various kinds of narrative practice vehiculate intelligence in various ways.

At stake are differences in how specific instantiations of the semiotic system of narrative support cognitive representations and processes. Ethnographic, sociolinguistic, and communication-theoretic research may suggest how those differences can be correlated with the variable functions of stories across distinct cultural, subcultural, and situational settings. Relevant, too, is work in developmental psychology and applied linguistics[2] ; this research bears on age-graded differences in how stories are used by children

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[1] F.K. STANZEL, *Theory of Narrative*, trans. Ch. Goedsche, Cambridge, Cambridge University Press, 1984.

[2] Cf. E. OCHS and L. CAPPS, *Living Narrative : Creating Lives in Everyday Storytelling*, Cambridge, MA, Harvard University Press, 2001.

more or less fully apprenticed in their culture's, subculture's, and family's narrative practices. Comparative media studies, meanwhile, may reveal medium-specific constraints and enablements when it comes to the cognition-boosting power of stories. In turn, this necessarily interdisciplinary program for research –a program for studying how stories are woven into the very fabric of intelligent behavior– constitutes an important subdomain of cognitive semiotics.