

# Poetry and narrative: an evolutionary perspective on the cognition of verbal art

Norbert Francis

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**Abstract** The study of the aesthetic genres reveals important design features of cognition, in how complex higher-order abilities are organized mentally. An evolutionary perspective frames this research in a way that considers the componential nature of language-related abilities in particular. In addition, it directs our attention to the important problem of understanding how different abilities are related. In this review of the research the focus will be on poetic and narrative abilities: (1) as they develop in children, (2) how the component sub-structures of poetry and narrative might be represented cognitively, and (3) how they may have emerged in early humans. Crucially, the analysis of component structures implies understanding how they interact in performance, and more interestingly how different abilities and faculties share competence modules and processing mechanisms in common. This approach helps put the discussion regarding the relative weight of domain-specific and domain-general structures into perspective, potentially reconciling some seemingly opposing viewpoints in evolutionary science and in the study of language development.

**Keywords** Verbal art · Poetry · Narrative · Evolutionary psychology · Modularity

## Introduction

The study of poetry and narrative, together, from a cognitive science perspective seems like a topic that should be split up into two. But there are a number of good reasons for considering these important uses of language side by side. Taking a wide and inclusive view of each one, as networks of discourse ability, poetry and narrative appear to encompass the totality of the verbal arts. Narrative distinguishes

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N. Francis (✉)  
College of Education, Northern Arizona University, PO Box 5774, Flagstaff, AZ 86011, USA  
e-mail: norbert.francis@nau.edu

itself as its domain crosses over into the prosaic genres of non-fiction, keeping in mind that poetic forms of narrative (especially in the early traditions) do the same. While both poetry and narrative belong to the widely recognized realm of the creative use of language with relatively clear lines of demarcation, their dependence on the faculty of language implies the sharing in common of a number of cognitive domains. Historically, the genres overlap, as in epic poetry, ballads, and drama composed in verse. The different varieties of poetic narrative, in fact, may have been the predominant form that narrative took for an extended period, especially before the advent of writing. The domains that are not typically shared then count as distinguishing features.

Both discourse forms appear to be universal across all cultures, and rudimentary abilities show spontaneous and precocious development in children. Without explicit instruction, young children attain impressive levels of ability, particularly in receptive proficiency, and implicitly distinguish among the genres and sub-genres, evidenced in independently developing poetic and narrative sensibilities at an early age. These features call attention to important research problems related to questions of early acquisition, mental architecture, and processing in typical everyday expressive and receptive performance situations. Cautious speculation regarding evolutionary origins is suggested by the reliably uniform access to relevant knowledge structures and processing skills, open to all normally developing individuals. To reemphasize, the initial development of these competencies and skills appears to be triggered by exposure alone. In this way both poetry and narrative can be categorized as “primary,” not dependent in their early and incipient emergence on literacy, schooling, or other kind of deliberate training.

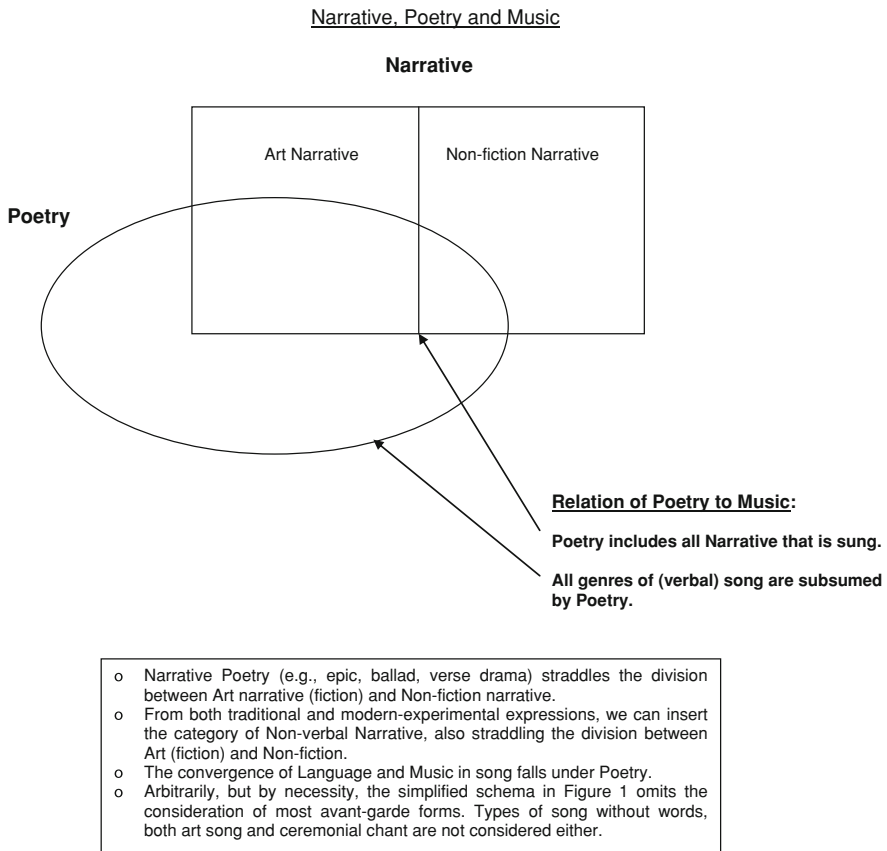
Both the earliest written and surviving oral tradition artifacts evidence highly advanced forms and elaborate organization suggesting at very least a long historical development with deep roots in ancient times. This is the second way in which poetry and narrative can be thought of as “primary.” Thus, origins in evolutionary time, among archaic humans, cannot be discounted.<sup>1</sup> In fact, researchers have engaged these topics along the above-mentioned dimensions (development, cognitive organization and processing, and evolution) with an eye to analogies with other domains of complex ability. Comparing and contrasting in this way suggests ways of understanding how the structures that underlie all complex

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<sup>1</sup> Decisive empirical evidence for evolutionary foundations of music, poetry and other artistic genres is probably forever out of reach. But informed speculation on this problem has an important purpose. First of all, it is not likely that the capabilities in question emerged in a recent historical period, separated from the origin of language and the higher-order cognitive faculties by many thousands of years. Thus, theoretical coherence invites consideration of the different origin scenarios. For example, a hypothesis about the domain-specificity of a module specialized for a given competence should consider at least one plausible account of evolutionary emergence; two or three logical possibilities would be even better. If, say, all evolutionary possibilities that include natural selection as a mechanism can be discarded, the hypothesis for a domain-specific component should perhaps be reformulated. If no plausible evolutionary account of any kind can be proposed, and direct findings from archaeological and population genetics research disfavor it, the claim would appear to be severely weakened. Then lacking indirect neuropsychological and behavioral evidence in modern humans, alternative models that might account for the competence in question should be seriously examined.

abilities are designed and how they come together in skilled performance (in this paper, to include both expressive and receptive aspects).

A model for this discussion will be taken from an ongoing discussion of the same themes as they are related to another art form, music, specifically from Patel (2008), Peretz (2009) and Jackendoff and Lerdaahl (2006). The approach that will be taken from this highly productive exchange has addressed two related ideas: (1) a componential approach allows for comparisons (e.g., from music and language) to determine which subsystems might be shared with other faculties or abilities and which might be specialized (domain-specific); (2) a cognitive faculty can be thought of in terms of a “broad” faculty together with its “narrow” subset, the latter consisting of components that are specialized, specific to the competencies and functions of the faculty. The “broad faculty” in turn will recruit domain-general capacities and processes and specialized resources from other faculties. Musical ability, as we will see shortly, serves as a particularly useful comparison for poetry; see Fig. 1.



**Fig. 1** Narrative, poetry and music

One influential proposal in the research on the cognition of art, which can serve as a starting point for the specific examples of narrative and poetry, is that of Tooby and Cosmides (2001): that the predisposition to engage in artistic activity is based on design features of an evolved psychology of aesthetics. The relevant “cognitive machinery” (p. 9) is specific to the capacity and strong proclivity to participate in imagined worlds, which crucially include art. According to the approach taken by the authors, specialized neurocognitive programs underlie these abilities and motivations, having been selected during an ancestral environment of evolutionary adaptedness (EEA). Involvement in aesthetic experience and the emergence of the knowledge structures that underlie artistic abilities contributed to survival and reproduction among early humans.

Scalise Sugiyama (2001) narrows the hypothesis down to the case of narrative as a possible adaptation: “[Depending] for its operation upon the integration of numerous cognitive mechanisms,... The narrative faculty meets many of the standards of ‘special design’: it is species typical, reliably developing, and exhibits a degree of complexity that is unlikely to have arisen by chance” (p. 222). Encompassing the aesthetic and non-aesthetic domains (in Fig. 1, art <-> nonfiction), the claim is that narrative may have evolved to solve critical information-processing problems. One example would be that this particular language use form lent itself ideally to transmitting fitness-enhancing knowledge. According to this view, the origins of literature can be traced to an early proto-narrative. In this primitive story-telling capability the evolution of the species-specific Theory of Mind (ToM) of early humans, and related pragmatic competencies, would have found an effective medium of acquisition (Carroll 2008).

The proposal for the rise of a “narrative faculty” is particularly opportune, as it allows us to apply the two guiding concepts from the discussion of the faculties of language and music: (1) the broad-narrow distinction and (2) the confluence of shared and specialized components in the execution of abilities. The same concepts should now also apply to a proposal for a “poetic faculty.” The following sections will consider questions currently under discussion in cognitive and evolutionary science:

- What is the nature of a faculty, as opposed to another kind of network of knowledge components and processors; and what is the importance of the criteria of adaptation, selection effected during the EEA, in regard to this difference?
- If not all cognitive structures are specialized, in what sense are some components domain-general?
- If the development of specialized cognitive structures is genetically programmed, how might the development of domain-general structures be the same and how different in this regard?

Before beginning with the research on the discourse forms selected for this review, two points of clarification are in order. Because the particular cognitive science interest in this case is focused on better understanding the component structures of specific abilities, the category of “aesthetics” is too broad for this purpose. Thus, the proposal of a “faculty of art” is not sufficiently well defined to be a useful idea.

Narrative and poetry will then be treated separately. Secondly, that a given domain of knowledge and performance be considered a faculty, that its origins involve a biological adaptation, and that today it might be sub-served by domain-specific modules, or not, are interesting and important research problems. But these problems are independent of whether or not the domain of knowledge and performance in question is fundamental and primitive to human nature.

The following sections will address the three themes outlined in the Abstract, in this order: section “**Narrative**”—narrative development and its cognitive organization, section “**Poetry**”—development of poetic competence and its cognitive representation, section “**Evolutionary origins**”—evolutionary origins of both narrative and poetry. The final section will take up the important question of how cognitive-general capacities might have participated in the formation and emergence of these language-related abilities.

While reference will be made in this discussion to the concept of modularity, no commitment to its validity as a working hypothesis will be required in order to appreciate the main line of argument to be presented regarding the mental architecture of either narrative or poetic ability. In other words, readers inclined one way or another should be able to follow how the respective claims for narrative and poetry unfold up to and including the final section. The reason for this possibility is that, after examining the indirect and partial evidence, such as it is, it will be proposed, as a (new) starting point for further research, that neither narrative nor poetic ability rests upon a foundational core domain-specific component structure unique to either ability network. Thus, a limited and provisional common ground presents itself with investigators who do not find the concept of modularity as well founded. Specifically, the argument will be put forward that the idea of a faculty of narrative, or of poetry, is more useful in an informal or figurative sense, or in the sense of a faculty that contains no component structure unique and specific to narrative or poetry. The common ground is about the importance of better understanding how domain-general competences come to be structured in development and how they came to be part of the cognitive endowment of humans.

## **Narrative**

As was just mentioned, of the many different approaches to the study of narrative, the one that is the focus of attention in this section is on how its component skills emerge in development and how they come to be represented cognitively. In turn, findings from research on these questions suggest lines of theorizing about how they might have emerged in evolution (“**Origins of narrative**” section). An essential backdrop to all of this, often taken for granted as unremarkable, is the possibility that narrative discourse forms are shared among all cultures and speech communities. Anthropologists have yet to uncover one, among the dwindling number of the most isolated localities, in which narrative ability is not acquired. On this note, Everett’s (2005) claim that the Pirahã, an isolated indigenous tribe of the Amazonia, lacks creation myths or any type of fiction of its own is interesting. Tribe members

have been reported, however, to recite passages of stories from neighboring communities, evidence for access to underlying knowledge structures necessary for the narrative use of language. The second part of this backdrop concerns the relationship of narrative to another assumed universal: grammatical competence that underlies language ability. To be more specific, are there non-linguistic underpinnings of narrative, and which aspects of narrative are more language-dependent?

### Early development of story

Data from young children comes from two sources: early recounts of experience and attempts at story production, but more importantly, evidence of comprehension of complex age-appropriate stories. Studies have analyzed responses of children as young as two and a half and three years old. Future methodological advances should allow for systematic sampling of abilities under the second category (comprehension) from even younger subjects with recourse to non-verbal measures.

By three years of age, from simple immersion in children's narrative tradition, robust expressive abilities are widely attested cross-culturally. In recounts of experience (including imagined episodes), temporally ordered memory traces are organized into an event structure. Basic chronology lays the groundwork for the beginnings of coherence in which successively higher degrees of integration and permutation are achieved. A *reduction* of the entire stored memory of actual events is created, abstracted from the original context. Beyond this uniformly accessible rudimentary platform, investigators have described a rapid development of more elaborate and varied types of coherence, including the use of grammatical and lexical cohesive devices, portrayal of characters and their goals and mental states, cause and effect relations, integration of settings and circumstances, and external evaluation by the child narrator. The transition from "interactional" to "transactional conversation" (involving information transfer), and dialogue-dependent scaffolding to independent monologic story construction, again, has been shown to be remarkably continuous and expeditious (Bamberg and Moissinac 2003; Boudreau 2008; Chang 2004). These pre-school developments in narrative parallel exactly the appearance of elementary ToM capabilities and complex syntax associated with the use of mental verbs (de Villiers and de Villiers 2003). Early narrative development is correlated with ToM-related emergence of decontextualized uses of language, tied, as it is, to the construction of hypothetical worlds and characters, and imaginary interlocutors that children invent; see findings of this interesting study by Trionfi and Reese (2009).

Ultimately, it is the line of investigation that focuses on measures of comprehension that will be able to separate out the primitives of narrative ability. If early onset and spontaneous acquisition of implicit knowledge characterize 3- and 4-year-old capabilities, future research might be able to describe the core precursors of narrative in late-infant cognition. A focus on receptive abilities would be the key as these precursors and primitives hypothetically are non-linguistic, falling exclusively within the domain of central conceptual structure (CCS). Even in studies of older children, an interesting dissociation appears between discourse-level structural well-formedness and strictly linguistic indices at the sentence-level

(Berman 2008). Kim et al. (2008) observed a similar separation between oral text comprehension and word-level “basic language skills” that typically predict literacy learning. These findings are interesting because narrative abilities are commonly thought of as being closely language-related. But to be sure, the hypothesis of a non-linguistic core to narrative ability, independent of language, must be taken strictly as a proposal at this stage of the research.

Testing receptive abilities in young children (but old enough to command expressive verbal ability) depends on interview techniques that prompt further recall following independent retelling of a story by the child, presented audio-visually or aurally. Most noteworthy, results from these free and prompted recall studies show sensitivity to causal organization of complex stories with multiple episodes. Children selectively recall events that are structurally important to the coherence of narratives; events with fewer causal interconnections or that are peripheral to the plot of the story are recalled less frequently. Thus, there is a strong tendency on the part of the untutored and preliterate child to construct coherent representations of narratives in which cause-effect relations are given priority (Kim et al. 2008; Lynch et al. 2008). In middle childhood, a different kind of developmental tendency marks the learning of advanced discourse processing abilities tied to academic language proficiency and literacy (Berman 2008; Francis 2006). This aspect of narrative should be considered apart from the issues at hand in this discussion; but clearly the essential antecedents have matured independent of schooling, and much earlier.

### Narrative cognition

This focus on internal mental organization picks up on the idea of dissociations in development from the previous section. Which identifiable component subsystems of narrative ability (a “broad” domain) might be necessary for the construction of chronological and thematic coherence, for example? What, materially, in the mind/brain, might set narrative structures apart from networks that support other kinds of comprehension and expression? Alternatively, might it be still premature to propose that language abilities be decomposed into component subsystems at all?

From informal observation, college instructors are familiar with this research problem when they grade papers of international students who are second language (L2) learners of the language of instruction. Despite frequent and persistent errors of grammar on the first draft, L2 students’ essays are often well organized with all arguments and supporting evidence presented logically and coherently. Conversely, the papers of many native speakers can just as easily show the opposite profile. The dissociation in this case goes “both ways.” In studies that ask whether a competence domain is unique and separable, the result of a one-way dissociation may be suggestive, but in the end it is always inconclusive (in regard to the issue of domain-specificity). For example, if discourse ability consistently shows impairment or inferior development in relation to sentence-level grammar, it cannot be ruled out that both are served by the same suite of sub-skills, the former simply requiring a higher degree of mastery.

Neuropsychological research has applied its methods to this same question. Studies so far suggest that indeed some of the distinguishing component subsystems

of narrative ability are separable from other language-related comprehension and expression abilities. At the same time, however, the evidence opens the door to considering the possibility that none of them are domain-specific modules, specialized for narrative. In a comprehensive review, Mar (2004) summarizes the relevant findings. Of the various studies that examine different kinds of divergence and contrasting imbalance, the cases of double-dissociation stand out. Patients with impairments occasioned by certain patterns of trauma exhibit difficulties in ordering actions, processing script constraints and thematic information, or discarding events unrelated to the plot of a story, while processing of sentence-level grammar remains intact. Separate lesion patterns (e.g., in Broca's area) present an opposite differentiation: severely defective syntax with discourse-related skills spared, a result in line with studies of aphasia in general. Sirigu et al. (1998) reported on the details of these contrasting impairments, on the surface appearing as all related to patterns involving "sequence" in language processing.

The separation between text-level and sentence-level processing is also consistent with theoretical models of discourse and syntax. In a nonspecific or inclusive sense, we refer to "order" and "sequence" of "constituents," in "story grammar" and "sentence-grammar." But the respective patterns and underlying structures are only related analogously (perhaps one day research will show them to be related by biological analogy). Bilingualism, for example, illustrates this nicely. The linguistic competence of each "language" (Navajo and English, French and Spanish, that a bilingual knows) is represented by a separate and independent knowledge subsystem. Conceptual structures and non-linguistic processors (to which we should now add the core components of discourse ability) are stored autonomously, in a single non-verbal domain, shared in common between the language subsystems (Paradis 2004). Commenting on the above-mentioned investigations, Carota and Sirigu (2008) conclude that: "double dissociation on the syntactic and script-related pragmatic abilities is indicative of the involvement of different knowledge domains .... mapped onto different networks (p. 192) ... For example, action sequences would be based on natural cause-effect and means-end relations. On the contrary, word order in language would follow an independent set of rules *specific to language structure*" (emphasis added) (p. 194). In turn, within the network of discourse-related pragmatic abilities, further differentiations appear, for example, between ordering/sequencing skills and selection (for attention) of goal-related events (Mar 2004, pp. 1425–1426). But again, these subcomponents of narrative/discourse ability are separate from the linguistic subsystems and modules of syntax and morphology; they are "mapped onto different networks."

Confirming evidence for the discourse-syntax separation comes from a study of diverse impairments by Ash et al. (2006). The contrast that is of special interest to us is between the disorder of social comportsment and executive functioning (SOC/EXEC) and progressive nonfluent aphasia (PNFA). SOC/EXEC patients are nonaphasic *and* are strikingly impaired in basic narrative proficiency, tied to overall difficulties in deploying "executive resources" and working memory involved in planning and organization. Most interestingly, their difficulty in grasping the theme of a story and inferring narrative cause-effect relations is paralleled by difficulties in organizing and carrying out complex routine non-linguistic tasks in daily life.



Patients with PNFA, on the other hand, suffer from impoverished and error-prone sentence grammar, but on some narrative-related assessments they are “not significantly different from controls, ... their performance on higher-level discourse measures of connectedness is quite good when they are able to describe an event.” (p. 1412). Thus, a strong hypothesis from brain research, coinciding with proposals from behavioral studies of discourse ability, is that the core narrative competencies may be independent of language. In neuroimaging studies the same activation patterns show up when subjects are asked to process both pictorial sequences and stories presented linguistically (Gernsbacher and Kaschak 2003). This hypothetically non-linguistic core of narrative ability may be supported by a diffusely distributed network of components related to organizing mental representations of experience, planning and executing ordered formations of different kinds, reflection upon and prediction of event sequences, and thinking about how ideas in general are related to each other. While examples of narrative are ideal for studies of discourse ability, for a number of reasons, the problem of whether the skills that have been identified are specific to competence structures of story pattern, per se, is still very much an open question.

## Poetry

As in the previous section, we will attend to the earliest developmental indices in young children and how poetic competence might come to be structured mentally. Speculation on evolutionary origins will be deferred (to section “[Origins of poetry](#)”) so as to combine it with the discussion on the respective claims for narrative. Considering evolutionary origins, the claims will turn out to be different, except for one: the same proposal will be offered for both poetry and narrative in regard to the question of whether or not they were targets of natural selection. Parallel to narrative, it is also safe to assume cultural universality; see Dowker et al. (1998) for discussion. But unlike narrative, poetry maintains intimate and organic ties not only to the universal of language, but to that of music as well.

### Developmental poetics

In comparison to the work on narrative, the research on early childhood poetic development is relatively sparse. But evidence to date points to a parallel emergence, during the same period between ages two and three, of highly productive expressive capabilities animated by limited exposure to positive evidence alone. In what is termed “deliberate language play” by investigators, the precursor of full-blown phonological awareness appears in normally developing children (Inkelas 2003; Joffe 1998). We could think of it as a kind of “implicit unconscious metalinguistic” processing of the sound patterns of language. Attested as early as 2 years 5 months, incipient forms of meta-level knowledge might develop in the realm of poetry even earlier than they do in rudimentary narrative (i.e., right from the start). Importantly, if the research reports are correct, early awareness of phonology is applied to a “primary” domain associated with aesthetic uses of language, independent, in

particular, of subsequent literacy learning. The same would apply to early attention directed at other levels of grammar in: repetition (morphology/syntax), metaphor (semantics) and metrical pattern (prosody). Examples familiar to parents consist of invented rhyming games in which words are partially or totally reduplicated with a fixed onset that substitutes at the beginning of the reduplicant: Minnesota – bota, aorta – bota, stegosaurus – baurus, triceratops – bops, ant – bant (age: 2;5) (Inkelas 2003, pp. 560–561). Extemporaneous early verse is produced by children as young as three years demonstrating both creative use of language-specific grammatical knowledge and cross-language constraints when poetry takes license with the mature adult norms of the grammar (Chukovsky 1925/1963):

Ilk, silk, tilk  
 I eat kasha with milk.  
 Ilks, silks, tilks  
 I eat kashas with milks. (p. 63)  
 The red house  
 Made of strouss (instead of “straws”) (p. 67)

“[Beginning] with the age of two, every child becomes for a short period of time a linguistic genius. Later, beginning with the age of five to six, this talent begins to fade.” (p. 7).<sup>2</sup>

Inkelas argues that the poetic use of language relies on the same parameters that frame variation in the musical patterns of all human languages. In addition, early childhood creation of rhyming patterns reflects a precocious acquisition of adult-like phonological competence. This appears as a strong explanation for child verbal artistic expression that vastly surpasses positive examples provided by experience (for example in the form of “models” that can be “reproduced”). Creative expression of this kind appears, in fact, to be a condition for the development of higher-order language abilities. In regard to the function of language play and pretence, the case is made for verbal art as both an evolutionary adaptation (Boyd 2008) and as a developmental resource (Joffe 1998). Processing capabilities and sensibilities are sharpened by engaging attention in scenarios where grammatical constraints and word meanings are tested along their outer boundaries.

The hypothesis that young children’s response to poetic features of language is based on specific innate dispositions, demonstratable potentially before six months of age, has been proposed from studies of mother-infant communication (Miall and Dissanayake 2003). Calling attention to findings of babies’ preference for infant-directed speech (IDS) over unmodified adult speech, the authors argue that from birth children are sensitive to the metrical and phonological patterns of an elementary aesthetics of language modified to lay emphasis on these patterns. In a description of IDS provided to a eight-week-old child, a number of poetic devices were recorded: a repetitive regulating meter, parallelism, exaggerated contour, well-controlled pitch steps and alliteration and assonance product of the more frequent

<sup>2</sup> A prominent contemporary of the great Russian children’s poet, Vygotsky (1930/2004), also saw in young children’s impulse to deform and exaggerate their representations in play (with the greatest delight derived from the most outrageous excess) a necessary stage in the development of advanced artistic creation and scientific thinking.

repetition of words and phrases. Discourse analyses such as these may support an emotive and early bonding hypothesis for the antecedents of poetry (and music). But it is clearly unjustified to present descriptive and exploratory findings of this kind as part of an argument against the hypothesis of literary arts as a by-product of other adaptive mechanisms (i.e., as *disconfirming* or *negative* evidence). Nevertheless, the authors' overall basic idea of an evolutionary emergence of poetic ability seems to be on the right track.<sup>3</sup>

Miall and Dissayake's proposal for a domain-specific specialization for poetry finds support in analyses of adult written verse. Fabb (2008) begins by differentiating between cognitive-general capacities (e.g., inference based on logical procedures and analogy), and specialized modular components that carry out domain-specific computations. Any given poetic ability would bring together both kinds of cognitive structure in performance. Specialized rules might govern competencies related to literary forms: division of a poem into hierarchically organized sections (lines, stanzas, etc.), assignment of meter to lines of verse, identification of parallelism, and sound patterning of special kinds. Such competencies should be considered as supported by "central [as opposed to 'peripheral'] modules" and as largely independent of (narrowly defined) linguistic competence, although in close interface with the corresponding linguistic modules. These claims for an innate predisposition and modular-type organization of poetic ability lead us now to the next section that considers what this cognitive organization might consist of. They are useful in helping to frame the next discussion even though, as the reader recalls, the concluding proposal for poetic competence in this paper will be different.

### Aspects of poetic competence

In a similar way as in the study of musical cognition (Peretz 2009), research on traditional, early childhood and vernacular poetry should help to keep our focus on essential properties. This refers, of course, to the essential properties of what at the moment, in this paper, we are mainly interested in: understanding the unique abilities that humans possess in the artistic use of language. Beginning in the previous sections with the foundations of narrative and poetic ability in young children frames the problem in the right way for this section, and for the following discussion on evolutionary origins. Narrowing the field in this way is also related to the selection of material that researchers make for analysis. Focusing on the vernacular genres corresponds more directly to the core species-specific endowment

<sup>3</sup> Kotthoff's (2001) idea of the aestheticization of vocal expression of "basic expressions" is strikingly parallel to the ethnographic description by Cuban musicologist Alejo Carpentier (1953/1985) of ritual wailing and conjuration presented in his celebrated novel *Los pasos perdidos* [The lost steps]. The portrayal formed part of his discussion of the theory of a common origin of music and language in proto-linguistic/musical human vocalization (the same origin, we might speculate, is shared by poetry). The intense and deeply felt affective responses of grief and magical communion with the spirit of the moribund Amazonian hunter-gatherer, by the shaman on this occasion, laid recourse to the primal foundations of poetic discourse (in *Los pasos perdidos*, metaphorically, for the first time). "As well in Georgia, cries of grief and appeals to the deceased occur. They are spoken or sung, slowly falling intonation contours with integrated peaks, bowed bodily postures and an expressive lexicon" (Kotthoff 2001, p. 168). For the same ritual escenification, see Carpentier (1953/1985, pp. 182–229).

in each case because the relevant abilities are less likely to have been influenced by intervening factors such as literacy and schooling. The assumption in this discussion, so far, is that an endowment of this kind is a real possibility.

Work in the ethnography of the “proto-aesthetics of communication” has made important advances in applying the above-mentioned approach; see Kotthoff (2001) and other papers in the same volume. In ritual performance, especially, strong emotive impulses are linked to religiosity and verbal/vocal art, providing for the development of metalinguistic abilities specific to poetry, most interestingly, again, independent of schooling and literacy. The analysis of the special features of lamentation speech by Kotthoff offers a compelling example of how the poetic function of language permeates discourse and text types from a wide range of usage.<sup>4</sup> It finds its way into everyday expression where attention is shifted to wording, to special patterns and forms. In the discourse of ritual expression, non-conversational and non-prosaic language patterns violate expectations for the purpose of making the wording itself salient because of its special significance or symbolic value, as opposed to the transmission of information, which normally is not new.

Embedded in narrative presentation, this kind of metalinguistic-aesthetic device also directs attention to pivotal events and mental states or serves as a way of inserting so-called “internal evaluation.” As poetic forms that are more closely integrated into everyday language use or typical oral narrative, we would expect that these vernacular poems (or poetic embeddings in narrative discourse) would tend to deviate from expectations more along pragmatic lines, in comparison to the poetic patterns in composed works. They would deviate in a different way than do the sharper deviations in syntax, for example, more typically found in written poetry. In an autobiographical recounting of a memorable childhood experience, Justino Montiel shifts systematically between prose-narrative and non-prosaic styles throughout his story, illustrating how vernacular art forms emerge from attention to discourse pattern in everyday language use. The day had arrived to leave the family home and move in with his godmother in the city to go to school.

Buscaba a mis padres. Buscaba a mi madre. Buscaba a mis hermanos. Buscaba el pueblo.

[I] looked for my parents. Looked for my mother. Looked for my brothers. Looked for the town.]

...

Me venían las lágrimas, porque me recordaba yo de ellos ¡qué bueno!  
Esos lloridos, ese sentimiento que traía, por una parte, me duró febrero, marzo, abril, hasta mayo.

[Tears came to me, because I remembered them; how good!]

[Those weepings, that feeling that I carried, on the one hand, lasted me February, March, April, to May.]

...

y así duró todo mayo, junio, julio y agosto.

[and in this way it lasted all of May, June, July and August.]

<sup>4</sup> See footnote 3.

...

Era un maestro exigente, pero buena gente para enseñar.

Tenía en su mesa, en su escritorio, piedras; tenía canicas, tenía palitos, bueno, tenía todo.

Y era muy buena gente, pero eso sí exigía mucho.

[(He) was a demanding teacher, but a good person for teaching.]

[(He) had on his table, on his desk, rocks; had marbles, had little sticks, well, had everything.]

[And (he) was a good person, but really demanded a lot.]

...

Sin ninguna pena, sin ninguna vergüenza, sin miedo, vaya, de que me regañara el señor director.

Le contestada yo; le enseñaba yo.

[Without any embarrassment, without any shame, without fear, yeah, that the principal might scold me.]

[I answered him; I showed him.]

Note the recurring parallel/repetitive patterns (e.g., “looked for,” “looked for,” “looked for,” “looked for,” followed by “tears,” “weepings,” “feeling”), and the related use of itemization (two parallel sets of itemized months feels much longer than the prose-narrative gloss “February to August”).<sup>5</sup> In the fourth segment: “demanding teacher-good person” is repeated and inverted, “good person-demanded,” in the closing line. Enclosed by this frame, another series of repetition/enumeration is accentuated by the assonance in: “tenía,” “canicas,” “palitos,” “sí,” and “exigía.” In the resolution of this episode, the repeating pattern of the second line of the fifth segment (“I – him,” “I – him”) recapitulates the now confident and determined tone of the repeating pattern in the first line (the story gets even better; see Francis 2001).

### Analysis of composed written poetry

However, just as in the study of edited narrative, the analysis of published art poetry<sup>6</sup> has contributed to our understanding of how it is structured differently from everyday conversation and other formal genres of the prosaic type. Recall that all reference in this paper to “structure” assumes, as a provisional hypothesis of

<sup>5</sup> According to Navarrete Gómez (personal communication), itemization is a common rhetorical device used in a number of different public registers in the first language of the narrator (Nahuatl), and by bilinguals (in Spanish) in the region of Central Mexico where he lived. For discussion of traditional narrative styles, see Navarrete Gómez (2009).

<sup>6</sup> The difficult distinction between vernacular poetry and art poetry should be taken as roughly analogous to the difference between folk music and concert music, more widely accepted but similarly subject to overlaps and ill-defined boundaries. In this discussion, the former should be taken as poetry that is more likely to be integrated into everyday and culturally-specific discourses, typically not written and edited for publication, or deliberately composed as a separate creative activity to stand alone as a work by itself. Art poetry today is typically a composition that is edited for publication or formal performance, such as a *reading*. As opposed to integration into ritual or other exceptional language use context, it is more likely to be composed as part of a separate creative act by a professional writer or self-identified poet, resulting in the creation of a fixed text (oral or written).

conceptual framework, the formation of corresponding mental representation, cognitive structures (even though we are very far off from a clear idea of exactly what these might be). In fact, it seems from a survey of the research literature that restricting ourselves to the vernacular genres (as tempting as this is for sound theoretical reasons) would present an incomplete picture of verbal artistic ability. At the same time, it is important to keep in mind that poetic forms in their final published texts are perhaps the product of a more deliberate and contemplative creative process than is the case for any other discourse form, oral or written. Therefore, the most interesting problem for us to consider, for now, concerns how poetic discourse structures are processed and perceived by listeners/readers (primarily the former). For example, of the multiple layers of organization and pattern uncovered by professional linguists and literary critics from actual texts, which of them are “mirrored” in receptive structures on-line, so to speak (line by line)? Considering the different populations of untutored audiences as potential informants, we could begin with the sub-group, not necessarily illiterate, that has benefited from an extensive or typical immersion in the poetic tradition of its culture (for some cultures more than others “typical” is “extensive”). Under the category of attention to form without explicit awareness, to which patterns would the listener/reader assign structure, under optimal conditions of performance (especially receptive)? Alternatively, at what level or layer is poetic structure mirrored (i.e., how fine-grained)?

It is unlikely that there would be a complete disconnect between analysts’ schemas (qua “tree diagrams”) and the listener’s “poetic mental grammar.” But this (as in the study of sentence grammar) remains a still very hard empirical question. In any case, it is with this question in mind that we should evaluate the findings from this work. The related research problem important for our overarching topic is whether or not there is a fundamental difference between: (1) poetic ability, at some level or in regard to at least one of the component cognitive domains that comprise this ability, on the one hand, and (2) other discourse abilities. Prose-narrative happens to be the most informative contrast/comparison for evaluating a fundamental difference hypothesis.

In a seeming paradox, poetry presents itself as the discourse form most closely dependent on the grammar, phonology included, of the language of composition (e.g., consider the modality-specific features of sign language verse) while at the same time being the one that most deliberately and radically transgresses the same grammar. As the violation, typically, is not random, this particular and peculiar aspect of poetic discourse continues to be an important research problem in cognitive science-oriented literary studies. In the first place, it is what clearly sets it apart from ordinary language use, including other kinds of text, even in literature. The research problem in this literary dependence-transgression, implemented within different subsystems of language, consists in understanding and describing the constraints that make it non-random. Which components of the faculty of language narrow ( $FL_n$ ) and which components of the faculty of language broad ( $FL_b$ ) must continue to govern verse forms? In regard to  $FL_n$ , the rules of language-specific prescriptive grammar, of course, are not relevant, opening up the field of possibilities to the operation of constraints that are more abstract and general.

Regarding FL<sub>b</sub>, poetry again opens up the field, now to linguistic–nonlinguistic interactions of a special kind, or rather to interactions that (over)exploit existing interfaces selectively. These interactions would, for example, import massively from the nonlinguistic domains. Interactions internal to FL<sub>n</sub>, in turn, (e.g., typical syntax–semantics interfaces) are altered for aesthetic effect, poetry appropriating in this way subtle and not so subtle dissociations between core and peripheral grammar, native and second language competence (see Motokiyu 2005, for an example), and so forth.

In considering all of the alterations and contraventions of literary grammar, it needs to be kept in mind that all composed verse is a creation of poetic *ability*, a complex network of FL<sub>b</sub> and nonlinguistic component knowledge structures and processors in super-charged interaction. Recall that poetry is a performance category in which meta-level manipulation of language patterns is probably taken to a higher level than in any other discourse type. Metalinguistic operations and computations associated with links to extragrammatical domains (both “below” and “above” awareness) are of the same kind that intervene in the deployment of all complex language abilities. But the weightings and proportions, we could propose, are very different, on another scale. For discussion of these points, from other (in large part compatible, I believe) perspectives, see Fabb (2010), MacMahon (2007) and Perlmutter (2008).

Language-specific “verbal-melody” is an important concept in differentiating poetry from narrative and all other types of prosaic and conversational discourse, accounting for why in the case of the latter translation is usually more straightforward. Creative writers and audiences need to shift attention to the linguistic patterns of words themselves, “separating” these out temporarily, to exploit their special melodic and rhythmic properties. Simultaneously, in parallel, conceptual and musical elements are balanced and coupled in verse lines (Ross 2009), in a different way than in the formulation of sentences and paragraphs. These elements are coupled in a more “integrated” way in prose text and conversation (except when poetic patterns are introduced).

In the same vein, Lerdahl (2003) proposed a model for understanding poetic form based on the cognitive domains that language shares with music. The parallels of sound pattern that we perceive and are aware of reflect extensive neural networks common to language and music. An analysis of poetry that makes use of the theoretical categories of musical perception is consistent with this view. For example, prosodic patterns of grouping and stress can be recast into an equivalent musical format (even though in verse there is more variability, as a rule). In both poetry and music metrical patterns consist of “hierarchically related periodicities” (p. 416) inferred from the input. Ordinary speech, in contrast, does not rest upon the shared domains common to language and music to the same degree (e.g., the lack of systematic repetition, and that stress patterns are more irregular, inhibiting the inference of a metrical grid).

According to Lerdahl’s model, component structures shared in common between language and music are: processing for rhythm (durational patterns, grouping and stress—“accent” in music), contour, and timbre. In contrast, the structures specific to the grammar of music are components that govern pitch space. Those unique to

linguistic grammar are: syntax, the syntax-semantics interface, and phonological distinctive features. Because these component structures are largely independent from each other (this allows them to be shared between larger ability systems), they can be selectively impaired. For example, contour (in language, intonation) is separate from tone contrast (e.g., in Chinese); the former is a component of prosody, the latter is a distinctive feature in contrastive phonology. Thus, a speaker of a tonal language, affected by amusia (impaired processing of fixed pitch intervals) may still have intonation (and presumably complete poetic ability) spared, as well as tone contrast in speech. Evidence from studies of brain lesion (Peretz 2009) is consistent with a model of domain-specific and shared structures of this kind, i.e., no self-contained and exclusive network for language completely separate from music, and vice versa.

One way of summarizing the proposal for analyzing poetry in musical terms is to think of it, categorically and exhaustively, as song (as suggested in Fig. 1); the properties of pitch space are omitted when verses are not sung. Overlapping, exceptional and atypical examples, such as ritual chant, traditional and modern sound poetry (see Haverkort and de Roder 2003 for discussion), song without words, and Japanese *Shigin*, a kind of chanted poetry, all support this conception. Metered poetry with systematic timbral repetition (alliteration, rhyme, etc.) corresponds, roughly, to traditional tonal music, modern/avant-garde poetry corresponds to atonal and other non-tonal musical genre.

Important evidence consistent with the model proposed by Lerdahl (2003) of shared and independent domains and consistent with a fundamental difference between poetry and narrative ability comes from a recent study by Tillman and Dowling (2007). Previous investigations by the authors on musical memory (Dowling et al. 2001) prompted the comparison between poetry and narrative. In the study of memory for musical phrases embedded in ongoing instrumental pieces, discrimination between exact target phrases and similar lures (same melodic and rhythmic contour, pitch level or musical texture changed) was strong for short delays and even improved for longer delays. This result contrasted from the well-known rapid decay of verbatim memory for prose-narrative text in relation to recall of paraphrased foils. Tillman and Dowling then compared poetry and narrative to adjudicate between the plausible alternative explanations for the different sets of result: (1) the lack of semantic structures in music, or (2) the difference in temporal organization between music and prose-narrative. If the time course of memory for poetry patterns in a way similar to narrative (decay of verbatim memory), the first explanation could not be discarded. But to the contrary, results from a series of four experiments, each accounting for different intervening variables, consistently supported the second alternative: the features that language *in poetry* shares with music, and *not in prose-prose narrative*, appear to be decisive. There was no decline in discrimination performance in any of the four tests confronting verbatim and paraphrased verse passages. Similar to tonal cadences in music, poetry often marks phrases with recurring closure devices such as alliteration, assonance and rhyme, correlated in turn with organized rhythmic patterns. Rising tension is resolved by a return to relative stability in a similar way. With attention directed to surface patterns of phonological repetition and rhythm, the authors suggest that memory of



verbal constituents, closely linked to these sonorous regularities, is enhanced. Interestingly, the findings from the poetry/prose-narrative study coincide with theories of early oral tradition style regarding the use of the same musical/poetic features, exploited by oral poets as mnemonic resources (Jahandarie 1999).

## Evolutionary origins

Even prior to the emergence of language, it is hard to conceive of archaic humans without at very least a basic platform of pre-narrative ability consisting in the capacity to cognize temporally coherent event sequences. The evolution of basic proto-language ability would suffice to propel this nascent narrative capacity forward. The early rise of an even more advanced narrative capability is entirely plausible, enhanced successively by gradual advances in linguistic competence (Scalise Sugiyama 2005). Regarding the precursor of poetry, we have reason to suspect that its roots can be traced to the same period prior to the emergence of a fully formed language faculty. But despite the possibility that the precursors of narrative and poetry emerged prior to the language of archaic humans, and despite the later historical overlap between narrative and poetry (Fig. 1), we will pursue in this section the hypothesis of separate origins. Narrative would be associated with primitive event structure conceptions and poetry with proto-music. Two proposals for discussion follow: (1) the essential core properties, in embryo, of neither narrative nor poetry were derived from fully formed language; and (2) no modular/separable component structure specific and unique to poetic or narrative ability was the target of natural selection.

### Origins of narrative

Even though, historically, narrative came to occupy a prominent place among the aesthetic genres in all cultures, a reasonable approach to our problem is to trace its evolutionary origins to non-aesthetic functions. For one, the centrality of an evolving social intelligence is widely recognized to be part of the original picture. Capabilities of prediction, cognitive model building, higher-order reasoning, responding to pressures for greater cooperation and competition, favored survival and reproduction. Rudimentary ToM, social mapping related to understanding goal-oriented behavior, cause-effect and chronological relations all helped early humans gain a better understanding of their social world. In relation to all this, narrative-type organization in both information processing for reflection and for communication should count as an important facilitating cognitive resource (Bjorklund and Kipp 2002; Scalise Sugiyama 2008). Where theorists differ is on the question of how much weight is to be given to domain-specific versus domain-general factors in how these capabilities emerged, and how they are acquired and implemented in development by modern-day children.

Recent work by Tomasello and his associates has informed this discussion with their findings regarding possible evolutionary precursors of ToM. Research with non-human primates strongly suggests that their understanding of other's goals and

intentions and perceptions of beliefs may be more advanced than previously assumed. While not demonstrating attainment of higher-order ToM capacities, such as awareness of other's false-belief, chimpanzees nevertheless were shown to be sensitive to perceived inferences of conspecifics (Schmelz et al. 2011; Tomasello 2011). Interestingly, understanding of other's false belief is still difficult for very young children as well. At least some of the above-mentioned capabilities of social intelligence, precursors and contributing participants in the emergence of narrative (according to the proposal in this paper), are not exclusive to modern humans.

Recalling the finding of a double-dissociation between narrative discourse and sentence-level abilities in expression and comprehension, we can understand this separation in the final analysis as a difference between non-linguistic and linguistic foundations, respectively, even though today narrative ability is typically revealed through language use. Indeed, it is a safe assumption to make that during the long period of primate evolution well before the appearance of *Homo sapiens*, ancestral non-linguistic hominids also came to attain relatively advanced information processing skills that prefigured full-fledged narrative-related abilities, even without the participation of a proto-language. These precursors of early human-like discourse capability would have been built from remembered experience and rudimentary episodic memory. Social bonding and competition would have been informed by histories of prior interaction. The processing of memories of event sequences involving agency and intention shaped cognition, not only for social-communicative functions but also for higher-order thinking in other domains, like for time travel in other realms of experience and for decontextualization (Dautenhahn 2002).

Now it should at least be considered that these cognitive foundations could serve not only narrative but other (non-verbal) discourse-related subcomponent capacities as well. Speculation about what these subcomponents might be suggests that the mental resources in question are diffusely distributed and domain-general, not unique to narrative. It is widely accepted that traits (such as competencies that form part of ability networks) subject to the pressures of natural selection, are co-opted to serve new functions. An encapsulated module can be recruited by an ability network not originally forming part of the original faculty or system to which the module "belonged." As abilities evolve to respond more flexibly to changing external and internal conditions, narrowly specific components participate in a greater number of such interactions. This kind of resource sharing, over time, is propagated among previously self-contained systems resulting in a better fit between organism and environment. An example would be the adaptation of a control mechanism such as inhibition (suppression of attention or response to non-relevant stimuli). Perhaps initially useful for monitoring and controlling lower-level social behavior, inhibitory processors come to be modified for use in mentally manipulating event scenarios and ideas, for predicting, attending selectively in the resolution of conflicting information, as in ToM tasks, and so forth. As an information processing mechanism (as opposed to a knowledge/competence component) it becomes an important ingredient of general intelligence (Bjorklund and Kipp 2002; Skowronski and Sedikides 2007). Narrative ability, clearly, requires its participation in the construction of coherent and relevant episodes that in turn are reduced and

organized into well-formed stories. In this instance, verbal narrative would recruit domain-specific modules (e.g., syntax from the FL to formulate sentences) and domain-general capabilities that impose temporal and logical pattern.

On one account, creativity, a foundation of cultural evolution, depends on a capacity for the mental rehearsal of action. Closely tied to narrative-related competences and processors, it requires the activation of interacting action schemata in novel ways, utilizing meaning relationships drawn from context. Pretend play, also closely associated with narrative construction, involves the rehearsal of all different kinds of scenario creatively, and supports in this way the emergence of hypothesis testing and scientific thinking (Vygotsky 1930/2004). Universal to all human societies and exponentially superior to any homologous skill set among other primates, what is posed are innate cognitive-general capacities, appearing as adaptations during the EEA (Carruthers 2009). Hypothetically, they involved adaptations separate and largely prior to fully formed linguistic competence. In line with such a proposal, already established primal narrative-related capacities participated crucially in the early emergence of more advanced competencies (Victorri 2002).<sup>7</sup> This possibility is consistent with the view that conceptual structure, including perhaps most importantly social cognition, provided a critical prior foundation for the evolution of language. The concluding proposal of this section is that all aspects of narrative ability are integrally contained within this foundation.

### Origins of poetry

The working hypothesis that all the discussion so far on narrative ability is converging upon is that its emergence in evolution was supported by the participation of a system of component structures and mechanisms, all of which were, and are today, cognitive-general. But for poetic ability, speculating in equal measure, there is a different course of primitive emergence that we should consider: that originally not all of its nascent subsystems were cognitive-general. The interesting aspect of this proposed difference is that, in a similar way that today there are no “narrative-specific” modules at the core of a hypothetical “faculty of narrative (narrow),” poetic ability is not sub-served by “poetry-specific” component structures either. In both cases, their respective “faculties (narrow),” as is being defined here, perhaps arbitrarily, would be represented by an empty subset. As was already suggested, the core competence structures of poetry might be traced to a common origin with proto-music. To be more precise, what is being proposed here is that the ancestral core competencies of poetic ability are one and the same as proto-music. A strong hypothesis among theorists, in fact, is that this evolutionary

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<sup>7</sup> Functional, or functionalist, accounts of the *evolution* of language in archaic humans present arguments that are plausible and convincing. But the same arguments are not necessarily relevant in all respects to the problem of explaining language *development* in children. The latter is a research problem of ontogeny, the former a question about how the human language acquisition capacity came to form part of the biological endowment of our species. Victorri (2002) is an example where these research problems tend to be confounded.

genesis is shared with early proto-language, plausibly as far back as to the time of a proximal common ancestor of modern humans and *Homo erectus*.

The shared genesis of music and language hypothesis, one version originally formulated by Darwin (1871/1981), conceives of an undifferentiated and holistic communicative capacity that integrated primitive antecedents of musicality and linguistic knowledge. The related logical possibilities (language evolving as a by-product or outgrowth of proto-music, or music as an outgrowth of proto-language) are difficult to clearly differentiate from the common-holistic origin hypothesis. Even an independent-parallel emergence, given the scale of evolutionary time, among other exceptional factors peculiar to conditions of cognitive formation of the period, would have unfolded under the effects of extensive interaction between musical and linguistic competencies, such as they would have been. The nature of the shared properties of the modern fully formed, and today autonomous, faculties of music and language is strikingly remarkable, and points to an original integration/interaction of some kind. A reproductive advantage for individuals who could process information of this music-like/language-like system more effectively, as social bonding came to be more and more critical for survival, favored its advance and perfection over time. In other words, the claim for selective pressures favoring an integrated proto-music/language ability is the same as that for the evolution of a complete linguistic system. Hypothetically, highly dependent human infants, for example, with a capability to “understand” and respond to the early-evolving IDS-type vocalization of caretakers were more likely to participate in “survival-enhancing affiliative interactions.” This capability would have been of immediate survival benefit to them in extremely vulnerable situations, as well as serving the development of overall social intelligence (Dissanayake 2000). Recall, by the way (from section “[Developmental poetics](#)”), the inclination of young children to engage in spontaneous word play that incorporates prosodic features of music/poetry.

That vocal music predominates cross-culturally over instrumental music is in line with the idea that musicality was closely tied to expression via the human voice. Many authors contend that it was emotive vocal expression in particular that was associated with the primary precursors of music. If this view turns out to be correct, the proposal for an identity of musical and poetic origins is greatly strengthened. Speculation regarding the composition of this holistic “musilanguage” stage generally also supports the so-called identity hypothesis. Elements of prosody may have served as an evolving intermediate domain, straddling what would become the core of a true linguistic system, on the one hand, and ancestral gesture-call, on the other. For example, a holistic tonal modality may have contained, in latency, the potential of strictly linguistic tone of the phonological subsystem, at one extreme, “tone-of-voice” of emotive expression, at the other extreme. Intonation/contour for its part still “straddles” verbal discourse and music. Emphatic stress and durational pattern, volume, tempo, rhythm and timbre of an integrated “musilanguage” can be added to intonation/contour as components that would continue to be shared between the co-evolving differentiated systems of language and music upon eventual separation. The proto-musical-language capacity was a homogenous tonal-(rudimentary)lexical system. An expanding lexicon pulls away by gradually

constructing a linguistic grammar to serve the preexisting conceptual structure, both of which diverge the farthest from the emerging autonomous faculty of music. But again, the claim is that the integrated precursor system, heavily weighted toward a dependence on contextual information and prosodic resources, had an adaptive communicative function conferring selective advantage to individuals predisposed to master it (Brown 2003; Burling 2005; Ler Dahl 2003; Mithen 2009).

On most versions of this approach to language and music evolution, the primary foundation of music/poetry became independent of the dedicated linguistic modules of FL<sub>n</sub>, which serve semantics, as this foundation diverged from the domain-specific components of language. The specialized musical vocalization and movement of latently artful ancient ritual appears to have provided music/poetry with the essential performance context for its consolidation as an independent and exclusively human aesthetic capability (Haverkort and de Roder 2003).

For understanding human poetic sensibility, the all-important question of music-language separation, and subsequent interaction, is treated at length by Brown (2000). An interesting distinction is put forward between shared *homologous properties* and *interactive functions*. The homologous properties would be the most basic and essential that poetic discourse (now coming into its own as a free-standing aesthetic capability) exploits from the domains shared between language and music. On the other hand, interaction between the two independent systems (language and music) produces novel forms and hybrid genres. The participation of uniquely linguistic, uniquely musical, and shared domains, in addition to cognitive-general structures, are distributed among new ability networks. “[Divergence] is accompanied by rebinding of music and language in the form of novel functions that evolve parallel to their separation. The emergence of these interactive functions reflects co-evolution of the underlying linguistic and musical systems” (p. 296). Along these lines, an example of an “analogous” parallelism is the similarity between hierarchical organization in linguistic grammar and music grammar. These are two completely distinct kinds of “syntax” that coevolved in parallel, as opposed to the shared domains of common ancestry. Presumably, an interactive function would lay recourse to parallel structures in a different way than in the case of the interfaces involving access to a common underlying cognitive domain. Promising continued neuroscience research, for one, will help us sort out the details of the respective architectures of the two “sister” faculties, shedding light in turn on the evolutionary origins of interactive and “rebound” capabilities like poetry, as it actually emerged as a literary form, bound to language as it turned out.

Returning to the question that was presented at the beginning of this section, it is clear that a hypothetical “faculty of poetry” evolved incorporating a complex network of component structures, some of which arguably are domain-specific. The proposal offered here for discussion is that all of the apparently poetry-specific modules are shared or borrowed from the core of the faculty of music. This idea is related to the problem of how to understand the evolution of cognitive-general capabilities; that not all complex human knowledge and its implementation in performance is subserved by encapsulated and dedicated modules specific to one domain (topic of the concluding section). Formulated in this way, the proposal

appears as a weaker, more defensible, version of the modularity hypothesis; its potential flaw, though, might be that it turns out in the end to be less elegant than either of the polar opposing strong proposals.

## Conclusion

At this point some readers might object to the conception of faculty presented so far as too ill-defined and all-inclusive, for example to the possibility of a faculty consisting of a network of components none of which are unique and domain-specific, i.e., a “broad faculty” with no “narrow faculty” subset components of its own. From another point of view, a different objection might be that proposing no domain-specific modules, or core “narrow faculty,” for either narrative or poetry is insufficient, reducing them in effect to mere “evolutionary by-products” (a non-essential status), not primary and fundamental to human nature. However, cognitive-general capacities are also foundational; and in humans, the scale of their unrivaled power is by all accounts species-exclusive. As such, they also could have been survival-enhancing adaptations, according to the line of argument presented in the previous section. Perhaps domain-general capacities emerged by means of different evolutionary mechanisms than was the case for domain-specific modules, but they came to be biologized just the same. From this point of view, our interest should be in better understanding the design features of narrative and poetic cognition, not so much in what things are called. Conferring, or not, upon an aesthetic genre the “status” of “faculty” is not about promoting or demoting it. Weighing the evidence for or against the evolution of a dedicated and encapsulated core competence subserving a complex ability implies neither augmenting nor diminishing the category of its cognitive organization. The respective claims, pro and con, should also be independent of the questions of innate constraint and universal cross-cultural development in children.

Following the out-of-Africa migration of *Homo sapiens* about 60,000 years ago (possibly earlier by 10–20,000 years), the Old World was rapidly colonized, soon after, the Americas. Within a relatively short period, in evolutionary time, we see the rise of the great urban civilizations around the 5th millennium BCE in southern Mesopotamia, followed very shortly by the same in the Nile River Delta, Indus Valley, Eastern Asia, Europe and Meso and South America by the beginning of the 1st millennium BCE. Spectacular achievements in the arts and literature, engineering and mathematics required the deployment of highly complex creative and analytical capacities, calling upon the extensive integration and coordination of relevant sub-skills and ability networks. Modern humans responded to new problems of adaptation with innovative solutions of the most creative and open-ended kind. Clearly some, if not most, of the later civilizations emerged independently, separate from any cultural influence from the earliest urban centers. This is obviously the case for the New World civilizations. It is then a safe assumption to make that in the common ancestral lineage of these peoples the cognitive organization that supported higher-order information-processing capacities, advanced decontextualization, and symbolic thought had already evolved.

The gathering consensus today in fact is that the origins of the early colonizers of Eurasia, Australia and the Americas can be traced back to a common ancestral line, a single species of the genus *Homo* from which founder populations migrated (DeSalle and Tattersall 2008; Dillehay 2009; Klein 2009).

Restricting ourselves just to the early achievements in literature, art and music, the human intellectual attainment that supported them is unlikely to have been that of a completely (“massively”) modular mind, in the sense of a confederation of narrow faculties composed exclusively of encapsulated competence modules and domain-specific interfaces. Among researchers who accept one version or another of the modularity hypothesis, many view cognitive componentiality in terms of modular structures in coexistence and interaction with (central) cognitive-general structures, a kind of “dual architecture.” This was more or less the original conception in Fodor (1983). Along the same lines, in development, modular domain-specific acquisition mechanisms complement general learning resources. Cognitive-general learning resources seem to be what Tomasello (2011) has in mind in the claim that the qualitative advance for humans consists in the acquisition of “skills and motivations for shared intentionality” (p. 33), advancing over simply understanding others’ goals and intentions. Higher-order ToM, which is species-unique, involves complex inferencing and cooperative reasoning (p. 35). This hypothesis is relevant to the question of whether ToM is subserved by an encapsulated domain-specific module. On Tomasello’s account, among others, the suggestion would be that it isn’t. Following this logic, the concluding proposal here disfavors the view that we should begin with the assumption that cognitive capabilities are componential extensively and exhaustively, in modular capsules forming part of every domain of knowledge and ability.

Non-specific intelligence and domain-general mechanisms are like CCS in that they are “horizontally” interactive, have no fixed proprietary database, and in performance are independent of any single processing task. In language use, for example, they would be readily accessed (shared between language subsystems) in bilingual processing tasks. In the application of open-ended problem solving strategies, information is brought together from multiple sources, evaluated for relevance, and for how it is related to previous knowledge and past experience. Logical and chronological sequences are assembled for solutions that are not preprogrammed in fine detail. What psychologists have dubbed System 2 capacities are marked by controlled processing and selective attention, providing these capacities with greater flexibility over the highly contextualized and automatic System 1. Correlated with general intelligence, we find the more open-ended and heterogeneous abilities. Examples include:

- understanding complex causal relations,
- formulation and managing of goals and sub-goals by constructing mental scenarios that include plans of action,
- reasoning by analogy and analysis,
- context-independent thinking and abstraction (detection of the shortcomings of prior knowledge and contextual information),
- monitoring of inductive learning and experimentation (metacognition), and
- social learning that minimizes costly trial and error.

What is interesting about domain-general faculties and abilities is how they depend on the use of language for their full expression. Interestingly, these higher-order intellectual capacities and learning mechanisms are uniformly attainable/learnable by all normally developing children (even though we recognize variation, within certain limits, in ultimate attainment). A contrast to this class of domain-general capacity would be the type of domain-specific competence of some components of language knowledge. Thus, two different kinds of universal access seem to be involved (related to the System 1–System 2 distinction), an interesting research problem for investigators to formulate more precisely in future work. For all of the above, see Chiappe and MacDonald (2005) for a more complete overview.

Modeling how domain-general ability networks came to be targets of natural selection (or other kind of evolutionary mechanism) appears at first to be more difficult than for closely circumscribed modules. For example, the so-called “frame problem” accounts more easily for the evolution of domain-specific mechanisms—why all competencies and processors are not holistic, integrative and unconstrained (Chiappe and MacDonald 2005). But evolved motive dispositions (EMDs), basic innate biosocial goals (e.g., hunger satiation and safety), also place limits on the potential explosion of alternatives that individuals confront in problem solving. They motivate the formation of flexible strategies that include evaluation of sub-goals and results of past learning (e.g., in tool making). The adaptations in this case responded to problem solving in changing environments and to degrees of unpredictability, a survival advantage accruing to individuals who could adapt opportunistically to shifting ecological conditions. Faced with novel challenges, EMDs help direct attention to relevant skill sets. The objectives and beliefs that they trigger must be acted upon, and the ability to reflect on action plans and their implementation should have been favored during the human EEA. Early communicative abilities, and especially language, ramped up reasoning powers by providing a very useful implement for working memory: a means for bringing up to awareness the outputs of different component structures, modular and non-modular. In all this it should also be kept in mind that complex ability systems are assembled from lower-level building blocks; and that modules did not all evolve as one kind. Both systems and their respective components vary in their openness to experience and learning (the issue of “plasticity”); in reference to the many aspects of creativity, “although human imagination may be limited by biology, biology is pliable” (Carter 2006, p. 142). One possibility is that primitive mechanisms were inherited to then undergo modification, some becoming more encapsulated and domain-specific, and others becoming more interactive and penetrable. An example, mentioned earlier, might be basic inhibition capabilities that were co-opted for controlled processing and other higher-order functions, evolving in this way toward greater applicability (Bjorklund and Kipp 2002; Geary 2005). As an aside, in the discussion of cognitive-general capabilities in this conclusion, readers might have taken note of the many parallels to the components of narrative ability and to speculation about its origins, in “[Narrative cognition](#)” and “[Origins of narrative](#)” sections.



What appears to be a view that is sharply counterposed to this “dual architecture” model is that of “massive modularity,” reflected in the approach of Barrett and Kurzban (2006), Shettleworth (2000) and Sperber and Hirschfeld (2008) for example, and also perhaps in the study by Tooby and Cosmides (2001) cited earlier. But it’s not always clear where exactly the lines of debate can be drawn. One difference of emphasis pertains to the relative weight that might be assigned to domain-specific competencies—how or to what degree “massive” might modularity be under the different proposals. No researcher would deny that in performance domain-specific structures interact with cognitive-general mechanisms of some kind. From this point of view, an ability or a skill set should never be analyzed as *a* module. On the other hand, all discussions of “massive modularity” recognize the importance of the difficult research problem of interactivity, for example in historically “new” abilities such as reading music (performance directly from notation) and written narrative and poetry (not transcription of oral performance). The difference of emphasis issue could then be taken up case by case around the question of interactivity, starting at the level of ability or broad faculty (where both questions actually come up), one specific ability network at a time.

Patel (2008) frames our problem in a useful way by starting with the faculty of language, for which a robust narrow competence core can be assumed, at least for argument’s sake. Evidence for strong critical period effects in L1 acquisition (a “biological cost of failure”), precocious, universal and spontaneous development, a Poverty of Stimulus problem for learners, and selective impairment of specific linguistic subcomponents all point to the formation of neural circuits specialized for language that were shaped by evolutionary pressures.

According to Patel, the case for musical ability is less compelling; Justus and Hustler (2005) argue along similar lines. But again, for argument’s sake, we will accept Jackendoff and Lerdahl’s (2006) claim that at least one of the core component structures of the faculty of music is music-specific, not recruited from other faculties: tonal pitch space. Patel (2008, pp. 402–408) suggests another competence structure unique to music that may have been a target of natural selection: beat-based rhythm processing. Thus, as a concluding proposal for further discussion, it is fitting to reiterate a contrast already suggested. The starting point would be the assumption that not all universally accessible human capacities and abilities are subserved by a dedicated narrow faculty subset of domain-specific structures. To refine this idea, a working distinction, or division, is proposed between:

- the examples of the broad and narrow faculties of language and of music on the one hand, and
- the broad faculties of narrative and of poetry on the other, neither of which would contain narrative- or poetry-specific modules.

Findings from further research on these and other creative capabilities might then prompt us to draw the distinction, or division, further to the left or to the right.

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