

biographical and historical dimension, the feeling of a life that only existed in the moment, in the present.

His visual intelligence—his ability to solve visual puzzles and problems—was good, in radical contrast to his profound difficulties with verbally based problems. He could draw and liked drawing: he did good diagrams of the room, he enjoyed drawing people; he “got” cartoons, he “got” visual concepts. It was this that above all gave me the feeling of intelligence, but an intelligence largely confined to the visual. He “picked up” tic-tac-toe and was soon very good at it; I had the sense that he might readily learn checkers or chess.

Joseph saw, distinguished, categorized, used; he had no problems with *perceptual* categorization or generalization, but he could not, it seemed, go much beyond this, hold abstract ideas in mind, reflect, play, plan. He seemed completely literal—unable to judge images or hypotheses or possibilities, unable to enter an imaginative or figurative realm. And yet, one still felt, he was of normal intelligence, despite these manifest limitations of intellectual functioning. It was not that he lacked a mind, but that he was not *using his mind fully*.

It is clear that thought and language have quite separate (biological) origins, that the world is examined and mapped and responded to long before the advent of language, that there is a huge range of thinking—in animals, or infants—long before the emergence of language. (No one has examined this more beautifully than Piaget, but it is obvious to every parent—or pet lover.) A human being is not mindless or mentally deficient without language, but he is severely restricted in the range of his thoughts, confined, in effect, to an immediate, small world.<sup>47</sup>

<sup>47</sup> Or is he? William James, always interested in the relation of thought to language, corresponded with Theophilus d'Estrella, a gifted deaf artist and photographer, and in 1893 published an autobiographical letter from d'Estrella to him, along with his own reflections on it (James, 1893). D'Estrella was born deaf, and did not start to acquire any formal sign language until he was nine (though he had devised a fluent “home-sign” from earliest child-

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For Joseph, the beginnings of a communication, a language, had now started, and he was tremendously excited at this. The school had found that it was not just formal instruction that he needed, but playing with language, language

hood). At first, he writes:

I thought in pictures and signs before I came to school. The pictures were not exact in detail, but were general. They were momentary and fleeting in my mind's eyes. The [home] signs were not extensive but somewhat conventional [pictorial] after the Mexican style . . . not at all like the symbols of the deaf and dumb language.

Languageless though he was, d'Estrella was clearly inquisitive, imaginative, and thoughtful, even speculative, as a child: he thinks the briny sea is the urine of a great Sea-God, and the moon a goddess in the sky. All this he was able to relate when, in his tenth year, he started at the California School for the Deaf, and learned to sign and write. D'Estrella considered that he did think, that he thought widely, albeit in images and pictures, before he acquired formal language; that language served to "elaborate" his thoughts without being necessary for thought in the first place. This too was James' conclusion:

His cosmological and ethical reflections were the outbirth of his solitary thought. . . . He surely had no conventional gestures for the casual and logical relations involved in his inductions about the moon, for example. So far as it goes then, *his narrative tends to discountenance the notion that no abstract thought is possible without words*. Abstract thought of a decidedly subtle kind, both scientific and moral, went on here in advance of the means of expressing it to others. [Emphasis added.]

James felt that the study of such deaf people could be of major importance in casting light on the relation of thought to language. (It should be added that doubt was expressed by some of James's critics and correspondents about the reliability of d'Estrella's autobiographic account.)

But is thought, all thought, dependent upon language? It would certainly seem, if introspective accounts can be trusted, that mathematical thought (perhaps a very special form of thought) can proceed in its absence. Roger Penrose, the mathematician, discusses this at some length (Penrose, 1989) and gives examples from his own introspection, as well as from autobiographical accounts by Poincaré, Einstein, Galton, and others. Einstein, when asked about his own thinking, wrote:

The words or the language as they are written or spoken, do not seem to play any role in my mechanism of thought. The psychical entities which seem to serve as elements of thought are certain *signs*, and more or less clear *images* . . . of visual and some muscular type. Conventional words or other

games, as with a toddler learning language for the first time. In this, it was hoped, he might begin to acquire language and conceptual thinking, to acquire it in the *act* of intellectual play. I found myself thinking of the twins Luria described, who had been in a sense so "retarded" because their language was so

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signs have to be sought for laboriously only in a second stage.

And Jacques Hadamard, in *The Psychology of Mathematical Invention*, writes:

I insist that words are totally absent from my mind when I really think . . . [and] even after reading or hearing a question, every word disappears the moment that I am beginning to think it over; and I fully agree with Schopenhauer when he writes "thoughts die the moment they are embodied by words."

Penrose, who is himself a geometer, concludes that words are almost useless for mathematical thinking, even though they might be well suited for other sorts of thinking. No doubt a chess player, or a computer programmer, or a musician, or an actor, or a visual artist, would come to somewhat similar conclusions. It is clear that language, as narrowly conceived, is not the only vehicle or tool for thought. Perhaps we need to enlarge the domain of "language," so that it embraces mathematics, music, acting, art . . . *every* form of representational system.

But does one actually *think* in these? Did Beethoven, late Beethoven, actually think in music? It seems unlikely, even though his thought was articulated, and issued, in music, and cannot be glimpsed or grasped except *through* it. (He was at all times a great formalist, and by this time had been deaf, and auditorily deafferented, for twenty years.) Did Newton think in differential equations when he was "voyaging through strange seas of thought, alone"? This too seems unlikely, but his thought can scarcely be grasped except *through* the equations. One does not think, at the deepest level, in music or equations, nor, perhaps even for verbal artists, in language either. Schopenhauer and Vygotsky are both great verbal artists, whose thought, it might seem, is inseparable from their words; but both insist it is beyond words: "Thoughts die," Schopenhauer writes, "the moment they are embodied by words." "Words die," Vygotsky writes, "as they bring forth thought."

But if thought transcends language, and all representational forms, nonetheless it creates these, and needs these, for its advancement. It did so in human history, and does so in each of us. Thought is not language, or symbolism, or imagery, or music—but without these it may die, stillborn, in the head. It is this which threatens a Joseph, a d'Estrella, a Massieu, an Ildefonso; which threatens any deaf child, or any child whatever, not given full access to language and other cultural tools and forms.