

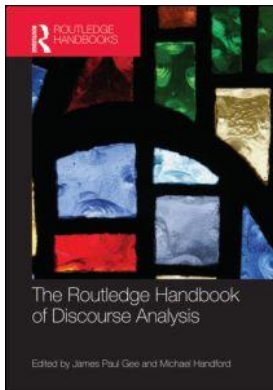
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Narrative, cognition, and rationality

David R. Olson

Discourse and rationality

Rationality, the giving of reasons, is the hallmark of the human mind, a native endowment, a universal human trait. Cognitive psychologists analyze the processes involved in reasoning and propose mechanisms to explain these processes, sometimes appealing to the relation between language and rationality (Dennett, 1978; Carruthers, 1996). I propose to examine the relation between language and rationality in terms of modes of discourse or *genre* in which distinctive ways of thinking and reasoning are called for. Although the genres of literature are both very diverse and ill defined, I shall focus on two general classes of extended discourse that Bruner (2002) described as narrative and paradigmatic—what we may think of as literary and scientific modes of discourse. The claim is that the invention of distinctive modes of discourse and, equally, their mastery by children entail distinctive modes of thought. Thus, if the claim is true, there is not one way of thinking but as many ways as there are distinctive modes of discourse. And the task of this chapter is to sketch out these distinctive ways.

The view linking rationality to modes of discourse stands in sharp contrast to general cognitive processing models of rationality such as that proposed by Stanovich (2009), building on the influential work of Tversky and Kahneman (1974) and of Kahneman and Tversky (1996). Like in the case of other “two tier” models of cognitive processing, Stanovich distinguishes low-level, automatic “algorithmic” processes from “higher level” reflexive processes, further claiming that failures on such high-level tasks indicate that people are often, if not basically, irrational. Such information processing models pay little attention to what in fact subjects are thinking, and they overlook the possibility that deviant answers are actually a rational solution to a different problem. By appeal to the understanding of the alternative modes of discourse mentioned above, we may be able to fill in that gap. Specifically, it is proposed that a class of reasoning failures occur when formal reasoning tasks are disguised as conventional narratives. Narratives, like ordinary informal oral discourse, are radically open to context and to prior knowledge in determining the meaning of a word or expression; paradigmatic discourse, of which reasoning tasks are exemplary, require attention to a narrowed and specialized “literal” or logical meaning of terms. Which terms and how they are interpreted remains to be determined. While such specialized knowledge of the meaning of terms is important for science and philosophy, it can also easily mislead the innocent, as noted by the Lone Ranger’s partner Tonto when he said: “White man speaks with forked tongue.”¹

That people are largely irrational contrasts sharply with the view advanced by Locke (1690/1961), which I largely endorse (while, with Locke, granting a place for logic):

But God has not been so sparing to men, to make them barely two-legged creatures, and left it to Aristotle to make them rational ... He has given them a mind that can reason without being instructed in methods of syllogizing; the understanding is not taught to reason by these rules, it has a native faculty to perceive the coherence or incoherence of its ideas, and can range them right without any such perplexing repetitions.

(pp. 264–265)

While reasoning and rationality are manifest characteristics of the human species, humans have developed more specialized modes of thought, suitable to particular social and intellectual functions. The modes of discourse of concern here are the literary and the scientific, what Bruner (1986) first distinguished as the narrative and the paradigmatic modes.

The place of narrative

Whereas stories are both ancient and universal, non-fictional prose is the more refined instrument of science and philosophy, not to mention the primary discourse, at least in the West, of the dominant society and its schools. Stories are commonly seen as works of the imagination, whereas non-fictional prose is seen as serious discourse, uniquely suited to issues of truth, validity, and rationality more generally. Indeed, some classical Greek philosophers disparaged all artistic uses of language, including poetry and narrative, Plato going so far as to suggest he would banish users of such language from his ideal republic.

While scientific, academic prose remains relatively unchallenged as an instrument of science and philosophy and as an important goal of schooling (Snow and Uccelli, 2009), the position of the narrative remains more controversial. Bruner describes two contrasting attitudes to story. In one camp he places the “fabulists,” those who point out the importance of story in understanding ourselves, others, and the world, and in the other, the “antifabulists,” who worry about the ways that stories mislead (Bruner, 2002: 11–12). Fabulists, Bruner claims, describe the virtues of story not only for its power to entertain, but also for its ability to “subjunctivize” experience, to bring experience out of the ordinary world of doings and happenings into the world of the possible, the hypothetical. It is to enter the world of the imagination and to learn to see that what happens is only one out of a large number of possible outcomes. In a word, stories allow one to adopt a more reflective and self-conscious attitude to experience, thereby liberating the mind. Given his attitude to the exploration of the possible through stories, it is easy to understand Bruner’s commitment to the “process” of education, the invitation to speculative thinking (Bruner, 1960)—in contrast to the more rigid attainment of specific, fixed goals.

But the imagination gives rise to error as often as to truth. Modern critics are equally suspicious of stories, claiming that people spin themselves into stories that are clearly at odds with scientific and logical truths. As an example, in America much ink is spent in the science versus religion debate between the biblical account of creation and the Darwinian account of evolution, one side insisting that creationism is a scientific theory, the other that it is rather a religious “Biblical narrative,” that is, a story; one side, that Darwin’s account is just another story, the other, that it is a rigorous scientific theory. The frontier between story and theory has become a much contested one. When does a story become a theory?

We find much the same difficulties in advancing psychological laws, in that they often rely on an inexhaustible list of possible exceptions that may be better explored in narrative than set out in truly causal laws (Allport, 1937). Hence some psychologists have begun to turn from the causal theories offered by standard cognitive science and to adopt, with Bruner, “the narrative stance,” the attempt to understand thought and action in terms of the consciousness, the beliefs, and the

intentions of actors. As novelist Julian Barnes (NYRB, June 11/2009: 10) suggested, “human consciousness always insists on narrative and meaning.”

Similarly, in other disciplines such as medicine, some researchers have begun to advocate a narrative approach (Greenhaigh, 1998). This approach treats patients not as objects, but as agents who are attempting to deal with their illness and its consequences. Economists, too, despair of finding causal laws for economic growth and may be more inclined to providing narrative accounts. Nobel laureate Robert Solow said: “In real life it is very hard to move the permanent growth rate; and when it happens. ... The source can be a bit mysterious even after the fact” (Easterly, 2009).

The increasing importance of narrative discourse and narrative modes of explanation has undermined the monopoly on knowledge, truth and rationality currently held by scientific discourse. A recognition of narrative as a mode of thought opens the possibility of at least two modes, appropriate to different contexts and uses, and each dependent upon particular uses of language. Put simply, one cannot ordinarily think of science without appealing to notions of hypotheses, evidence, facts, and theories (see Snow and Uccelli, 2009). And one cannot think in terms of narrative discourse without appeal to notions of agency, intentionality, and, most importantly, disruptions to the expected.

As mentioned, in his earlier writing on narrative Bruner saw narrative as one out of two equally important modes of representation: the more scientific and logical form, which he dubbed the “paradigmatic mode,” and the less formal mode, which he called the “narrative mode.” Both were seen as essential to understanding the mind—one tied more to the sciences, the other to the humanities. In more recent writing (Bruner, 2002) he acknowledged that the contrast between and comparison of the two modes “has been left behind,” adding “for better or worse” (p. 115, n. 19), and he concentrated on the diverse uses of story in literature, law, and life.

But what Bruner has “left behind,” the scraps from the table, so to speak, provide sufficient nourishment for the less adventurous; and in the remainder of the chapter I shall employ the distinction between narrative and paradigmatic discourse and show how the failure to recognize the rational uses of these alternative modes of discourse leads to misleading conclusions about reason and rationality.

What is a story?

The critical centre of a story is what Aristotle called *peripeteia* (“adventure,” “reversal”): the violation of expectation, the event that upsets the ordinary, taken for granted, everyday happenings, what I shall call “exceptionality.” Kenneth Burke (1945) in *The Grammar of Motives* referred to this violation of expectation as “Trouble” with a capital T. “In the still of the night, there is a knock at the door. And in comes a stranger.” The unexpected, exceptional event is at the heart of the story. That exceptionality is what makes stories endlessly entertaining.

But stories are said to contain other features as well, including a cast of characters, a setting that provides the basis our expectations as to what normally occurs—a restaurant, a beach, a post-office, a bar, a market, a home, or the like—the *peripeteia*, as Aristotle called the unexpected and the exceptional—sometimes a resolution to the trouble, and finally a narrator to tell it and an audience to listen. The understanding of stories has generated a vast literature that shows that readers and listeners are well aware of these distinctive properties (Cooper, 1985). The telling and the understanding of stories is further embedded within the general discourse constraints deriving from Grice’s “cooperative principle” (Grice, 1989): to honor what he called the maxims of quantity and quality, that is, to tell what is necessary for the listener to grasp the meaning and to exclude information that is irrelevant and distracting. This point is expressed in the formal

convention known to every reader and spelled out in every manual of story writing: “The invariable rule should be, put in nothing that has not a bearing on the catastrophe of the story, and omit nothing that has” (Cody, 1894: 37). It is a convention recognized by children as young as nine years. In one study (Winner *et al.*, 1986) children were asked to select one out of two endings for a story, one of which adverted to as incident mentioned in the introduction, the other not. Whereas the choices of 7-year-olds were made at chance, 9- and 12-year-olds chose the ending that picked up the earlier mentioned incident.

It is the trouble, Burke’s “Trouble,” the violation of the reliable expectations of the listener, that is central to narrative and distinguishes narrative from more paradigmatic modes. There is a phrase in logic that captures, so as to exclude or at least to manage, the notion of trouble. It is the Latin expression *ceteris paribus*, which means “all other things being equal.” A scientific law, for example Charles’ law relating temperature and the volume of a gas, claims that an increase in temperature causes a linear increase in volume, *ceteris paribus*, all other things being equal. The law does not hold if the pressure changes or, worse still, if there is a hole in the container. Scientific laws assume that all the other conditions excluded by the *ceteris paribus* clause can be systematically controlled, if necessary by creating an artificial world known as a laboratory (Hacking, 1983). If these conditions cannot be stipulated, narrowly defined, and brought under some degree of control, one cannot formulate a causal theory. In literature, and arguably in the social sciences, there is no way to exhaust all the possibilities excluded by that clause. In a story, as in real life, when there is a knock at the door, it is someone who is expected; when “in comes a stranger,” that *ceteris paribus* condition has been violated. In a story, things are conspicuously not equal, nor can they be systematically ruled out as they may be in a scientific laboratory. In a story the unexpected occurs. The more unexpected, the better the narrative. It is, after all, the unexpected event that makes the story worth telling, thereby creating a link between the narrator and the audience. But this is also the reason why narrative is so important to explanation, in everyday life as well as in the psychological and other social sciences, and in the study of the human mind. This is a world in which it may be unrealistic to expect strictly causal laws; it is impossible to assume, for any real, naturally occurring event, that all other things are equal. Explanation will be local and contextual. Let us explore this issue more fully.

Ceteris paribus

Ceteris paribus is a Latin phrase, literally translated as “if other things are equal/of the same weight.” It is commonly rendered in English as “all other things being equal.” A prediction, or a statement about causal or logical connections between two states of affairs, is qualified by *ceteris paribus* in order to acknowledge, and to rule out, the possibility of other factors that could override the relationship between the antecedent and the consequent (Schlicht, 1998).²

Put another way, *ceteris paribus* marks the limits of generalization. “I’ll meet you for lunch tomorrow *ceteris paribus*,” that is, unless something completely unforeseen comes up. My grandmother always guarded her promises by adding “Lord willing,” thereby acknowledging that not everything was under her control. Nor could her, or anyone else’s, actions be predicted by purely causal laws; the unexpected may, and often did, intervene; conspicuously, all other things are not equal. The history of science is replete with cases in which scientists were misled or confused about which factors had to be listed as having to be held equal. Prior to the invention of astronomy, astrologers sought to influence the motion of planets by prayer and ritual. Astronomy became a science when the factors relevant to celestial motion could be enumerated. In this way the *ceteris paribus* conditions could be sufficiently contained to allow the formulation of strictly causal laws. As suggested above, whether or not the social sciences can formulate such laws remains an open question.

In literature there is no way to limit these conditions. A defining feature of narrative is the open-ended opportunities it provides for exploring the exceptional events that violate expectation. Narrative is the primary means for exploring the possible, for linking unlikely events into a coherent, comprehensible story. To do so, it expands or stretches not only the imagination but the language as well. Literature relies on the openness of the meaning of the terms it employs, allowing meaning to be more context and situation sensitive. Consider what the word *word* means when we say “I give you my word,” or what *all* means in “All men are created equal” or in “I gave it my all.” Or consider what the word *and* means in literary contexts such as “love and marriage,” where *and* means something like “leads to,” or in expressions such as “he ate and left,” where *and* means “and then” and yet in other, more specialized contexts, where it means something like *plus*. Words cover diverse situations by allowing context to specify their appropriate interpretation.

Rationality and modes of discourse

The distinction between narrative and scientific and philosophical discourse may be drawn on the basis of assumptions about *ceteris paribus* conditions. Discourse that restricts these conditions in a manageable way, so as to allow the formation of lawful relations, defines the paradigmatic genres, the discourses of science and philosophy; discourse that treats these conditions as essentially open ended defines the narrative genres. Neither has a monopoly on rationality; both offer distinctive advantages and uses. Problems arise when the boundary between these classes of genre is unacknowledged, as in the current debates on rationality. Let us examine this claim by appeal to literary and non-literary examples.

Let us begin with a literary example. Consider poor Mary Barton, the central character in Mrs. Gaskell’s nineteenth-century novel of the same name, about life in a textile mill-town in England a century earlier (Gaskell, 1848). Mary Barton is the beautiful and dutiful daughter of a struggling weaver who is courted by the mill owner’s son, Harry. A reader, reading this novel, may think: Is it more likely that Mary Barton will marry the mill-owner’s son, or is it more likely that she will marry the mill-owner’s son *and* use her newly acquired status to relieve her family from oppressive poverty? Most readers will choose the latter, but, if current research on rationality and summarized by Stanovich (2009) is to be believed, those readers would be irrational. We shall return to Mary Barton presently.

So-called failures of rationality of this sort have become a favored topic in the psychology of reasoning in the past few years, largely because of the discovery by Kahneman and Tversky (1996) of what they called “cognitive illusions”: cases in which adults are routinely distracted into making invalid decisions. Even well educated persons often draw conclusions that are formally invalid, particularly if they rely on naïve statistical intuitions. Stanovich (2009) reviewed this rich literature on invalid reasoning, what he calls “irrationality.” The reasons people base their invalid conclusions on are often bad ones, and when recognized as such may be held in check—or so, at least, educators hope. The list of types of errors in reasoning include anchoring bias, confirmation bias, hindsight bias, self-serving bias, base rate neglect and other failings. These errors are not all of the same type, some being caused by ego-centrism, some by cognitive overload, some by ignorance of statistics, and yet others, the ones I consider here, by—I suggest—a conflation of genre, namely, of narrative with more scientific–philosophical discourse. I shall attempt to show that narrative, far from being the cause of errors in reasoning, is an alternative and valid mode of thought.

The most famous of the problems studied by cognitive psychologists is that of a certain fictional character named Linda. The story continues: “Linda is a 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.” The

reader is then asked to “[r]ank the following statements by their probability,” and the statements to be ranked included:

1. Linda is a bank teller.
2. Linda is an insurance salesperson.
3. Linda is a bank teller and is active in the feminist movement.

Most adults commit the logical error of thinking that (3) is more probable, whereas, by necessity, the probability of (1) is greater. Rather than see the problem in terms of probabilities, thereby choosing (1), 80 percent of subjects see it in terms of what Stanovich refers to as “similarity assessment”—it seems like a good description of Linda—and choose (3). And they are thereby judged by the psychologists as irrational.

In fact, readers are not blind to probabilities. In Tolstoy’s celebrated novel *War and Peace*, the Czar asks General Kutuzov why he has decided to abandon Moscow to the invading armies of Napoleon. Kutuzov replies: “Which is worse? To lose Moscow? Or to lose Moscow and the entire Russian army?” The Czar concedes that the general is right not to try to defend Moscow; a double loss is greater than a single one. And, as every reader knows, although Moscow was burned, the army survived to destroy the retreating French troops. So, if simple probabilities are not the problem for readers, what is?

Subjects are judged as irrational in the Linda problem because they fail to apply a formal, statistical model. Indeed, they were asked “Which is more probable?” and so they should, perhaps, be alerted to the type of problem they were facing. If we apply a statistical model to the Linda problem, it would be represented thus. Is she more likely to satisfy condition A, that she become a banker, say, with probability of 0.5, or that she satisfy both condition A, that she be a banker with a probability of 0.5, and B, say, also with a probability of 0.5, that she becomes a feminist, which results in a joint probability of $0.5 \times 0.5 = 0.25$ (assuming that the two conditions are independent)? Obviously 0.25 is less than 0.5, so A is more probable than A and B together. Readers are misled by their over-reliance on their literary intuitions about Linda. For good reason, as we see when we return to poor Mary Barton.

Consider again, then, the narrative model carefully constructed by Mrs. Gaskell. The likelihood of Mary Barton (1) marrying the mill-owner’s son is zero, unless (2) she is granted the right to benefit her impoverished family. Consequently, the probability of her meeting both conditions (1) and (2) is equal to, if not greater than, that of her meeting the single condition (1), namely that she marry the mill-owner’s son. The narrative model would seem to predict just the opposite of what is predicted by the statistical model. And it is the one most frequently chosen by readers and by subjects in experiments on rationality. The narrative model allows scope for all sorts of possibilities; one cannot assume “all things being equal,” the *ceteris paribus* clause. Specifically, in this narrative context, *and* is not treated as conjoining independent conditions but as meaning something more, like *unless*; and in order to understand Mary Barton’s decision a reader must grasp that relation. That is what narrative rationality requires.

Or consider a more famous case, the biblical story of Esther. Esther is a Jewess admired by the non-Jewish king. Esther knows that only the king could save her father, and her people, from the evil plot of the king’s servant Haman. Which is more likely: That Esther marry the king? Or that Esther marry the king *and* thwart Haman’s threat? The latter, because she would marry the king only if he frustrated Haman’s evil plot. And a reader is not irrational if s/he judges the latter as more likely. Here *and* means something like *if only*. A reader, to understand her decision, would have to interpret *and* in this contextually more appropriate way.

Again, statistically, the probability of meeting two criteria is the diminished product of the probability of each of the two independent criteria, so the “rational” answer is that it is more likely

that Esther will marry the king than that she will marry the king and plead for her people. However, the narrative context makes the latter alternative the more likely one, because if she could not defend her people she would not consider marrying the foreign king at all.

But this is not the whole story. Technically speaking, it is not possible that the joint probability of being a banker and a feminist is greater than the probability of simply being a banker, because the part cannot exceed the whole; she is a banker in both cases. Again, even if Mary Barton marries to help her family, she still marries the mill-owner's son. So in both cases the likelihood of the specific claim cannot exceed the general one. This is why most subjects in such experiments eventually come around to agreeing that being a banker is more likely than being a banker and a feminist.

But, again, we suspect a linguistic trick. Technically speaking, the category "banker" is an inclusive category that includes "banker and feminist," just as the category "animal" is an inclusive category that includes "rabbits." But in informal discourse, including in narrative, categories are ordinarily used contrastively, such that, if one category is "banker and feminist," the contrasting category is "banker and not feminist." Or if one category is "rabbit" the contrasting category would conventionally be something like "dog" or "duck," members of the same class. If asked to compare "animal" with "rabbit," the reader or listener is likely to infer that "animal" is to be interpreted as "animal *other than* rabbit." Piaget (1962) reported just this pattern in young school-age children. Children are told: "There are three rabbits and two ducks." When asked "Are there more rabbits or animals?," children typically reply, "Rabbits." When asked "Why?," they reply "Because there are only two ducks." That is, they treat the question as "Are there more rabbits or *other* animals?" This phenomenon has been studied extensively in children (Ford, 1976; French and Nelson, 1985; Macnamara, 1986).³ Children, like unwary adults, assume that *or* conjoins mutually exclusive classes, as it does in ordinary and in literary contexts. They succeed only if they are forewarned that they are to treat the expressions strictly, literally, or technically and if they have been schooled in just these formal conventions. The technical conventions involved in this case have to do with treating terms of ordinary language as if they were logical or mathematical expressions. One is taught that *and* is to be treated as equivalent to the mathematical operator *plus* and *or* is to be treated as logical disjunction.

The discourse in which the meaning of terms is to be constrained to their stipulated, defined meanings is the discourse of modernism (Reiss, 1982). It is the use of language with, as the Secretary to the Royal Society of London put it, a "mathematical plainness of style" (Sprat, 1966). It is the language of science and philosophy, the formal language that is referred to as "schooled" or "academic" language, an end product of a literate tradition (Olson, 1977, 1994; Snow and Uccelli, 2009). It is a discourse in which the text is treated as if complying with the *ceteris paribus* convention—the convention of "all other things being equal."

Narrative, on the other hand, is literary genre appropriate for coping with human contexts in which the logical demands of *ceteris paribus* cannot be assumed. There is no formal computational rule for determining the actions of unique persons in unique situations. Mary Barton is a uniquely human person in which feelings of concern, values, and goals temper every decision. The writer, Mrs. Gaskell, plays on the reader's knowledge of these personal characteristics and on their ability to anticipate the actions of Mary Barton and their consequences. Narrative, consequently, provides a frame for probing into the vicissitudes of everyday life as well as of literature.

Narrative is not only an alternative to more formal and statistical models of rationality, it is by far the more universal mode of thought. Indeed, it takes several years of schooling for reasoning to be brought under the more austere forms of rationality essential to the kinds of tasks confronted in more formal contexts. The issue is not one of rationality, but of learning to recognize and cope with alternative genres of literature.

The Linda problem is in the narrative genre. It is clearly fictional, and the reader recognizing it as a narrative knows that the mentioned details are essential to the story (to mention irrelevant details is to violate Grice's cooperative principle). In spite of this, researchers require the reader to read it in the paradigmatic, that is, in the scientific–philosophical genre, and to treat as irrelevant the detail that Linda is committed to social justice. When the reader fails to comply with the assumptions of the test giver, he or she is judged irrational.

On the contrary, it may be argued that what is at stake is the experimenter's insensitivity to the conventions of genre. Indeed Stanovich, citing Kahneman and Tversky, describes these different interpretive stances (i.e. ways of reading) as “framing effects.” Framing effects are “basic violations of the strictures of rational choice” (2009: 88), as they are responses to surface variants or “trivial rewordings” of formally identical problems. As I have indicated above, narrative is closely attuned to surface variants and readers of narratives know that those surface variants cannot be ignored. Conditions of “formal identity” occur only in logic and mathematics. Gigerenzer (1996) criticized Kahneman and Tversky on just these grounds, claiming that the questions asked did not make sense and that “the conjunction rule is [not] a universally applicable norm for sound reasoning” (p. 593). Hertwig and Gigerenzer (1999) provided evidence that people assume non-mathematical meanings for the terms in such tasks, basing their judgments on semantic and pragmatic rather than strictly mathematical meanings. More generally, even such logically equivalent expressions as active and passive sentences are not semantically equivalent, as they carry different presuppositions (e.g. “John chased Mary” is logically equivalent to “Mary was chased by John,” although one is about John, the other about Mary). The notion of descriptive invariance is defensible only by reference to some specified criterion and cannot be assumed to be a general property of language.

In fact there is a long history of confusing the rationality of persons with their culturally conventional ways of using language. Researchers were early drawn to what appeared to be conspicuous failures of reasoning demonstrated by members of traditional societies who had had limited access to modern society, and in particular to a formal education. Luria (1976), in collaboration with Vygotsky, conducted a series of studies in Central Asia, in an area undergoing rapid social change under the collectivization programs of the Soviet government in the 1930s. Luria was able to give a series of psychological tests, including classification and reasoning tests, to a group of traditional non-literate farmers and to a comparable group from the same villages who had some formal schooling. The least literate tended to treat tasks in a concrete, context-bound way, whereas those more educated treated them in a more formal, logical way. No doubt the educated subjects had learned something important. However, it is the responses of the uneducated subjects that are more informative. In a typical, widely cited example, subjects were told the following story:

In the far North, where there is snow, all the bears are white. Novaya Zemlya is in the far North and there is always snow there. What color are the bears there?

Literate subjects, of course, answered “White.” The non-literate subjects tended to reply as “I don't know... there are different sorts of bears.”

(Luria, 1976: 108–109)

Luria called such responses failures to infer from the syllogism. Kahneman, Tversky, and Stanovich would presumably agree and claim further that these more traditional subjects are irrational. A more charitable explanation would be to say that these subjects are perfectly rational, but that they are unfamiliar with the required genre and treated the narrative as a narrative with an unknown and unspecified set of alternative conditions and consequently as open to interpretation. The subject, it appears, treated the story not as a set of logical premises but as a set of ordinary

assertions forming the kind of narrative from which one is free to draw one's own conclusion depending on the possible contexts of interpretation. To advert to the earlier argument, subjects fail to treat the story as implying that all other things are equal. Schooling, in large part, is learning to manage paradigmatic discourse systematically, to the point of learning to read even narratives in a formal, logical manner. And possible problems are particularly difficult to detect when logical tasks are disguised as narrative, as Kahneman, Tversky, Stanovich, and Luria have done.

A discourse model of reasoning

What requires analysis, then, is not the rationality of persons but the distinctive properties of genres of literature, in particular the narrative and the paradigmatic. Narrative forms are both extremely ancient and universal. Paradigmatic modes are special in ways that require examination. Lyotard (1993) described paradigmatic, what he called scientific discourse, as a specific type of language game, in that it restricted itself to denotative statements. As noted earlier, these are statements with precise meanings from which valid inferences may be drawn. Learning to read and think paradigmatically is slow to develop in children and requires extensive schooling (Olson, 1977, 1994, 2009). Furthermore, there is considerable evidence to suggest that the development of extended paradigmatic discourse is a relatively recent historical development, set in motion by Aristotle's logic and given rigorous form only by the Renaissance humanists and the early modern scientists.

Linguist Roy Harris (2009) has traced the development of logic to the Aristotelian attention to "sentences" rather than to "utterances." Sentences are treated as autonomous artifacts with stipulated meanings, which may be examined for their semantic values quite independently of how they are used in context by persons. Harris writes:

With the arrival of 'the sentence', a new forum is created for the discussion of human thinking, and along with that comes the concomitant demand or expectation that all thinking (reasoning) worth bothering about has to be presented in sentential form. (This expectation is already realized by the time of Aristotle, because the sentence is the basis of the Aristotelian syllogism.)

This new forum, however, is also an intellectual cage or enclosure imposing its own limitations. It cannot accommodate non-sentential modes of thought.

(Harris, 2009: 51)

In his study of the history of the understanding of metaphor, Leezenberg (2001) similarly concluded that "literal meanings, then, are not the start of the life of the language, but rather the end product of a long social and historical process ... Literal meanings depend on the stabilization and codification of linguistic norms; these are achieved with the aid of literacy, education, standardization of language and lexicography" (p. 302). The literal meanings of particular relevance to the reasoning tasks I have considered are those of the connectives *and* and *or* and quantifiers such as *all*. Presumably these terms have, among their possible meanings, the narrow meanings seized upon by logicians; but the meaning in such cases depends upon context. It requires a tradition of defining, refining, and clarifying terms to make one of these meanings the normative standard. Stipulated definitions develop as a historical process, a part of a literate or written tradition passed on through systematic schooling. It is the special, indeed peculiar form of this formalized genre that students of rationality have failed to recognize in imputing irrationality to anyone who fails to honor it. This is to confuse rationality with a particular use of language.

Non-sentential modes of thought are what I have been describing as narrative modes of thought, thought in which both premises and inferences are open to redefinition in the context. Or, more precisely, statements for which one cannot safely make the *ceteris paribus* assumption.

Such expressions are best treated as the manifestation of a human mind subject to equivocation and re-interpretation rather than as formal objects for which “other things being equal” may be assumed.

The narrative and paradigmatic simply distinguish two great classes of the genres of literature. All of the ways of using and understanding language are grounded in ordinary spoken discourse. Metaphor and simile are common in all speech, any expression may be quoted and commented on, statements may be judged true or false, assertions agreed or disagreed with, intentions and feelings discussed. Ways of writing and reading exploit these linguistic resources in extended discourse, in part taking expressions out of the ordinary oral context of direct speech and creating a written record, thus displacing language from its immediate context of use and opening it to re-reading and design for particular purposes. The result is literature, with its diverse ways of reading and its models of rationality. In fact, defenders of the humanities often bemoan the monopoly of rationality held by the “maths and sciences.” Slouka (2009) argues that the neglect of the humanities has a seriously distorting effect on defining the goals of education.

Conclusion

Many of our arts and sciences are devoted to creating such formal expressions, whether in science, philosophy, or law. The advance of true statements from which valid inferences may be drawn is the goal of all of our sciences. Such laws hold by virtue of the condition known as *ceteris paribus*, the assumption that all other things may be equal. Narrative is called for when all the conditions cannot be assumed to be equal, when human purposes, fears, hopes, beliefs, and desires come into play. Which is to say, most of the time other than when we are doing our science—and perhaps even then. Different genres have been invented to handle these differences, the narrative and paradigmatic being two of these clusters of genre. And the study of thinking and reasoning will take an important step forward when thinking is set in the context of discourse genres that have been invented for ordering our world and our minds. What psychologists treasure as rationality is merely a special way of using language. It is using language in a mathematical kind of way that has given us our modern scientific world. Not to be disparaged, of course, but to be recognized for what it is. And to restore to narrative its privileged place in the human sciences.

Further reading

Havelock, E. (1982). *The Literate Revolution in Greece and its Cultural Consequences*. Princeton, NJ: Princeton University Press.

Havelock was the first to state, one could say overstate, the role of writing in the invention of philosophical discourse in classical Greece. He thought the alphabet critical, a view that must be tempered by new understandings of the importance of other scripts. But he was correct, I believe, in emphasizing the importance of the fixed text and of its availability to the common as opposed to the elite reader.

Goody, J. (1987). *The Interface between the Oral and the Written*. Cambridge: Cambridge University Press.

Goody uses his extensive knowledge of traditional oral culture to reflect on social changes produced by the agricultural and urban revolutions and on the role of writing in intellectual and social changes that accompanied them.

Eisenstein, E. (1979). *The Printing Press as an Agent of Change*. Cambridge: Cambridge University Press.

Eisenstein documents the increasing reliance on printed documents in social, political and intellectual life in the sixteenth and seventeenth centuries, when modern thought evolved. Her important emphasis on the availability of texts, in my view, somewhat understates the importance of the new authority of the common reader and the waning authority of king and church during that period.

McLuhan, M. (1962). *The Gutenberg Galaxy*. Toronto: University of Toronto Press.

McLuhan, often disparaged for his overstatement and universal popular appeal, was nonetheless the first to insist that the medium of communication mattered and that writing invited a new mentality.

Notes

- 1 The unscrupulous often take advantage of the gap between explicit and implied meaning, that is, between what is said and what is meant, a distinction critical to modern literacy (Olson, 1977). Reasoning tasks that involve “trick” questions are subject to Tonto’s charge.
- 2 Philosophers who worry about *ceteris paribus* analyses do *not* worry about cases in which the “other factors” can be systematically evaluated; their worries are focused on *ceteris paribus* clauses that are not even eliminable *in principle*. For example, in the philosophy of science, it is common to say that there is a natural law that events of kind A cause events of kind B *if and only if* an event of type A, *ceteris paribus*, is always followed by an event of kind B—in order to rule out the possibility of other causal phenomena overriding the ordinary effect of the event of type A. But, in order to eliminate the *ceteris paribus* clause in *this* analysis, a philosopher would need to know *every* sort of causal event that could possibly override *any other* sort of causal event—and, even if there is *in principle* some finite list that exhausts all of these possibilities (a philosophically controversial claim), that list is, for certain, *not* known to the person claiming to be giving a definition of causality. So there is no one who can say just what is being ruled out by the *ceteris paribus* clause in this analysis. (Even if an omniscient physicist *could* spell it all out in a finite period of time, *we* are the ones purporting to understand how to use the words, and *we* see these things only through a glass, darkly.) *Wikipedia, On-line*, 2009.
- 3 Piaget took children’s failure as indicating a logical failure, others as a failure to recognize the special nature of language involved.

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