

# The body's role in our intellectual education

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## ABSTRACT

Most educational theorizing, and practice, seems to go on as though humans were disembodied brains. While it is indeed the strange distinctiveness of our brains that is of great importance in education, it is also crucial to recognize that these brains are parts of our bodies, and that the distinctive human body remains central to all forms of education. In this paper, we argue that only by attending much more closely to the kind of body we have and how it, in part, constitutes and interacts with our minds will we be able to construct adequate notions of how to educate. We will focus particularly on the body's emotional responses and attachments, musicality, and contribution to humor, along with bodily senses, gesture and communication, referencing, and intentionality. We will explore how these features of our bodies, learned most intensively during our earliest years—though also educable throughout our lives—remain crucial in all future intellectual education.

We explore some of the fundamental tools that are available to us as we grow up, with the kinds of bodies we have, in a modern society. We examine the sense-making toolkit we have available in our bodies and how this toolkit remains important in our future intellectual education. We look also at the toolkit that is available to us when we learn an oral language, and explore how this toolkit is intimately tied to the first toolkit that comes with our bodies. We will also explore the ways we might educate children better by observing how our body's "toolkit" continues to be important during later schooling. We focus only on primary schooling, and consider how this perspective might change some long-held assumptions about how best to educate children in those years.

## Introduction

Most educational theorizing, and practice, seems to go on as though humans were disembodied brains. While it is indeed the strange distinctiveness of our brains that is of great importance in education, it is also crucial to recognize that these brains are parts of our bodies, and that the distinctive human body remains central to all forms of education. In this paper, we argue that only by attending much more closely to the kind of body we have and how it, in part, constitutes and interacts with our minds will we be able to construct adequate notions of how to educate. We will focus particularly on the body's emotional responses and attachments, musicality, and contribution to humor, along with bodily senses, gesture and communication, referencing, and intentionality. We will explore how these features of our bodies, learned most intensively during our earliest years—though also educable throughout our lives—remain crucial in all future intellectual education.

We want to take a somewhat Vygotskian approach to our problem, drawing particularly on Vygotsky's notion of how our intellectual growth occurs by our picking up an array of the cognitive tools that are available in our society and in the local human and natural environments with which we interact. "Cognitive tool" is perhaps not the best term to use for the set of bodily "tools" we bring to bear on early sense-making, but it is the term most commonly used so we will ask our readers only that they understand it in the sense that has been developed in Vygotsky's usage and that of others since and allow for a degree of metaphoric looseness (see, e.g. Vygotsky, 1981, 1997; Wertsch, 1991, 1997).

In this paper we want to explore some of the most fundamental tools that are available to us as we grow up, with the kinds of bodies we have, in a modern society. So while drawing on Vygotsky's ideas, we want to expand them to look, first, at the kind of sense-making toolkit we have available given our bodies and how this toolkit remains of crucial importance in our future intellectual education. We will look also at the toolkit that is available to us when we learn an oral language, and explore how this toolkit is intimately tied to the first toolkit that comes with our bodies. We will also explore the ways we might educate children better by observing how our body's "toolkit" continues to be important during later schooling. We will focus here only on primary schooling, and consider how this perspective might change some long-held assumptions about how best to educate children in those years.

## **Part One**

### The body's toolkit

We will introduce this "toolkit" quite briefly, just establishing the kind of categories we wish to deal with, and giving a paragraph or two elaboration of what we mean by each element of the "toolkit" that we will focus on. Thereafter we will explore how these tools persist as language develops and school begins.

Senses: The inescapable elements of our body's toolkit are our senses—our sight, hearing, touch, taste, and smell, which we value more or less in that order. (We could add others, like balance, proprioception, nociceptivity, attention, temporality, and some others that have been nominated here and there with greater or lesser general acceptance.)

These senses are stimulated in our earliest years, and babies take a particular delight in

games that combine a number of them: plops, clicks, and squeaks that create, then follow, patterns that involve sight, touch, and taste. Our senses are necessary for our initial understanding of the world and allow us to perceive and deal with a certain range and scale of the phenomena of our environments. Several theorists suggest that all of our later meaning-making actually emerges from this initial understanding by means of the body, a point upon which we shall elaborate later. Indeed, many of us do seem to have great difficulty later in life understanding things that are not an extension of these senses. For example, most of us can happily follow Einstein as he invites us along to ride on the back of a light-wave, but lose him sadly when it all dissolves into mathematical formulae and abstractions. Similarly, while we might scoff at the unlamented Taliban education minister of Afghanistan scoffing at the notion that the sun is more than 90 million miles from the earth, because, as he reasonably pointed out, “There is no tape measure long enough to reach it!” we also can feel some sympathy for a person who wants a way of measuring such distances based on familiar senses.

Emotions: A central feature of our bodies’ sense-making toolkit is its emotional nature. These emotions will persist and develop as the most basic orientors and organizers of our cognition throughout our lives; in other words, while emotions are essential to understanding by means of the body, they are clearly not specific to this type of understanding. The way in which we respond to the physical and social world around us depends, importantly, on our emotions: from an early age we experience profound emotional patterns such as expectation and frustration, or satisfaction, of the expectation. These are experienced in our bodies, through such things as loneliness and lack of

comfort, or hunger and satiation, but our emotions allow us to interpret them as fear or happiness.

Indeed the way we interpret events, including our later ability to critically analyse them, will always be shot through with emotions. Delight, distress, elation, horror, satisfaction, anger, compassion, or fear constitute elements of the underlying matrix that shape our responses, and thus even rationality itself. David Kresch coined the neat term “perfinkers” (in Bruner, 1986, p. 69) to highlight the fact that we perceive, feel, and think together. If we recognize the foundational development of our bodies’ emotional core, we will be less likely to see cognition, and cognitive tools, as somehow separate from our emotional lives; however sophisticated our thinking becomes it will always be oriented and shaped by the emotions of the body within which it occurs.

Pattern and Musicality: Stephen Mithen’s *The Singing Neanderthals* has helped to show how profoundly we are musical animals. Our musicality seems a central feature of our body’s toolkit, perhaps, as Mithen suggests, from early in our evolution as modern humans. We walk according to particular patterns that easily lead us to dance, and we sing, and sing together, in ways that are profoundly central to being human. Our bodies seem to be unique in the animal world in the way we recognize, track, compose and respond to patterns in the physical world (including patterns of sound), that seem to have no particular utility to us. This peculiarity of our sense-making seems to give humans in all cultures, and perhaps babies more than anyone, great aesthetic delight.

Rhythm and pattern are recognized in some form by all animals, but humans’ sense of both is rich and quickly “bootstraps” into more complex forms that find expression through all our senses. We look for meaning in patterns from our earliest

years, even when what we see, hear, or touch may be quite random. But we quickly recognize those recurring regularities that give us our most basic understanding of the world we find ourselves in, of its significant patterns of sound, sight, touch, taste, and smell. We begin to construct that uniquely human kind of meaning on the back of these patterned regularities our senses deliver to us.

Humor: Another prominent component of our bodies' toolkit is humor, although, as with the earlier components discussed, humor is, of course, hardly limited to bodily meaning-making. While educators have typically neglected humor, or treated it as some relatively casual frill, the presence of humor in our earliest interactions suggests that its stimulation and development might be profoundly important to us, and consequently should be considered as a constituent of any adequate program of education. It is useful to remember that humor, in many of its forms, is based on incongruity. The intentional interruption of any normal pattern of activity—even if that pattern has just been created for the game—can stimulate a humorous response. The interruption conditions the baby to incongruity. Ability to deal easily and pleasurably with incongruity contributes to flexibility of mind, which is an important component of an educated person. Humor is important for many things, not least the delight it can give to experience, but it has a distinctive educational importance in its contribution to flexible, imaginative, and creative thinking.

Our bodily sense of humor becomes evident in such early activities as the mutual sticking out of tongues, tickling, the hiding and revealing of peek-a-boo, and other forms of pretend that so delight babies and elicit laughter. All our behaviors seems accessible to a sense of humor, both to enrich the experience itself and to recognize it as parts of

contexts that we can also transcend. That is, even in those peek-a-boo games, we engage in a form of behavior while recognizing that the overt behavior is only a part of what is going on. Of course, babies cannot express this, but their positive response and their grasping of the “rules” of such play indicates clear understanding. The fuller meaning, as Mithen suggests, may lie in the fostering of affection and communication; what is happening, again, is only a part of what is happening. In later forms, such awareness develops into a sense of irony, which seems crucial to enriched and flexible thinking.

Mimetic Intentionality: Merlin Donald (1991) argues that mimesis, intentional representations that are invented, is central to early forms of humans’ learning behavior. While numerous other species mimic (or even according to Donald’s categorization, imitate) the physical movements and sounds of other individuals in their community, it is only humans that seem able to combine such gestures or sounds in novel ways, or indeed invent new gestures derived from known ones. For example, a young child might cover her face and bow her head to indicate grief; such types of gestures, involving “a representational dimension to imitation” (p. 169), are not performed by apes and other animals. We use our bodies while interpreting the gestures of others, of course, as well as in inventing novel gestures for communicative purposes. Such types of interactions, Donald argues, “interlock the infant’s growing mind with those of its caretakers and ultimately the broader society” (p. 255).

If you are sitting next to a one-year-old and a cat and you point at the door, the toddler will usually look at the door and the cat will look at your finger. The toddler will also point to things, something the cat, or a chimpanzee, will not do. We very early develop the power to read the intentions of others’ in their actions and anticipate their

reading ours in our actions. We represent the world in the mind, and relate to the external world so composed in the mind, in a way that is unique in the animal world.

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Important for our argument is the fact that very young, pre-language-using children have an understanding of the world. This is not an “animal” perception; it is a distinctively human “take” on the world. It is constituted of how we first make sense with our distinctive human perceptions, our human brain, mind and heart and whatever else our bodies can deploy in orienting themselves. Anyone who has lived with babies as they grow recognizes that development of language does not mark some distinct beginning of that individual person; rather, language allows each individual a new kind of expression. This new expression is profoundly important, but its deployment by each individual person is clearly continuous with that individual’s earlier development. Recognizable and distinct individuals, then, adapt the common language they are initiated into to fit the set of tools they have developed in exploring the world accessible to their bodies.

But yet we also *are* languaged animals from the beginning. As numerous theorists (e.g. Chomsky, 1968; Pinker, 1994) have pointed out, we seem to be hard-wired for language. Though it takes a couple of years for us to get up and running with our language-using community there is a sense in which our preternatural attentiveness to those sounds above all others shapes our consciousness in some degree from the beginning. Even so, the set of bodily characteristics—our bodies’ toolkit—mentioned above, come initially free from language in the way we understand it later in life. But within a couple of years language begins to invade our bodies and our bodies tools

reciprocally invade language. In the following section, we will discuss this mutual invading and explore something of how the body's toolkit influences the development of the toolkit that comes along with an oral language. While we could go on to explore how the body's toolkit influences the toolkits that come with literacy and theoretic thinking, because our immediate purpose is to see how important it is to recognize the bodily bases of our later cognition, in some fairly simple and explicit ways not much attended to in primary (or later) education, it will be enough at present to connect the previous set of tools with a related set we can identify as the toolkit of oral language.

The toolkit of oral language includes such things as story structuring and recognition, metaphors, abstract binary opposites, rhyme, meter, and pattern, jokes and humor, forming images from words, and the sense of mystery. We will describe each of these below, indicate why they are reasonably considered significant components of the toolkit of oral language, and show how they are in turn shaped by the body's toolkit.

All these categories are attempts to identify features of our developmental profiles that are not much explored either in psychology or education. The kind of category we are trying to bring into focus is one that is, we believe, better suited for educational purposes than those that are more familiar from psychological theories, whose extrapolation to education seems to us to have nearly always been unsuccessful. This is not an argument to pursue here, but is simply an attempt to account for the unusual features of our main "tools." The complexity of human development is such that these crude and general categories are inevitably imprecise so it would be a mistake to assume that each of the previous tools will morph in some direct way in the tools we will explore in this section. Indeed, these are fairly general categories, and not very well sorted into a

coherent set; story, metaphor, and binary opposites, for example, may seem to be at different “levels” or, at least, are not, apparently, items of the same set. So we should not expect any simple and direct movement from, say, our senses to our use of metaphors even though we will be suggesting there are important connections. Even in the case of bodily humor and oral jokes, the connections are far from simple, and bodily humor slops over in ways that bits could be picked up by other oral language tools, such as rhyme, or stories. While one is wise to remember that there isn’t anything simple or straightforward about the way these few categories try to capture some features of the enormous complexity of human development, we will try to clarify, as simply and straightforwardly as possible, these admittedly messy connections.

## **Part Two**

### The toolkit of language

At the very simplest level of language development we can see the strong constraints the body places on language. The unique physiology of our speech organs gives us remarkably more sound options than those exhibited by our primate cousins. We suck air into our lungs and gradually let it seep out and be shaped by the pharynx, the larynx, and tongue to make those commonly accepted sounds that form the basis of human language. We could say that, at least to some extent, the thoughts we have are shaped by the amount of air we can pull into and emit from our lungs in one go: generally, this constrains our expression into clauses and sentences. Stephen Pinker (1994) called the sentence a case of syntax overriding carbon dioxide, though we might

more appropriately see the limits of the sentence as carbon dioxide's triumphant determination of syntax.

Indeed, the body may be more central to all later forms of meaning-making, including those that come with oral language, than we are generally aware of. Some anthropologists have suggested that spoken language may have evolved from gesture (Mithen, 2005, p. 15); Mithen argues that, even in our complex modern culture, body movement appears to be "crucial to language" (p. 155) and that the use of spontaneous gesture while speaking may be a remnant of the proto-language from which spoken language and music both originated (p. 276). The fact that some words sound similar to the way in which their referents in the natural world look, move or feel (called sound synaesthesia) is another way in which the physical bodies (our own as well as those of others) shape language. For example, in numerous languages, the vowels [e a o u] are used to name large and slow moving animals (like elephants and whales), while the vowel [i] is used in names of animals that are smaller and faster-moving (such as insects and squirrels) (p. 170).

Similarly, Lakoff and Johnson (1980) argue that our language itself evolves from our bodily experience of phenomena and that bodily-based metaphors pervade our understanding of many of the world's most fundamental physical forces and operations. These body-based metaphors provide "a pervasive principle of human understanding that underlies our vast network of interrelated literal meanings" (Johnson, 1987, p. 65.) For example, such simple concepts as up and down may indeed be based in our bodily experiences of the world, so that positive emotions, (such as happiness) and increases in quantity (such as more) go up and negative emotions (such as sadness) and decreases in

quantity (such as less) go down. We subconsciously continue complex orientation and meaning in language from the orientation to the world first established by our bodies in our use of such bodily-based metaphors as “in,” “out,” “force,” “balance,” and so on. These basic concepts, while grasped by individuals in slightly different ways as a result of our particular bodily experience and our emotional responses to that experience, are, of course, somewhat culturally bound, but generally publicly shared and understood by everyone.

Besides these direct ways in which the physical world and our own bodies shape the particular sounds we can make and the words we “choose,” there are other ways in which our bodies shape the understanding we acquire with oral language. For example, we might say that the bodily constraints that shape the sentence also give us the story as the sentence writ large. The relationship between those rituals of expectation and satisfaction the baby experiences from the beginning, such as hunger and feeding, or hunger and not being fed sufficiently quickly and so frustration, then satisfaction, and the thousand variations we all know from the beginning of our experience, can be seen when language develops in the plots of stories. We set up expectations in stories, complicate them, then satisfy them, or fail to satisfy them in more complicated plots. So these bodily patterns of our emotional lives are evident in the shapes of our later stories.

It is not too difficult as well to see clear parallels between the structure of sentences and those of stories. The rules that bind sentences (grammar) create syntax; the rules that bind stories (verisimilitude, etc.) create plot. Or we could say that as morpheme is to syntax, so event is to plot. (For further examples of some of the more subtle ways in which sentences, shaped by bodily constraints, are analogous to the structure and

composition of stories, which also bear the more distant marks of our bodies, see Egan, 1978).

Understanding based on the mediation of binary opposites, as is evident in meaning-making that comes with oral language, also seems to be a development of the kinds of mediation that we employ as part of bodily knowing. As babies, the events of our days are experienced in terms of our bodily senses of security and anxiety, pleasure and pain, expectation and satisfaction, happiness and sadness, and so on. We oscillate from pole to pole, rarely settling for long in the mediating condition between the two opposites. Such binary oppositions provide the basic structure for children's stories, such as *Cinderella*, *Hansel and Gretel* or *Jack the Giant Killer*. These fairy tales are all built on top of powerful, abstract, binary oppositions such as security and anxiety, pleasure and pain, expectation and satisfaction, happiness and sadness, and so on. The body, then, provides a template on which our understanding of stories is fairly directly built.

Similarly, the rhymes, meter, and pattern of language are fairly straightforwardly built on the patterns and rhythms that our bodily awareness of the world establishes, and also on the patterns and rhythms of our bodily wants and needs. When we are pre-linguistic, we gain a sense of the world as involving regularities and patterns of seemingly infinite kinds. These absorb and are absorbed into our languaged perception of the world, so that new tools such as rhyme in language, pattern in numbers, and deliberate shapes and lines in art are built on and can give the same delight as the sense-making patterning of our earliest bodily experience. The fundamental musicality of our physical make-up leads to our shaping sound into the shared patterns of language and

then shaping language to give pleasure as well as to communicate meaning, and sometimes to do both together.

In much the same way as physical rhythm transforms into our language, rhythmed sense of the world, so too do our earliest bodily games and humor give birth to jokes; the physical fun of peek-a-boo becomes the fun of the concocted language of riddles, puns and other forms of jokes. Maybe you heard about the boy who fell into the sea and thrashed around shouting: “I can’t swim! I can’t swim!” A girl stood looking at him from the shore: “So what? I can’t play the violin, but I don’t go shouting about it.” Jokes such as these, which typically delight young children, rely greatly on incongruity. The incongruity that is crucial to the humor of infancy (with a person disappearing and magically appearing again in a new location) now finds a role in the jokes that rely on deliberate misunderstanding, or perhaps misusing, of language. Both in the physical and oral form, familiarity with and use of such incongruity helps develop flexibility and creativity of mind, a capacity that can be furthered enormously by language. (The kind of joke that gives greatest delight changes as we grow older and more particularly as we pick up further toolkits of understanding—so don’t try playing peek-a-boo with a 45 year old on the bus.)

Like humor, the array of images available to our minds, while somewhat limited in our early years, is suddenly enriched immensely by the acquisition of language. We seem unable to not form images as we hear events described in words, and a range of the effects of stories depends, to a great extent, upon listeners’ ability to form images in their minds. We can, of course, treat vivid descriptions as though they are abstract terms, and resist creating images while listening, but it certainly requires effort. Normally images are

brought into the mind seemingly effortlessly. The ability to call up precise and rich images is a unique feature of our minds and is clearly connected with the development of the imagination.

Another tool of language-based understanding whose origin can be found in our bodily engagement with the world is a sense of mystery. When we are babies, the mystery of the world is properly part of our experience: although we may not be able to articulate it, we tend to be absorbed by and delight in the wonder of the world around us and the love and joy that others share with us—or indeed that we elicit in others. This sense of mystery is one of the tools of oral language that we consider more important than seems commonly recognized. The story of Isaac Newton in his later years, praised by his nephew for the numerous and wonderful scientific and mathematical achievements that had won him great fame, poignantly captures the power of the sense of mystery. Newton replied famously that he should more accurately be seen as like a boy on a sea-shore diverted by a prettier stone or shell, while before him the great ocean of knowledge lay unnoticed. That sense of how little we know about the world and our lives in it seems a part of a properly educated mind. With the development of language, such mystery can be represented in various ways in words. Look more closely at the mysterious world of Mother Goose—it is not unsurprising that part of children’s positive response to the stories may be attributed to the sense of a mysterious world that is highlighted.

Consider the poignancy of these examples. “There was an old woman / Lived under the hill;/ And if she’s not gone, / She lives there still.” Why does she live there? How does she breathe? Can we go visit her? Can I live under a mountain? And what’s going on with the protagonist’s pastime in, “Jack be nimble, Jack be quick, / Jack jump

over the candlestick”? Is this is a pastime, or indeed a punishment? What happens to Jack if he is not quick? How about the means of locomotion in “Old Mother Goose, when she wanted to wander, / Would ride through the air on a very fine gander”? Can we try that? How big does a goose or gander have to be before it can fly with a human passenger? Will any old gander do? Is jumping Joan really saying something more significant besides the obvious tautology: “Here am I, little jumping Joan, / When nobody’s with me I’m always alone.” Why is she alone? Is this a good or bad thing or neither or both? And what history is wrapped in: “Lucy Locket lost her pocket, / Kitty Fisher found it; / Nothing in it, nothing in it, / But the binding round it”? Who were Lucy and Kitty? From some accounts, better not to ask. And what about “the little boy who lives down the lane,” or, in some versions, “who cries down the lane” who is not going to get Baa Baa Black Sheep’s wool? There he sits since our childhood, wool-less still, and for reasons we don’t know. Such questions may not be commonly explicit in the child’s mind, but in their questions and enthusiastic responses to such rhymes, we can see the hidden echoes and stimuli to thought that may germinate only years later. The fundamental questions of consciousness itself, and of security, love and belonging that the mystery of babyhood elicits—“Why do I love thee?” and feed thee, and change thee, and sing to thee?—are the beginnings of mystery that remain strong during the kinds of understanding that develop with oral language, and indeed throughout all of later life, if we continue to foster them, rather than allowing them to become atrophied.

We could examine more ways in which our early bodily experience provides templates for our later languaged experience, but the above set should suffice for the purpose of the next section, in which we will consider some of the implications that such

a way of thinking about our earliest tools of sense-making can have on primary education.

## **Part Three**

### Some implications for primary education

The story is one of the fundamental tools for engaging our emotions in establishing meaning. And by “story” we do not mean simply the “once upon a time” kind of story but also the kind we are interested in when we ask a friend, “What’s the story on the your upstairs neighbor’s argument with the landlord?” In this latter case, we are not asking our friend to make up a fiction; we are asking them to lay out the facts in a way that highlights their importance and emotional impact. This is the kind of “story” we read all the time in newspapers or hear on TV. We don’t expect the reporter to make up fictions, but rather to bring us the facts about news items in a format that clarifies our understanding. It is this sense of the story that seems to us to have greater importance for primary education than is commonly recognized. Instead of beginning by pondering our objectives for a new unit, we might better ask first, “What’s the story on this topic?” That is, we begin to organize lessons and units of study by first considering the emotional importance and how this can be brought out clearly to enhance students’ understanding through the use of the cognitive tool that is most powerfully able to engage their imaginations in learning.

There are many texts that promote the importance of fictional stories as a part of children’s education. Our point is quite different from this, however. We believe that students’ imaginations will be routinely engaged in lessons if they are “story-shaped.”

Take, for example, the common topic of the butterfly. The story about the butterfly is one of dramatic extremes: from being constrained in its movements to great freedom and constant movement; from being a rather featureless, ugly creature to one of the most beautiful; from being a voracious eater to eating almost nothing; from being monochrome to variously dazzling colors. The butterfly has one of the most dramatic transformations in the animal world. Our lesson will, then, need to work out how to tell this story in all its dramatic extremes. Teachers considering how this might best be done can draw upon the bodily understanding from which the story structure emerges. What expectations can we set up and then later fulfill for the students in their experience of the “story” of butterflies? What activities can they engage in that help them to understand these physical extremes? How can we structure the unit to allow students rich opportunities to understand and represent this story both with their bodies and with oral language?

Generating images from words is one of the powerful cognitive tools that comes along with oral language. Its immense utility was discovered long ago in the creation of shared images and feelings about who “we”—our family, tribe, or nation—are, what we are doing here, and what we are supposed to do for the time we are here. In tandem with the story, this tool provides the conceptual glue that binds societies together and generates their sense of solidarity and identity. Americans learn a story about their country’s founding and identity, and they learn a set of images, with appropriate emotional responses that support the story. Oddly enough, other countries do the same, in their peculiarly different ways—their stories and their potent images tend to leave us cold.

Given the range of social and psychological functions this image-forming tool allows us to perform, it is clearly something we can use in educating and a tool we need, in turn, to educate. That is, when teaching mathematics, science, or history, we need to attend to the images that can make the concepts and knowledge engaging and vivid. We will also be sensible to consider the conditions, apart from frequent use, that will stimulate increasing flexibility and sophistication in use of this tool. You may scan educational textbooks till your brain crumbles and you will find hardly any mention of image generation from words, and no discussion of how teachers can stimulate and develop it. The practice and development of the ability to generate rich and satisfying images helps keep alive the acuity of our bodily senses: when we create powerful images, not only do we smell, taste, touch, hear and see with great specificity, we also feel significant emotional responses to the images we have generated.

Most commonly today we don't simply ignore this cognitive tool; indeed, we almost seem intent on suppressing it. Electronic media, such as TV, movies, video games and the internet, can be great enemies of this tool's development, as they constantly provide images for us and so undermine our capacity to generate our own unique images from words. Rather than foster our ability to create vivid, emotionally resonant images on our own, being bombarded with images may encourage the easy acceptance of stereotypical, often emotionally barren, images. Similarly, giving children storybooks full of illustrations may not be as beneficial as telling them oral stories and allowing them to generate their own rich images in response. Even if a story is told hesitantly or stumblingly, nearly all young children will be engaged more by an oral story told by an adult than one read with many visually attractive illustrations. At least, this is the case

when children have actually heard a story told; sadly, many children today never experience this. They tend to watch movies, or TV, or, at best, have a story read to them while they look at the pictures. Given that many children suffer impoverishment for this tool from the beginning, and its importance in the development of the imagination, we will want to foster it in our primary educational program. (We are not recommending an either/or choice here; some TV and some well-illustrated books can also be beneficial. Our purpose is to draw attention to what is most commonly neglected and of considerable importance in our development of our ability to generate mental images.)

When we begin planning a lesson or unit, then, it might be helpful for teachers to ask, “What emotionally charged images are central to this topic?” The image can communicate a level of meaning with force and clarity in a way that also engages the students’ imaginations. If teaching about the properties of the air, for example, we can focus on how to represent to the students the fact that the “story” here is that the air they think of as empty when they enter a room is in fact full of the most amazing and varied things—radio waves, particles from the sun, dust (decayed human skin, and even decayed fly feces), pollen, and on and on. The emotionally charged image is not built just by showing students pictures of enlarged pollen, viruses or bacteria, but rather by achieving that vivid sense of the air as rich and crowded with more things than we can guess—in contrast to the things we do see and touch when we enter a room, which the students come to realize are really very dull and uniform. By using vivid description, telling stories, and asking children to play with their imaginations while considering the properties of the air—for example by imagining various entities as characters—students can create a repertoire of emotionally powerful images for the unit of study.

Let us consider a further couple of cognitive tools, which are connected, both to each other and to the story. These are children's recognition and orientation to new knowledge via binary opposites, and also their constant use of abstract ideas. We put these together because they seem to run counter to common current beliefs about young children's thinking and learning.

Think of the Grimm fairy stories and their almost universal appeal to children. Each story, just below its surface, has a simple structural element: emotionally charged binary opposites – like courage/cowardice, security/fear, love/hate, good/bad – give shape and provide access to the meaning of the events. The story of *Hansel and Gretel* would be just one thing after another if it weren't carefully structured to attach our emotions of security and fear to the sequence of events. The story plays with those emotions and their interactions and conflicts. How fearful that the children should be hungry and lost in the forest; what a relief that they find an edible cottage and are invited in; how fearful that the wicked witch . . . In educational settings, we will want to abstract this feature of binary structures to use it in teaching algebra, history, or whatever.

A part of the folklore of educators at present, which has long bewildered us, is that young children are "concrete" thinkers. Now clearly this idea captures something about the way young children's thinking differs from adults; but it is generally taken to mean that young children therefore can't understand abstractions, among other intellectual deficiencies they are presumed to labor under. The trouble with such folklorish beliefs is that they tend to prevent those who hold them from seeing children except through those beliefs. But consider the foundations of those Grimm fairy stories – security/fear, courage/cowardice, good/bad: what more abstract ideas have you ever

learned? Think also of the characters – they are not people in any rounded sense but representatives of beauty, simplicity, greed, terror, goodness, and so on. That is, it's not just the underlying structure of the story that rides on abstractions but the characters as well embody abstractions.

Young children do not usually explicitly identify theoretic abstractions, but their own thinking is constantly suffused with abstractions. Indeed it seems to make better sense than to claim that young children are “concrete” thinkers to claim that they make sense of the “concrete” better when it is tied to underlying abstractions. It is the abstractions – love, hate, fear, security, anxiety, good, bad – that are more profoundly known and pervasively used in their thinking. Our educational program, then, will be sure to draw on, to stimulate, and to elaborate children's use of abstractions. These emotionally-charged abstractions are clearly another cognitive tool we will sensibly try to develop and use in curriculum selection and delivery.

The Grimm fairy-tales, children's games, and most of what engages young children's imaginations are built on abstract, emotionally-charged binary-opposites. And if early schooling is to introduce children to the great stories and games of our culture—our history, science, mathematics, literature, and so on—we would surely be a little dense to ignore the structural feature we can see in all those other areas of their spontaneous engagement. Again, it might take a little ingenuity to see how to present mathematics and history in such terms, while ensuring they do not falsify what we want to teach. But only a little ingenuity is required and the rewards in terms of children's understanding can be enormous.

As time, experience, and education, continue, children learn to mediate between the opposites that provide their first grappling tools on knowledge. We each learn to build a conceptual world between the extremes—between the ideally good and bad, the totally secure and dangerous, the infinitely courageous and cowardly. Education becomes a process of elaborating that conceptual middle world to more adequately reflect in language the world we experience. But our adult recognition that the binary terms we begin with are not adequate representations of the complex reality should not lead us either to fail to recognize or deny their utility in the earliest attempts to grapple with areas of knowledge.

It might seem odd proposing the educational value of humor on the basis of it being one of our most fundamental sense-making tools, derived from our earliest interactions with caregivers, then finding an important place in both establishing our social being and easing relationships with others. But our common understanding of its educational application seems restricted to it being simply a personality trait of some teachers who might use it to motivate students to learn. Little is said about its much more profound and important contributions to our developing understanding, for example in developing a richer grasp of language itself. That is, humor should not be seen as some educational incidental, but as an important tool of our sense-making that itself should be a focus of our educational efforts—we should help students develop increasingly sophisticated understanding of humor and its possibilities.

Perhaps you heard about the weightlifter who was visiting town for the games and looking for a room to rent. The landlady said, “It’s three hundred dollars for the week.” The weightlifter responded, “How much is it for the strong?” Did you hear about the lion

that became a cannibal and had to swallow his pride? My uncle has a dog with no legs. I asked, “What do you call him?” He replied, “It doesn’t matter. He won’t come.”

The purpose of our using these jokes (which tend to work better with average six year olds that with educational researchers) is to point out something that is blindingly obvious—young children enjoy a certain kind of joke, and humor is an important part of their lives, unless suppressed by adults for one crazy reason or another. Indeed, this observation seems to have generally eluded educators—at least, as evidenced by shelf-loads of educational textbooks that never mention it.

All the jokes in the earlier paragraph play with language in such a way that, to get the joke, you have to recognize the language game being played; you have to see language as an object on which you can reflect. Language, very much a human behavior, is one of these odd shared behaviors that make culture possible. Becoming conscious of it, and being able to reflect on it, are prerequisites to developing increasingly flexible language use, and that is prerequisite to a huge range of cultural attainments. Developing what is sometimes called “metalinguistic awareness,” which involves seeing language as an object and not just a behavior, is clearly tied to the later development of a wide range of literacy skills and to an enriched flexibility in language use in early childhood. So we would introduce a period in our school day for jokes, in which students would be helped and encouraged to tell jokes, and instructed and helped in inventing their own in small groups. Such activities would add significantly to their ability to shape narratives, to use language more effectively, and in a range of other important linguistic skills. It might also make school considerably more fun. Because it is a tool that enables us to enlarge our

understanding and pleasure in life, and because these are worthy educational goals, humor will be a consistent part of the educational program we are working towards.

The recognition of mystery is another cognitive tool we bring from our earliest consciousness into language. A strange task we have engaged with since we developed oral language involves our struggle to find ways of capturing and expressing in words our experiences and discoveries about the world. Yet, however quickly it may seem to be accumulating, our store of knowledge is pitifully small. One problem with much early schooling at the moment is that the world is presented to children as a kind of vast encyclopedia, of which they are learning the first elementary bits. In many classrooms, the child is situated as a novice being gradually inducted into our vast realm of knowledge. And, of course, this in part captures what early schooling is about. But “science,” for example, is frequently represented as a relatively prosaic accumulation of facts contained in textbooks, and the set of textbooks line up one after the other through to the final years of schooling, and then even bigger ones grind on through college years. The world, in short, is presented to the child as known, and, for the most part, as rather dull: interior opposite angles are congruent, and a thousand other such theorems, without much sense of their human meaning or importance, can weigh down the spirit during the early years of schooling. Where the wonders of math and science should live energetically and fruitfully in students’ minds these are, for many students today, vast and empty deserts.

We noted above Isaac Newton’s sense of his own pitiful ignorance captured by the image of his not noticing the vast ocean of knowledge before him. This image suggests how tiny and inconsequential is what we know compared to what is to be

known. Not foolishly, we congratulate ourselves as a species for bringing more and more knowledge into the bright circle of our recognition. But we too rarely attend to how vast and mysterious is the unknown that extends perhaps infinitely beyond that small circle. We are surrounded by mysteries: not simply in some New Age-ish, sentimental or even spiritual sense, but all we know is, in fact, remarkably fragmentary and insecure. An important part of education is to introduce children to the mystery that surrounds our knowledge even as we introduce them to the knowledge. Behind and beyond the known is a sense of mystery that is crucial to education, and before which it is good to develop the attitude expressed in W.B. Yeats's "Everything we look upon is blest!" Blest in the sense of wonderful, strange, knowable in only limited ways. The point is not to suggest we induce stupor in children's minds about how pathetically little they can learn, and so encourage them not to bother, but rather to show them how precious and how wonderful is the knowledge that we have, with mysterious ingenuity, carved out of the unknown. What a strange adventure!—is the attitude that needs to be shared with children who are embarking on it, and that should infuse primary schooling.

Clearly, there are many ways by which this sense of mystery can be made a part of schooling. Teachers can cultivate their own sense of wonder about the topics they teach; they can encourage students to ponder the mysterious aspects of any subject; and they can be alert for and share stories that invoke a sense of awe, such as that above about the seemingly endlessly curious Isaac Newton. Even when learning simple counting, the idea of infinity can be brought forward for even young children to butt their heads against. When learning about prime numbers, students can be invited to find some pattern in the appearance of primes, and then can be told that this is one of the most persistent

puzzles mathematicians have grappled unsuccessfully with for centuries. Punctuation, such as the ingenious comma, can lead to students being invited not just to learn the rules, but to wonder about how these various squiggles make the page more hospitable to the eye, and they could be invited to invent new punctuation marks that would add to the courtesy that is the heart of punctuation. These different ways of seeing the familiar constantly open up mysteries surrounding our small and insecure space of knowledge.

### Conclusion

By attending to the toolkit for sense-making that comes along with the kind of bodies we have, and then observing how that toolkit blends into, and is changed by, the toolkit that comes along with an oral language, we have been led to a set of principles for primary education that are in some degree significantly unlike those that dominate our schools today. This approach inclines us to see primary aged children as engaged by abstract, emotionally-charged ideas, most especially when they are composed into story structure, and as using and benefiting from the educational application of binary opposites, the generation of images, humor and mystery. (Many more elaborate examples of using such tools in designing lessons and units for everyday teaching can be found at [http://www.ierg.net/teaching/lesson\\_unitplans.html](http://www.ierg.net/teaching/lesson_unitplans.html) and in Egan, 2005.)

These are just a few of the principles for early education that follow from taking more seriously our bodies and their roles in our intellectual education. For a simple initial trawl, trying to make what connections seem fairly apparent and relatively easy to see, we are led to a rather unfamiliar world of primary education. In our view, it is also one that makes much more sense than the experience children so commonly receive today.

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