

The Writing Problems of Visual Thinkers

Gerald Grow

Some people produce characteristic, recurring writing problems as a result of inappropriately applying visual thinking to writing. This paper traces the writing problems of such visual thinkers to three factors: a lack of words, the unimportance of sequence and the presumption of context. Because some gifted visual thinkers have difficulty producing the kind of writing required in schools and colleges, they may become casualties of a form of learning style discrimination built into the educational system. This exploratory paper pleads for better understanding of the thinking processes that produce such writing problems and the development of new ways of teaching writing that directly address visual thinkers.

The Writing Problems of Visual Thinkers

Some people write badly as a result of applying visual thinking inappropriately to writing. The resulting mismatch between visual thinking and writing produces characteristic, recurring writing problems. Some who write this way are accomplished visual thinkers and successful professionals, others are visually-talented students struggling to survive “the verbal bias of schooling” (Olson, 1977b). If teachers recognize that certain writing problems result from a strength misapplied, they may be able to help train the visual thinkers who will be so important in the technologies of the near future.¹

Some visual thinkers do not have difficulty writing. They are able to shift between the mode of visual thinking and the mode of verbal thinking, or to use both at once. Conversely, some writers have learned to incorporate visual thinking into their writing process, into the images of their prose or into the illustrations that accompany their articles. Others appear to specialize in visual thinking without carrying out the kind of verbal thinking required for analytical, expository prose; that group is the subject of this paper. Whenever I refer to “visual thinkers,” understand that to mean “those visual thinkers who have difficulty writing.”

This paper is the result of sustained speculation, based on years of teaching writing, observations of visual thinkers and a review of the literature; it is grounded in a pilot study of three dozen master’s exams written (without editorial assistance) by interior design students and a study of a collection of papers by college undergraduates in architecture. Examples cited in the text come from this study, which I use not as proof, but as illustration of the line of exploratory thought developed here. I trace the writing problems of visual thinkers to three factors: a lack of words, the unimportance of sequence and the presumption of context. Table 1 summarizes the writing problems this paper explains as the result of misapplying visual thinking to expository prose.

Table 1: The Writing Problems of Visual Thinkers

- 1 Naming imprecise or lacking. "The doohickey bollusked up my thingamajig." Broad, vague nouns and adjectives.
- 2 Words as labels for unseen pictures, labels for complex but unexplained thoughts. Effort to label large visual wholes at once, without analyzing them into their parts. Each verbal element seems to refer to more than it says; words have multiple or cryptic, rather than specific, meanings.
- 3 General fuzziness of language. Words imprecise. Connections unclear. Syntax slippery. Words don't seem real to the writer. Has a "You know what I mean" quality.
- 4 Words used in a private and eccentric manner, like decor. When asked, writer might reply, "That's just what I use the word to mean."
- 5 Few active verbs. Passive voice. Unexplained appearances ("there is").
- 6 Imprecise verbs; overuse of "to be."
- 7 Effort to express thought as clustered, stacked, layered, enfolded.
- 8 Descriptions static; not arranged in dynamic sequence.
- 9 Weak transitions and connectives. Parts juxtaposed without being related. Reads like haiku or film script. "Dissolve," "jump cut" and "fade to black" would be appropriate transitions.
- 10 Undefined references: "He did it to them." Dangling modifiers.
- 11 Poor organization. Digressive. Gets lost in detail.
- 12 Weak narrative. No sense of conflict, drama, structure, buildup, climax. Stated, but not well argued. Unconvincing. Bland, even, one-level quality to prose. No main point. Reads like a list.
- 13 Contextless. No introduction. It is what it is; it is not defined by comparison with anything. Attempts to move visual into verbal through description or proclamation.
- 14 Aesthetic indiscrimination: all details are equally important.

This paper skirts a key difficulty — defining visual thinking — by the pragmatic expedient of looking at the writing of students who are successfully engaged in a course of study that is commonly assumed to require the ability to think visually. It also skirts the difficulty of testing for visual thinking by accepting the respective teachers' judgment that the students used in this study all displayed the ability to think visually in the manner required in their course of study. It does not discuss the complicating possibility that visual thinkers who have reached college or graduate school may already have modified their thinking to accommodate the educational environment. This is not an ideal beginning for a study, as it prevents us from facing some rich complexities inherent in the topic, but it was the way I was able to proceed.

For those familiar with it, this paper presents in some detail an alternative to the widely accepted orality-to-literacy explanation of writing problems as presented by Ong, Olson and their followers. It also supports an alternative to the conclusion of developmental thinkers (Inhelder and Piaget, 1958) that non-verbal modes of thought occur early in life and are naturally superseded by verbal literacy and abstract thinking in the teen years.²

The lack of words

Visual thinkers who have writing problems use words in an imprecise sense for the simple reason that words don't matter. The real thought is taking place in another dimension.³

- 1 The man known as the 'Genius' of architects is accredited with the destruction of the 'box' in architecture.
- 2 The designers and craftsmen of this period are also to be attributed with interjecting human comfort and scale as an important feature of the furnishings.
- 3 Since many people come from many parts of the world, the United States is compromised of many people from many nations. [The same writer later calls expulsion from a professional society "dismemberment."]

Words have such little relevance to visual thinkers that they often do not even name the things they talk and write about. They use vague terms like *it*, *this*, *that* and *thing*, along with vague pronoun references — as in this example:

I feel that it is up to the individual designer to decide which is the best direction for him to take. As far as its implications on the profession, it could be a good thing, in that a client may feel more confident in his designer choice for a particular job if he is specialized in that area. On the other hand, it could be negative if a client liked the work a designer did for him on a commercial job and wanted him to do a residential job and the designer refused.

The passage *points* instead of *naming*. Almost nothing is specified: "up to the individual;" "the best direction;" "its implications;" "a good thing;"

“a particular job;” “could be.” Note that the last two him’s in this passage refer to different people — not a problem in a visual thought, but a potential problem in writing that any editor would spot.

Slips of the tongue can betray the visual thinker’s tenuous relation to words. In the middle of a statement, visual thinkers sometimes insert a word which names some object in the room their sight just happened to fall upon, like this conversation in a kitchen: “Yesterday when I was driving to school, the dishwasher overheated and I had to stop at a service station.”⁴

In a conversational pattern I often observe, visual thinkers stop in mid-sentence, stumped for a word: they can see it but not say it. Teachers could accuse such students of not thinking. They are thinking, but their thoughts arrive in visual, not verbal, form.

Absence of analysis

The visual writer’s lack of names indicates the absence of the complicated habit of analysis, comparison, valuation, organization and selective perception that leads one to have words ready to name perceptions and express thoughts — a habit essential to good writing. The thought dates to Vygotsky in the 1920s:

The independent elements in a visual field are simultaneously perceived; in this sense, visual perception is integral. Speech, on the other hand, requires sequential processing. Each element is separately labeled and then connected in a sentence structure, making speech essentially analytical. (1978, 33, his italics)

Naming is an analytical process. We use words so naturally that this thought may not at first seem significant, but it is crucial. Prior to naming, a thinker must carry out a process of analyzing “things” into “component parts” and “relationships” so that distinct concepts exist which can be named. Further, naming requires commitment: To name something is to engage a particular theory of the world as context and to assert, in that context, the thing one names. Merely using a word often commits one to a vast interrelationship of assumptions and values — which is either a road-map or a quagmire, depending on the verbal ability of the speaker. What we name are not things, but the analytical concepts by which we relate to the world. Writing magnifies the analyzing and categorizing functions of the mind: “All writing fosters categorical thinking and analysis, because analysis is built into the very act of writing. Writing is a technology for dividing the world into categories” (Bolter, 1991, 209). And, we add, giving names to those categories.

Every good writer builds and maintains a mental network in which every known word exists in relationship to similar terms, contrasting terms, homonyms, etymological roots, contexts of meaning, dialects, appropriate settings, etc., and where words are related by not only by shades of meaning but by rhythm, rhyme, and reference to history, literature and experience — including non-verbal experience:

Semantic memory is the memory necessary for the use of language. It is a mental thesaurus, organized knowledge a person possesses about words and other verbal symbols, their meaning and referents, about relations among them, and about rules, formulas, and algorithms for the manipulation of these symbols, concepts, and relations. (Tulving, 1972, 385-386).

Drawing upon the rich, dynamic, intricately interlinked vocabulary that they have developed as their “inner thesaurus,” good writers choose words from a wealth of possibilities.⁵ By contrast, visual thinkers often use a word as if they had no choice: It seems to be the only word available. Visual thinkers may use a word as if the word had no opposite, stood in contrast to nothing else, and had no shadings of meaning that differentiated it from similar words. At those times, the visual thinker’s words have a prophetic quality; they seem to come directly from the mind of God and imply that if you don’t understand them, the fault is your own. Lacking a sure sense of how words relate to one another and what those contrasting groups of words mean to other people, visual thinkers may use broad, vague words or they may use common words in an arbitrary, eccentric manner, as if words were colors and they were creatively decorating a room. In this sense, they are more eccentric in word use than are oral thinkers, who gravitate to socially-shared meanings.⁶ When asked about such usage, visual writers tend to say something like, “Oh, that’s just what I use the word to mean,” as if words, like colors, had no public meanings but could be freely redefined to express the private purposes of the author. Visual thinkers sometimes treat language like decor.

Words as labels of unseen pictures

The words of visual thinkers often make more sense if you consider them not as the exposition of a verbal, logical idea, but as labels for unseen pictures. Such thinkers may use a few key words repeatedly, without elaboration, as if each word contained and powerfully expressed a complex thought in its entirety. The reader, though, sees only the words and does not have the writer’s mental pictures that are necessary to convey the real meaning. The words are cryptic. The best visual writers are mysterious and evocative; the worst are simply incomprehensible.

Often, simple grammatical errors take on a different meaning when considered as products of misapplied visual thinking. Consider the misuse of “it” in the following sentence:

Open office systems have too many demonstrable advantages for any employee not to consider it favorably.

“It” would normally be considered a simple error in number that fails to match the plural “systems” with its proper referent “them” (rather than the singular, “it”). Seen as the writing of a visual thinker, however, “it” makes sense when understood as referring to an “it” that is an unspoken, visualizable unit of thought that stands for something like: “the process of making the change to open office systems.”

Fear of words

Lack of words and lack of the analytical process which makes words available may not be a defect, but a deliberate achievement. Because words interfere with many nonverbal processes, some nonverbal thinkers fear them. Impinged upon by language, a visual thinker (or dancer or potter or painter) may feel like the caterpillar who could not walk for thinking about it. Words alone may not be the problem so much as words that trigger an invasive analytical consciousness which imposes combative categories upon activities which function much better as un verbalized skills or feelings. Nonverbal thinkers may fear the very states of mind that Ong, in a bittersweet moment, attributes to fully-developed literate thinking:

- Writing... is a particularly pre-emptive and imperialist activity that tends to assimilate other things to itself. (Ong, 1982, 12)
- Writing introduces division and alienation. (179)
- Moving into the exciting world of literacy means leaving behind much that is exciting and deeply loved in the earlier oral world. (15)
- The spoken word forms human beings into close-knit groups... Writing and print isolate. (74)
- Writing separates the knower from the known. (105)

Given accounts like this, perhaps we should all fear the consequences of a hyperliteracy that has not been “properly interiorized” so that it “does not degrade human life but on the contrary enhances it” (Ong, 1982, 83). Persons whose natural nonverbal talents and worldly skills can be “degraded” by improperly interiorized verbal, analytical thought have reason to fear having their minds “colonized” by the imbalanced form of literacy emphasized in schools. Such persons might include not only visual thinkers, but mothers, artists and craftspersons, kinesthetic male first-graders, inarticulate persons with highly developed interpersonal sensitivities and others.

Many people prefer to deal with their crafts or relationships intuitively and do not like to talk about what they do. Indeed, some activities, perceptions and kinds of thinking may work better in the absence of words (Weschler's 1982 biography of American artist Robert Irwin is titled with a quote from Paul Valery: *Seeing is Forgetting the Name of the Thing One Sees*). Visual thinkers work in regions of the mind where words are not essential and may be intrusive (Franck, 1973). They often engage in activities which focus not on words but on such non-verbal values as line, color, texture, balance, proportion, aesthetic experience and the manipulation of objects. Similarly, students of many kinds may resist the full achievement of *school* literacy for fear of losing their preliterate selves — including a sense of innocent wholeness, connection with their culture of origin, pleasurable embodiment in immediate experience, and the simple ability to stop thinking. (Rodriguez, 1981, gives an account of the loss of personal and cultural identity due to education.) In order to gain the trust of such learners, teachers must be prepared to teach them how to keep from being enslaved by the specialized analytical thought processes that (as Ong has vividly described) are so greatly empowered by writing.

This conclusion harks back to Arnheim's plea for an larger role for art in education (1969, 3) and goes against the current idea (implicit in Ong, Olson and many other writers about literacy) that students must give up the perceptual richness of their local culture to achieve the peculiar analytic isolation of high literate culture. Surely we should be seeking a way, after 300 years of the widespread use of tightly logical expository prose⁷ and some 2500 years of text-oriented thinking⁸ to domesticate literacy in the service of human wholeness.

Stacking, packing, and enfolding words

Because many elements can appear at once in visual thinking, the visual writer may try to make many elements occur at once in writing — trying to stack words, as it were, on top of each other, layering them, enfolding word within word, thought within thought, the way elements in a picture may be enfolded into one another.

The visual thinker may try to network words multidimensionally, as if a page of print had the capabilities of hypertext or the multiplicity of meanings inherent in dreams and myths. Instead of specifying and defining the subject, the words of a visual thinker tend to radiate out into multiple meanings. Single words may overlap with several different thoughts, expressing none of them separately. In this sense, visual thinkers don't write so

much with words in alignment as *worlds* in collision. The resulting ambiguity does not arise from the absence of gesture or oral context (as the orality argument would have it); it arises as the writer tries to make the newer technology of text work using the older logic of visual thinking.

The result is prose that requires interpretation; indeed, not even the writer has interpreted this prose. Such words arrive on the page like suitcases at the baggage claim: You know there is something in them and they have traveled far, but you cannot tell what the writer means. The words are filled with unstated meaning. They are (the term is Ricoeur's) "packed" and need unpacking. This method of using language, however, is not always a defect; radiantly evocative words have long been the language of myth, mysticism and love. Also, in earlier centuries, educated readers expected to interpret writing on several different levels at once (e.g., literal, allegorical, moral, and anagogical or spiritual), so that multiple meanings were the norm. This was before the era of clear, expository, fully-explicit prose.

Visual thinkers are accustomed to their own kind of interpreting; the very act of visual perception, as Gregory (1966, 1970) and Gombrich (1959) have shown, is interpretive. When oral thinkers leave you to guess at something they have written, it is usually something that would have been obvious had the writing been a conversation. Such is not the case with visual thinkers, even whose spoken words can be mysterious references to visual thoughts invisible to anyone but the thinker.

Writing done in this "packed" manner makes more sense when read as poetry than when read as prose. In a wonderful exercise, Couture (1986, 86) showed that such "elliptical" prose is easier to read when typed as free verse. In that form, the reader does not expect the prose to be fully explicit in spelling out its meanings. The reader expects to interpret, to make connections, to leap across gaps. But when elliptical prose represents itself as explicit prose, it fails to communicate. Students who write this way may fail in the assignment. Many are, I suspect, visual thinkers struggling with the mental technology of writing.

Difficulty with description

One might expect visual thinkers to excel at description. But when visual thinkers have difficulty writing, their descriptions are especially static, unmoving, repetitive and difficult to assimilate, precisely because the visual thinker does not "dramatize" description in the form a narrative, but "stacks" descriptive elements into a pile of details too large to keep in mind at once (this point was argued by Lessing in 1766).

Readers can grasp only a few unrelated elements at once (psychologist George Miller reached the well known conclusion that we can remember five, plus or minus two, unrelated items). But in a picture, say, of a face, a multitude of separate elements can be expressed within a larger visual whole. Accomplished writers create comparable wholes — they call them “narratives,” “story forms,” “theories,” “logical progressions,” “outlines” or “organizing metaphors”— inside which a large number of distinct elements become comprehensible because they are related to a central pattern. Visual thinkers, accustomed to unifying patterns of a spatial kind, need to learn to create unifying devices of the kind writers use.

In some cases, the visual habit of thinking in multiple meanings — stacking — may cause the author to unintentionally fuse two words. Some of the resulting words would be quite creative if they were intentional. In what could be mistaken for an error in spelling, for example, one student author discussed how dimmers, timers and light sensors can “illiminate” (eliminate + illuminate) the need for on and off switches. Another visual thinker referred to “affluent” lawyers (affluent + influential). Such “mistakes” indicate enfolded verbal thinking in which the words have not been extracted, made definite and placed in sequential relationships. These people may be thinking clearly, but doing so with images—and with words that have not yet been translated into expository statement.

Problems of Writing in Sequence

Importance of sequence

Sequence is of the utmost importance in verbal thought and writing: “Dog bites man” and “Man bites dog” are fundamentally different statements. In the visual expression of that thought, sequence is irrelevant, yet there can be no confusion about who bit whom: A picture can simply show it and show it all at once. Visual thinking produces whole, patterned expressions such as maps, symbols and pictures. Verbal activity leads to sequences such as narratives and explanations.

We have considered the possibility that visual thinkers may produce certain writing problems because they do not have the deeply developed habit of using words, along with the analytical and organizational skills required to maintain a network of interrelated, named concepts — a mental thesaurus. The next section will explore how visual thinkers show certain characteristic writing problems that appear to derive from thinking in wholes rather than in sequences.

Difficulty with transitions

Visual writers display difficulty in handling transitions and connectives. Because their primary mode of thought is spatial, visual thinkers lack the habit of relating one element precisely to the element that follows it. Juxtaposition — the jump-cut — is the visual thinker's normal mode of transition. In extreme, visual writing sounds like haiku: briefly-evoked scenes abut one another without explanation. One professor described the writing of his artist wife as “jumping from island to island, without traveling down the freeway bridge that connects them.”

Verbal thinkers, by contrast, relate one sentence to another through the use of connective terms like “on the other hand,” “but,” “accordingly,” “previously,” “in conclusion,” “as a result,” “notwithstanding” and so on. They have a sophisticated vocabulary of transitional words and phrases that specify the relationship between thoughts in the sequence and provide readers with signals that activate appropriate interpretations. Verbal thinkers work hard to place their sentences so that relationships among thoughts are either made explicit or strongly implicit.

In writing, visual thinkers use fewer transitions and use them less precisely, than verbal thinkers do. Consider these examples from the writing samples I analyzed:

- 1 A switch to an open office system also introduces a unique flexibility... This flexibility must be incorporated in considering the initial costs of switching to an open office environment. However, not only do you have the flexibility to reconfigure an existing space but consider a move to a larger space or to a new area of the country.
[Revision:] Switching to an open office system is always one of several choices, all of which should be considered in figuring the costs of the switch. Not only could you choose to reconfigure an existing space, you could move to a larger space or even to a different city. In some cases, moving may be cheaper than reconfiguring.
- 2 *Albeit* my apprehension, the readings were surprisingly palatable...

In the preceding examples, “however” was used for “moreover” and “albeit” for “in spite of.” The writer seemed to sense that some transition was called for but did not have even these fundamental transitional words ready at hand. The thought is coherent; the mode of expression, however, shows a weakness characteristic of visual thinkers who do not have a ready command of verbal transitions and connectives, or of the mode of thought that makes those transitions work.

Visual thinkers may have another reason for their difficulty with transitions. In writing, sequence is essential. Thought unfolds over time and many of the tools of syntax and vocabulary serve to control that sequence and interrelate

the sequence of words, phrases and sentences. To the visual thinker, sequence is individual, may be unimportant and is often subordinate to detail and pattern.⁹ To a writer, sequence is as important as the order of dishes at a meal; a carelessly used transition could cause dessert to appear before the appetizer. In this analogy, a visual thought is more like the menu: all possibilities are present at once — and none favored.

Overuse of to be

The visual writer's de-emphasis on sequence leads to the overuse of verbs that juxtapose without arranging. And, since everything tends to happen at once and in present time to visual thinkers, they tend to choose static verbs, the passive voice and heavily depend on forms of the verb "to be."

John Portman designed the Peachtree Center in Atlanta, Georgia. Portman's designs are noted for being in the downtown areas of cities, bringing revitalization to those areas. The Regency Hyatt House in Atlanta was a major development in hotel design. It was the prototype of future hotel design. In this design, Portman took into consideration the human factor and how people relate to their environment. The main features of the Regency Hyatt are: glass elevator cables, extensive use of art and foliage, a central atrium extending the height of the building, sidewalk cafes, and a rooftop restaurant. These design features are seen today in other hotels by other designers.

The writing of a visual thinker is difficult to revise, because you have to make so many guesses about the exact meaning and the relationship between statements. But here is the way a verbal thinker might have written the above passage.

[Revision:] With the Regency Hyatt, John Portman not only helped revitalize a decaying downtown, he set a new standard for hotel design. Designed for people and the way they relate to their environment, the Regency Hyatt looms around a soaring central atrium through which visitors ride in glass elevators — looking down at sidewalk cafes, fountains, works of art, walkways, balconies and extensive foliage — up to the elegant revolving rooftop restaurant. Hotels with these features, built by Portman and his followers, now dominate the skylines of old downtowns around the country.

(Notice how the writerly passage tries to get around using a static list of features—by framing them as seen from a moving elevator.)

The visual thinker's overuse of "to be" leads to subject-heavy, verb-weak sentences in which long noun clauses (the rough equivalent of visualized objects) are loosely strung together with "is." Instead of the dramatic method of "who does what to whom now, and now, and next," the visual thinker tries to infuse prose with a multiple simultaneity that flattens out into "is...is...is..."

How his quote relates while designing a space is that the space should be designed for people to enjoy, to prosper in or relax in.

[Revision:] Portman emphasizes that the interior should be designed as a space where people can prosper, relax, or enjoy themselves.

Weak narrative

A kind of “storytelling” animates the heart of good writing and perhaps, as Fisher (1977) has argued, the heart of all communication. Good writing is inherently narrative and storytelling is the fundamental mode of oral communication (Ong, 1982, 140). In narrative, pieces of thought behave like characters in a story: they move, act, change direction, contrast to others, contradict, set up expectations and fulfill them, make claims, assert truths, argue, conflict and resolve. Good writing is not “statements of fact” so much as unfolding drama of interactive statements that challenge and qualify one another, that expand, surprise, oppose or confirm one another. Good prose is verbal theater which the reader interprets and enacts.

The first example below shows how a good writer dramatizes a point. The second “flattens” the point as visual thinkers so often do; in it, the drama of heightened sequence is replaced by a limp string:

- 1 When the topic of licensing interior designers comes up, the architect bristles for fear that he won't be allowed to design interior spaces any longer. This simply isn't true.**
- 2 The relationship between architects and designers is rapidly becoming more acceptable; once thought of as a threat to them, architects are now realizing designers are a valuable asset. [The misplaced modifier (“once thought of as a threat to them”) further spreads out a conflict that begs to be sharpened, then resolved. Notice the verbs: “is,” “are,” “are.” Even a single strong verb like “bristles” can animate a passage.]

Curtiss (1988) notes that art students typically have difficulty writing about themselves because they see their lives as a whole and do not easily break them into component episodes and sequences that are easy to write about. Unlike oral thinkers, visual writers have difficulty converting their thoughts into narratives. They tend to string thoughts together without any particular order. One thought doesn't follow another or lead to anything; it just *is*. When they use connectives at all, visual writers (like oral thinkers in this respect) favor the “additive” connectives: *and, also, again, furthermore, another* as well as connectives which do not explain how they connect (e.g., “I have already mentioned”).¹⁰ Unlike oral thinkers (who tend to sharpen and exaggerate), visual thinkers often *list* features without taking a position, imposing an order, or presenting an action:

Security is a design consideration not only in residential design for personal safety and property protection, or as generally thought of as in bank's security measures but must also be considered in relationship to every type of public space — malls, airports, parking lots, hospitals, etc.

[Revision:] In any type of space, the designer must consider security. People demand security — personal safety and the protection of property — in a home or a bank. It is just as important in a mall, airport or hospital.

In the habit of seeing everything as related to everything else in a continuously interacting gestalt, visual thinkers have special difficulty writing comparison and contrast:

Specialization, in and of itself, is neither good or bad. In my opinion, it has both advantages and disadvantages. Some narrowing of possibilities, within the broad field of design, lies in the specific skills of the individual. Personally, I think I would make a lousy salesperson, it neither excites or interests me to attempt to persuade people into one product over another.

The passage starts as a comparison of the advantages and disadvantages of specialization, but it abruptly jumps to an unrelated thought, then peters out. As in many of the examples cited in this paper, this one at first appears merely to be "bad writing." It might then be explained as a typical example of a student with "residual orality" failing to write "explicit prose." I am arguing that it also has specific characteristics that result when visual thinking is imposed onto expository prose. The teacher who recognizes this as not just "bad writing" but also as "visual writing" may (as we will consider later) be led to a different strategy of remediation.

Problems of Context

A good writer establishes the context for what is to follow. There are so many contexts in which to interpret experience that unless the writer directs the reader to a specific context, even the meanings of the most ordinary words become uncertain. "Male" and "female" mean something quite different when referring to electrical plugs than when referring to the mating rituals of whales. (Bransford and Johnson, 1972, is the classic demonstration of interpretation by context.) But because visual thinkers can always "see" the context they have in mind, they often assume that everyone else can too. For the visual thinker, context comes with the thought-image in the form of its background and surroundings. Context and image appear together as integral elements of a whole thought — just as the foreground of a painting appears with its background as an integral whole.

In a visual thought, a thing does not gain its reality the way words do, by existing in a network of comparisons, contrasts and shadings of meaning;

it simply appears. It is what it is. Visual thinkers too readily assume that everybody knows the context they are referring to. As a result, visual thinkers can show insufficient regard for setting context, for comparing the present subject to something else that is known, for cueing the reader to activate relevant schemata or contexts for interpretation or for other common methods of introducing topics. Phrases, like pictures, appear out of nowhere — full-blown and mysterious. Like children first learning to talk, visual thinkers expect you to know what context is built into their utterance (“Daddy, doggie!”) Visual thinkers may suddenly continue, without explanation, a conversation you last had a week ago, as if it was still going on; they may begin writing as if you were privy to their previous thoughts. When visual thinkers have writing problems, they tend to omit words that explain context and instead use terms that suggest sudden, unrelated, dreamlike appearances — terms like “there is,” “it is,” “one can see,” “also” and the like.

Many of the visual thinkers whose writings I examined did not introduce the topics they were writing about. They just started writing out of the blue. Others seemed to recognize the need to write an introduction, to establish a context, but did not seem to know how:

What is a Western point of view towards ethics? How about Eastern views? Are there differences, similarities? A good topic to discuss further is how interrelated the two might be... [Notice the verbs: is, are and be.]

Practice in context-setting, then, should be especially helpful for visual thinkers who want to write better. Such writers might benefit from studying how good pieces of writing begin.

Forest and trees

Visual thinkers seem to have unusual difficulty writing so that readers can see both the forest and the trees — main points and supporting details. Two tendencies pull them in opposite directions. On the one hand, visual thinkers have a natural love of detail: Looking at a tree, they may be drawn to the patterns of shadows cast by the tiniest hairs on the veins of the leaves. Seeing so much, visual thinkers get lost in aesthetic detail — a tendency I suspect is exaggerated by most artistic training. On the other hand, visual thinkers think in wholes. They love visual orderliness, balance and proportion. Indeed, if Silverman (1989) is correct, visual thinkers have a cognitive *need* to see the big picture. Given their disposition to gestalts, why do visual thinkers have difficulty organizing prose?

Visual thinkers may have difficulty organizing the details in their writing because they tend toward what I can only think to call “aesthetic indiscrimination.” Verbal thinkers constantly analyze, compare, relate and evaluate. Good writing is fundamentally biased — biased toward a particular point. In writing, the elements of thought are *not* equal. Most thoughts are subordinate to other thoughts and all are subordinate to a single overriding theme. Well-organized prose does not suddenly happen at the typewriter; it is the end result of a long process of analytical perception and a commitment to a particular strategy for sequencing the elements of the thought. Good expository prose grows from a subtle analysis which ranks details so they can be ordered in support of a central theme and expressed verbally. Expository writing is based on a thought process that is, at heart, analytical.

But everything can seem sublimely equal to a visual thinker. Every detail matters, no detail is irrelevant. Visual thinkers tend toward an approach to life that Manfred Clynes called “apreene” — a state of perceptual openness in which they “trust that whatever may come into awareness is worthy to be well received and even treasured” (quoted in Curtiss, 1987, 218).

Perhaps this receptive, non-evaluative attitude is a byproduct of the brain-wave state required for producing vivid visualizations, so that visual thinkers thus gravitate toward a state of consciousness inimicable to the precise use of words. Techniques for inducing more vivid visualization often emphasize such receptivity (e.g., the deep relaxation used in Autogenic Training). Perhaps this mode of thought is more fundamental and “natural” than analytical thinking; perhaps it even leads to more humane and holistic creations. Unfortunately, when visual thinkers have writing problems, this mode of thinking can lead them to become immersed in a flood of ever-changing details of texture, color and form or to space into a wholeness in which everything is intensely real but “there are no words for it.” Then, visual thinkers, inclined to consider each element of perception, thought or writing equal to all others, tend to produce static, digressive prose that lies passively on the page and offers the reader little direction or help.

Summary

Visual thinkers have difficulty organizing expository prose because their preferred mode of thought is even more fundamentally different from the organization of expository prose than oral thinking is. Prose is organized by story, focus, sequence, drama and analysis — none of which is native to the country inhabited by a visual thinker. The writing of a visual thinker is like a map of all the possibilities; a verbal thinker writes like a guided tour.

Discussion

Shaughnessy. All of the problems identified by this approach sound like the familiar problems of “basic writers.” What difference, then, does the present theory make? It leads us to a major conclusion that could have widespread consequences: clashes between nonverbal and verbal thinking could be a hidden factor in the writing problems of many students, even though those problems have previously been analyzed as having other causes. In her widely respected analysis of writing errors, *Shaughnessy* (1977) cites many examples that, from our perspective, sound very much like the byproducts of visual thinking.

For reasons that are not always clear, or the same, writers at this basic level often fail to name the object or person or idea they are writing about... This evasion of the subject entangles the writer in passive constructions or inverted patterns — it is, there is, etc... Subjects tend to be vaguely named: a method of teaching is labeled *this idea*, controversial issues are called certain things, or independent study is referred to as this way... But the favorite word is thing, the all-purpose noun that parallels the all-purpose that of syntax or the all-purpose comma of punctuation. No noun comes so easily or covers such a range of “things. (199; her italics)

What are such writers thinking when writing “thing”?— Probably, they are thinking “thing” with the visual or kinesthetic imagination. Such writing problems might be attributed to “oral” thinking as well, but other errors seem too inward for orality. In another place, *Shaughnessy* describes a problematic passage as having “the quality of a writer’s inner, pre-verbalized thought, not yet shaped for communication” (232). Notice that in using “thought” and “communication,” she presumes that the communication will be in words; I have argued that some thoughts may already be shaped for communication, but in a *nonverbal* medium, and it is their use in a verbal medium that causes difficulty. A number of the errors *Shaughnessy* attributes to “basic writers” could easily have their roots in visual thinking and other nonverbal modalities of thought.

Orality, Literacy, and Visual Thinking. This paper has implications for a second approach to the teaching of writing — the orality-to-literacy model. Some of the central characteristics attributed to “orality” appear in the student writings quoted in this paper, where they are explained rather as characteristics of visual thinking. “Preliterate” thinking may thus not be as intensively oral (sound-derived) as Ong and others insist. Visual, synesthetic and other forms of non-verbal thought may well account for some of the features currently attributed to preliterate orality. Furthermore, visual thinking can continue in force after the acquisition of full literacy as a parallel mode of mind and may not be assimilated by literacy — as orality is thought

to be. The orality-to-literacy model envisions verbal thought replacing other modes as one matures. This paper envisions mature thought as an interpenetration of several different highly developed modes of thought.

Visual thinkers, as described in this paper, have several tendencies opposed to those Ong and his followers attribute to oral thinkers. Because words are secondary to their thinking, the language of visual thinkers may be more private and eccentric than the communal language of orality. Because their primary thought processes are non-sequential, I have proposed that visual thinkers have difficulty with the dominant mode of oral thinkers: narration. And, throughout his analysis, Ong (after McLuhan, I believe) considers the visual to be severely analytical; this paper assumes a more holistic concept of visual thinking (a view also held by many others writing about visual thinking, such as Franck, 1973; Jackson, 1975; McKim, 1972).

This paper differs in another respect from the orality-to-literacy model. Visual thinkers are not necessarily orally competent; some speak poorly and only when required to. Even in a primary oral culture, there must have been inarticulate people; such was certainly the case in my grandfather's time. I have argued that it is important to consider visual thinking as a modality separate from orality. In addition, anyone tempted to adapt the orality-to-literacy transition to visual thinkers should read Brandt (1990) for her critique of the orality approach.

Implications for Research. The theory offered in this paper is a first step toward improving the teaching of writing to visual thinkers — and perhaps to musical, kinesthetic, personal and interpersonal thinkers as well — to use Gardner's (1985) categories. The concept in this paper directs us to improve writing by first identifying the underlying thought processes, rather than assuming verbal thought and working to improve the mechanics of grammar and syntax.

How to teach visual thinkers to write better remains to be determined, though recent research on the teaching of reading and thinking suggest places to begin. In particular, the following seem to me to open important doors: Dixon's remarkable book, *The Spatial Child*; Silverman's (1989) account of the visual-spatial learner; John-Steiner's (1987) study of creative thinking in several modalities, including visual; Clarke's (1990) innovative approach to teaching thinking through graphic symbols; Sinatra's (1986) writing exercises based on an understanding of visual literacy;¹¹ Gardner's (1985) description of multiple intelligences; the revolutionary work by Lakoff (1988) and Johnson (1987) grounding linguistic thinking in metaphors developed from bodily experience, which challenges the fundamental principle of modern linguistics and deconstruction — that signs and semiotic systems are arbitrary — and legitimizes nonverbal activities in the teaching

of writing; recent advances in the teaching of reading, such as instruction in cognitive processes and learning strategies (Derry, 1988/9; Derry, 1990; Jones and Idol, 1990; Jones, 1986); research on the visual representation of ideas (Jones, 1988/9; Armbruster and Anderson, 1984; commercial seminars by Information Mapping, Inc.); the importance of schemata in text and in readers' understanding (Anderson, 1984); and metacognitive cues which signal readers on how to interpret and organize what is being written (Vande Kopple, 1985). Studies of the interrelation among different modes of thought — what Stacks and Andersen (1989) called “intra-personal communication” — may also provide valuable resources for writing improvement, especially if this helps maintain the integrity of nonverbal experience in the face of literacy's power. Non-verbal thinkers may be more emotionally and kinesthetically oriented than verbal thinkers; for them, drama may provide a fruitful link between experience and exposition. Innovative work in progress by Karen Klein and Linda Hecker (first developed for dyslexic students) uses kinesthetic walking-through exercises to help writers organize their stories at the bodily level before outlining them in writing.

Research is needed on how to integrate students with strong visual abilities but weak writing abilities into the college curriculum. Stories from the adult literacy movement show that some individuals can attain high positions without being able to read or write; perhaps some students with visual gifts should be forgiven the requirement of learning to write “college prose.” Special integrative programs may be required which pool students with complementary skills the way those skills are combined on the job — the way editors and art directors work together on publications.

A study could be made of visual thinkers who write well. How have they bridged the gap between visualizing and writing? Do they visualize and then transform the visual images into prose? Do they use frequent illustrations? How do they sequence their visualizations into prose? If they have faced and overcome the difficulties this paper posits, they may have valuable ideas for helping other visual thinkers write better.

Research on visual thinkers is hampered by the lack of a simple, reliable test for identifying them. Silverman, Dixon and Truch identify visual thinkers by analyzing the relations among subtests from the Wechsler IQ battery; but the visual portions of some IQ tests seem to me to prove only that their makers lacked the imagination to see the multiple possibilities inherent in all images. I once thought that a spatial rotations test would suffice (Wheatley, 1978), but while it seems to identify analytical visual thinkers (such as mathematicians and architects), aesthetically oriented visual thinkers do not necessarily do well on it. To label someone a visual thinker still requires a

judgment call. Yet the label is meaningful to teachers of fine arts, graphic arts, graphic design, architecture, interior design, publication design and other forms of visual communication.

Varieties of visual thinking

In this study, visual thinking has been limited mainly to “static imagery,” a limitation not acceptable in more advanced studies of “spatial ability.” There are other types of visual thinking. The analysis presented here and the students studied probably should be considered in terms of “spatial thinking” (Brown and Wheatley, 1990), in contrast to “visual thinking” (such as generating and transforming mental images) or “pattern recognition” (seeing similarities in complex forms). There may be several distinct forms of visual thinking that have distinctly different effects on the dynamics of writing.

Varieties of writing

The “writing” considered in this paper refers to the kind most college teachers would consider desirable (Olson, 1977a): writing to prove that you have learned. But perhaps such highly organized, logically-sequenced, fully-explicit expository prose should be looked upon as an unusual and highly specialized form of human expression. Certainly, stories are more universal than research papers and disorganized, illogical writing is more common than logical, organized writing. Illustrated writing may be more “natural” than writing in words alone.

Perhaps visual thinkers need to learn not to “write” (in Olson’s sense of “text”— logical, fully-elaborated, expository sequences made exclusively of words), but to “communicate” through mixed media. The dominant concept of writing — based on the typographically traditional book format — has been severely challenged by easy interplay between graphics and text that can be found in any well-designed magazine. Fortunately, typography has recently been rescued from the near-invisibility imposed on it by the typewriter. In page-layout software, text can be divided into segments that can be typographically differentiated and arranged into sidebars, boxes, tables, pull-quotes and the like, creating what Bolter called “topographical” prose that is at once verbal and visual. The user of hypertext can go even further and organize prose in a multidimensional non-linear structure (for good discussions, see Tuman, 1992, and Bolter, 1991).

Perhaps writing has been made unnecessarily difficult by the rarely challenged assumption that students should write in a one-dimensional sequence and produce a document composed exclusively of words typed in a uniform typeface. Visual thinkers might learn to write better if they abandoned the words-only typewriter format and composed their thoughts directly onto page-layout programs in which the visual presentation of the material is, from the beginning, an essential part of its meaning.¹² Visual thinkers may be best at communicating complex ideas in forms where words are used to refine and label images, rather than images used to decorate pages of text.

On the other hand (those "other hands" give this topic a spider-like fascination) so many aspects of good writing seem to arise when words are forced to substitute for all other forms of communication (such as gesture, tone of voice and pictures) that, to develop the right mental muscles, good writers may have to wrestle naked with the naked word. The strength of this engagement could be diluted, not helped, by graphics and layout. Learning to write better might even be influenced (as Halio, 1990, suggested) by whether one uses a computer with a graphic interface (such as a Macintosh or Windows) or a computer with a verbal interface (such as MS DOS).

Verbal bias of schooling

This paper arose from a concern with the fate of students who have a gift for visual thinking. The context for this concern is the existing educational system with its bias toward verbal performance and the kind of thinking that results in analytical, expository prose. Some of the writing problems of visual thinkers are almost certainly a byproduct of this narrow educational emphasis. It is like requiring everyone, regardless of body type, to lift 150-lb. weights in order to graduate. Unfortunately, even the literate bias of schooling (to use Olson's phrase, 1977b) does not necessarily produce good writers and there is reason to be concerned that many of our future students, visual thinkers or not, will write as poorly as the students cited in this paper. Some students appear to be pre-literate not due to any special gift, but due to the influence of television and the lack of effective education. Others, impelled by an inner talent for visual thinking, approach writing from a perspective that causes them special problems. And if proponents of visual literacy like Sinatra are correct, visual thinkers will not respond to the kind of writing drill that helps underdeveloped verbal thinkers. Both groups, however, will benefit from learning the importance, specific skills and hard work of communicating, in whatever modality.

Verbal thought reconsidered

It is common these days to read that verbal thought is linear, sequential, slow, located in the left hemisphere, and fundamentally incompatible with spatial thought.¹³ There are other possibilities. The increasing use of subliminal audio tapes suggests that the mind may have the ability to think in complete syntactical units at enormous rates of speed and in several channels simultaneously. One recent experiment suggests that the mind may be able to think a burst of a thousand words as rapidly as it can produce a picture: Korba (1986) estimated that people can think at the equivalent of 4,000 words per minute. It is my hunch that people engage in high-speed, multi-channeled fully-verbalized thinking, as well as simultaneous “multi-tasking” in cryptic forms of verbal thought, nonverbal modalities and integrated forms of thought. Such a concept challenges current ideas about the limitations of “linear” thought and could revolutionize our idea of where writing starts. Current models tend to set visual and verbal thinking against one another, but there may well be a mode in which visual and verbal thinking are deeply intertwined. Such a concept could revive interest in ideas that rarely appear in current research agendas — such as intuition and the creative unconscious.

Limitations of the study

There are problems with terminology in this field — and in this paper. More tentatively than it may sound, I have advanced the idea that visual thinking causes certain kinds of writing problems. But the three problems I have discussed — lack of words, problems of sequencing and difficulty communicating context — may be separable mental conditions that are not necessarily linked to visual thinking. Furthermore, many visual thinkers clearly do not have these problems; and people may have these writing problems without being visual thinkers.¹⁴

I have used the term “visual thinking” to stand for something that has yet to be defined with care, making a broad sketch of a field in which few details are clear. It is almost certain that the kind of mental states I attribute to visual thinking occur in other kinds of thinking as well and those may contribute to writing problems in a manner similar to what I have argued for here. The literature on mysticism, for instance, describes unitary states that are wordless, imageless, utterly holistic and so contextless as to be given names like “cosmic consciousness.” Joel Goldsmith (1959) describes such a state this way: “All that exists in this universe is God ‘is-ing’— Is, Is, Is” (185-6) (Note the verb!) Words, analysis, labels, sequence, syntax, context,

connectives and images all vanish to make room for a state of consciousness that is valuable for certain purposes (Goldsmith is a spiritual healer)¹⁵ but cannot be written, spoken or even visualized. Further knowledge about such states may, by contrast, help identify the actual states of mind at work when visual thinkers have writing problems.¹⁶

Conclusion

The modern world needs strong visual thinkers, but this crucial talent pool is at risk. Students of high visual ability, but low expertise in writing, may produce the kind of writing that makes them sound unintelligent, rather than gifted in a mode of non-verbal thinking. They may then become casualties of what might be seen as a form of learning style discrimination, a prejudice not only against visual thinkers, but against thinkers who are intuitive, kinesthetic, empathetic, holistic, musical, emotional, creative and those gifted with the peculiar insight and compassion of comedy. As Thomas West puts it, “conventional educational practices may be systematically weeding out many of those who might have the most to give” in terms of deep creative thinking on difficult problems in important fields. (245) Unless students such as the ones considered here are identified as having the writing problems of visual thinkers, they may never receive instruction sufficiently matched to their mode of thought that they can learn to write well enough to enter college and graduate in graphic design, interior design, architecture, engineering or other fields in which visual thinking is prized. And what we learn while trying to teach visual thinkers is likely to help us teach many different kinds of writers better.

Endnotes

- ¹ I was not familiar with Thomas West's excellent book, *In the Mind's Eye*, until after this paper was accepted for publication. He shows that many visually gifted creative thinkers (Faraday, Maxwell, Einstein, Yeats, Patton, and others) had difficulties in school because of problems with 'easy' tasks like spelling, speaking, getting organized and writing. He argues that such visual thinkers will be crucial to the creative solution of many complex problems in the future and we must revise education so it does not discriminate against them.
- ² Olson (1977a) suggests that Piaget's "stage of formal thought," reached around adolescence, is actually a byproduct of the kind of thinking developed by "school" literacy, and not an inevitable stage of intellectual growth.
- ³ All assertions in this paper are tentative and exploratory, but in order to keep the prose uncluttered, I have removed most qualifying terms. As you read, add "perhaps," "sometimes," "for some people," "in some way whose limits are not yet clear," and similar qualifying terms.
- ⁴ A Beetle Bailey cartoon parodied the power of the visual over the verbal for such people. To the increasing perplexity of his staff, General Halftrack says, "Gentlemen, there are legs in our maneuver plans. Several hips have developed. We must work on the hair before the launch date." Then the lieutenant gets up to close the door, through which the General can see the legs, hips, and hair of his pretty secretary. (Mort Walker, Dec. 10, 1989).
- ⁵ You sometimes find these analytical relationships called "hierarchical," but I suspect the relations among them are much more intricate than a hierarchy. A thesaurus, however, is probably a good map of the kind of mental organization underlying expository prose.
- ⁶ Ong's important summary of the characteristics of oral thought and expression appears in *Orality and Literacy*, chapter 3.
- ⁷ Olson (1977a) traces the origin of logical, expository, fully-explicit "school" prose to Locke, 1690.
- ⁸ The debate over the effects of literacy is covered in Kintgen, et al. (1988).
- ⁹ Some of the characteristics I attribute to visual thinking bear a strong resemblance to the networks of hypertext described by Bolter (1991).
- ¹⁰ Ong attributes this "additive rather than subordinative" use of language to orality (1982, p. 37), but I posit that visual thinkers use language that way, too.
- ¹¹ Some of Sinatra's excellent exercises are specifically directed to the writing problems attributed in this paper to visual thinkers.
- ¹² Has anyone tried training a group of poets to use the the typographic power available in a good page layout program?
- ¹³ I have avoided using the terminology of "right and left hemisphere" in this paper, partly because "right hemisphere" is a "left hemisphere" term. What does the "right hemisphere" call itself?
- ¹⁴ Linda Hecker reports that some dyslexic students have difficulties finding words or sequencing thoughts without having difficulties thinking visually (personal communication).
- ¹⁵ The nonverbal, even non-imagistic nature of Goldsmith's specialized thought process is emphasized by the title of one of his books: *Beyond Words and Thoughts*.
- ¹⁶ The approach taken in this paper—which could be said to consist of a constellation of poorly-defined terms, hunches developed beyond the evidence, a lack of building blocks based on solid empirical studies, top-down thinking and faith in the value of working out an intuition — is maddening to some researchers. Others, I hope, will find this kind of exploration exhilarating.

References

- Anderson, R. C. 1984. Role of the Reader's Schema in Comprehension, Learning and Memory. In R. C. Anderson et al., eds. *Learning to read in American schools*. Hillsdale, New Jersey: Erlbaum.
- Armbruster, Bonnie B. and Thomas H. Anderson. 1984. Mapping: Representing Informative Text Diagrammatically. In Holly, Charles D., and Donald F. Dansereau. *Spatial Learning Strategies: Techniques, Applications and Related Issues*. Orlando, Florida: Academic Press.
- Arnheim, Rudolf. 1969. *Visual Thinking*. Berkeley: University of California Press.
- Bolter, Jay David. 1991. *Writing Space: The Computer, Hypertext and the History of Writing*. Hillsdale, New Jersey: Erlbaum.
- Brandt, Deborah. 1990. *Literacy as Involvement: The Acts of Writers, Readers and Texts*. Carbondale: Southern Illinois University Press.
- Bransford, J.D. and M.K. Johnson. 1972. Contextual Prerequisites for Understanding: Some Investigations of Comprehension and Recall. *Journal of Verbal Learning and Verbal Behavior*, 61, 717-726.
- Brown, Dawn L. and Grayson H. Wheatley. 1990. Relationship between Spatial Ability and Mathematics Knowledge. *Proceedings of the PME-NA-12*, Rutgers, New Jersey.
- Clarke, John H. 1990. *Patterns of Thinking: Integrating Learning Skills in Content Teaching*. Boston: Allyn and Bacon.
- Couture, Barbara, ed. 1986. *Functional Approaches to Writing: Research Perspectives*. London: Pinter.
- Curtiss, Deborah. 1987. *Introduction to Visual Literacy: A Guide to the Visual Arts and Communication*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Curtiss, Deborah. 1988. Deconstructing Visual Statements to Improve Written and Oral Expression. *Reading Psychology*, 9:4 (Special Issue: Visual Literacy and Its Relationships to Written Literacy), 483-94.
- Derry, S. J. 1988/9. Putting Learning Strategies to Work. *Educational Leadership*, December/January, 4-10.
- Derry, S.J. 1990. Learning Strategies for Acquiring Useful Knowledge. In B. F. Jones and L. Idol, eds. *Dimensions of Thinking and Cognitive Instruction*. Hillsdale, New Jersey: Erlbaum, 347-380.
- Dixon, J.P. 1983. *The Spatial Child*. Springfield, Illinois: Thomas.
- Fisher, Walter R. 1977. *Human Communication as Narration: Toward a Philosophy of Reason, Value and Action*. Columbia: University of South Carolina Press.
- Franck, Frederick. 1973. *The Zen of Seeing*. New York: Vintage.
- Gardner, Howard. 1985. *Frames of Mind: The Theory of Multiple Intelligences*. New York, Basic Books (first published 1983).
- Goldsmith, Joel. 1959. *The Art of Spiritual Healing*. New York: Harper and Row.
- Gombrich, E. H. 1959. *Art and Illusion: A Study in the Psychology of Pictorial Representation*. London: Phaidon.
- Gregory, R. L. 1966. *Eye and Brain: The Psychology of Seeing*. New York: McGraw-Hill.
- Gregory, R.L. 1970. *The Intelligent Eye*. New York: McGraw-Hill.
- Halto, Marcia Peoples. January, 1990. Student Writing: Can the Machine Maim the Message? *Academic Computing*.
- Information Mapping, Inc. Seminars on the visual display of information. Waltham, Massachusetts 02154.

- Inhelder, B. and J. Piaget. 1958. *The Growth of Logical Thinking*. New York: Basic Books.
- Jackson, Jim. 1975. *Seeing Yourself See: Eye Exercises for Total Vision*. New York: Dutton.
- John-Steiner, Vera. 1987. *Notebooks of the Mind: Explorations of Thinking*. New York: Harper. First published 1985.
- Johnson, D. 1987. *The Body in the Mind: The Bodily Basis of Meaning, Imagination and Reason*. Chicago: University of Chicago Press.
- Jones, Beau Fly. 1986. Quality and Equality through Cognitive Instruction. *Educational Leadership*, April, 5-11.
- Jones, Beau Fly. 1988/9. Teaching Students to Construct Graphic Representations. *Educational Leadership*, Dec. Jan.
- Jones, Beau Fly and Lorna Idol. 1990. *Dimensions of Thinking and Cognitive Instruction*. Hillsdale, New Jersey: Erlbaum.
- Kintgen, Eugene R., Barry M. Kroll and Mike Rose, eds. 1988. *Perspectives on Literacy*. Carbondale: Southern Illinois University Press. Includes Olson (1977a).
- Korba, Rodney J. 1986. The Rate of Inner Speech. *Dissertation Abstracts International* 47/09A, 3239.
- Lakoff, George. 1988. *Women, Fire and Dangerous Things: What Categories Reveal about the Mind*. Chicago: University of Chicago Press.
- Langer, Susanne K. 1951. *Philosophy in a New Key*. New York: Mentor. First published 1942.
- Lessing, Gotthold. 1662. *Laocoön: An Essay of the Limits of Painting and Poetry*. (Trans. E. A. McCormick). New York: Bobbs-Merrill. First published 1766.
- Kim, Robert H. 1972. *Experiences in Visual Thinking*. Monterey, California: Brooks/Cole.
- Olson, David R. 1977a. From Utterance to Text: The Bias of Language in Speech and Writing. *Harvard Educational Review*, 47, 257-281.
- Olson, David R. 1977b. The Language of Instruction: The Literate Bias of Schooling. In R. Anderson, R. Spiro and W. Montague, eds. *Schooling and the Acquisition of Knowledge*, Hillsdale, New Jersey: Erlbaum, 65-89.
- Ong, Walter J. 1982. *Orality and Literacy: The Technologizing of the Word*. New York: Methuen.
- Rico, Gabriele L. 1983. *Writing the Natural Way*. Los Angeles: Tarcher.
- Ricoeur, Paul 1976. *Interpretation Theory: Discourse and the Surplus of Meaning*. Fort Worth: Texas Christian University Press.
- Rodriguez, Richard. 1981. *Hunger for Memory: The Education of Richard Rodriguez*. Boston: D.R. Godine.
- Shaughnessy, Mina P. 1977. *Errors and Expectations: A Guide for the Teacher of Basic Writing*. New York: Oxford.
- Silverman, Linda K. 1989. The Visual-spatial Learner. *Preventing School Failure*. 34:1, 15-20.
- Sinatra, Richard C. 1986. *Visual Literacy Connections to Thinking, Reading and Writing*. Springfield, Illinois: Thomas.
- Stacks, Don W. and Peter A. Andersen. 1989. The Modular Mind: Implications for Intra-personal Communication. *The Southern Communication Journal*, 54, 273-293.
- Tulving, E. 1972. Episodic and Semantic Memory. In E. Tulving and W. Donaldson, eds. *Organization of Memory*. New York: Academic Press.
- Tuman, Myron C., ed. 1992. *Literacy Online: The Promise (and peril) of Reading and Writing with Computers*. University of Pittsburgh Press.

- Truch, Steve. 1989. *The WISC-R Companion: A Desk Reference for the Wechsler Scales*. Seattle: Special Child Publications.
- Vande Kopple. 1985. Some Exploratory Discourse on Metadiscourse. *College Composition and Communication* 36, 82-93.
- Vygotsky, Lev Semenovich. 1978. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, Massachusetts: Harvard University Press.
- Weschler, Lawrence. 1982. *Seeing is Forgetting the Name of the Thing One Sees: A Life of Contemporary Artist Robert Irwin*. Berkeley: University of California Press.
- West, Thomas G. 1991. *In the Mind's Eye: Visual Thinkers, Gifted People with Learning Difficulties, Computer Images and the Ironies of Creativity*. Buffalo, New York: Prometheus.
- Wheatley, Grayson H. 1978. *The Wheatley Spatial Ability Test, Form B*. West Lafayette, Indiana: Purdue University.

Acknowledgments

An earlier version of this article was presented as a paper to the Qualitative Division, Association for Educators in Journalism and Mass Communication. Thanks to David Butler of the Florida State University School of Design and Larry Peterson of the Florida A&M University School of Architecture for supplying encouragement and examples. And to my wife, Christl, the visual thinker in residence.

Joseph F. Keppler founded the arts journal, *Poets, Painters, Composers*. He reviews nonfiction books for *The Seattle Times* and poetry books for small literary magazines. His photography and sculpture are exhibited in Seattle, while his visual poetry has been shown internationally.

10254 35th Avenue SW
Seattle, WA 98146

Visible Language 28.2
Joseph F. Keppler, 162-171
© *Visible Language* 1994
Rhode Island School of Design
Providence, Rhode Island 02903