

The Conduit Metaphor— A Case of Frame Conflict in Our Language about Language

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I should like to respond to Professor Schön's chapter by replaying his theme several octaves lower. In my opinion, he has struck exactly the right set of notes. "Problem setting" should indeed be considered the crucial process, as opposed to "problem solving." And the "stories that people tell about troublesome situations" do set up or "mediate" the problem. And "frame conflict" between various stories should be studied in detail, precisely because it is quite often "immune to resolution by appeal to the facts." It is hard to think of a better overture to genuine advance in the social and behavioral sciences than this. At the same time, it seems to me that Schön has managed to sound these excellent notes only in their overtones, so that the fundamental frequency is barely to be heard—even though, to my ears at least, Schön's kind of thinking is real and long-awaited music.

Quite simply, what I believe is missing is the application of Schön's wisdom—this paradigm-consciousness—to human communication itself. It may seem predictable that I, a linguist, would take such a position. But, if I do, it is hardly disciplinary narrow-mindedness that motivates me. In 1954, Norbert Wiener, one of the originators of information theory, and the "father of cybernetics," stated quite flatly: "Society can only be understood through a study of the messages and communications facilities which belong to it" (Wiener, 1954, p. 16). I have never thought of this statement as referring to things like the size and adequacy of the telephone system. Wiener was talking primarily about the basic processes of human communication—how they work, what sort of wrinkles there are in them, when and why they are likely to succeed or fail. The problems of society, government, and culture depend ultimately on something like the daily box score of such successes or failures to communicate. If there are too many failures, or systematic types of failure, troubles will multiply. A society of near-perfect communicators, though it would no doubt still face conflicts of interest, might well be able to avoid many of the destructive, divisive effects of these inevitable conflicts.

What lies behind Schön's term "frame restructuring," and Kuhn's term "translation" (Kuhn, 1970a) seems to be just this much: better communication. Alleviating social and cultural difficulties requires better communication. And the problem that faces us is, how do we improve our communication? But, if we come around to saying this, then it is high time that we listened to Schön's good advice. It will not do to set out posthaste to "solve the problem" of inadequate communication. The most pressing task is rather to start inquiring immediately about *how that problem presents itself to us*. For problem setting, not problem solving is the crucial process. What kinds of stories do people tell about their acts of communication? When these acts go astray, how do they describe "what is wrong and what needs fixing"?

In this chapter, I am going to present evidence that the stories English speakers tell about communication are largely determined by semantic structures of the language itself. This evidence suggests that English has a preferred framework for conceptualizing communication, and can bias thought process toward this framework, even though nothing more than common sense is necessary to devise a different, more accurate framework. I shall thus be trying to convince you of what may be a disturbing premise: that merely by opening our mouths and speaking English we can be drawn into a very real and serious frame conflict. My own belief is that this frame conflict has considerable impact on our social and cultural problems. If we are largely unable, despite the vast array of communications technologies available to us today, to bring about substantive improvements in human communication, it may well be because this frame conflict has led us to attempt faulty solutions to the problem.

It is, of course, impossible to make such assertions without calling to mind the speculations and arguments of many twentieth-century figures—notably those of Whorf (1956) and of Max Black's (1962d) reluctant but thorough refutation of Whorf. There is an old joke about the Whorf hypothesis to the effect that, if it should be true, then it would be by definition unprovable. For if two human beings not only spoke radically different languages, but also thought and perceived the world differently, well then they would be far too busy throwing rocks and spears at one another to ever sit down and establish this as a fact. The grain of truth in this facetiousness can be found in Schön's dictum that frame conflicts are "immune to resolution by appeal to the facts." As he says, "New facts have a way of being either absorbed or disregarded by those who see problematic situations under conflicting frames." Now, for the past several years, I have been collecting some new facts and talking about them with many different people.

Very slowly, during this period of time, these new facts initiated a frame change in my own thinking about language. I had always been interested in Uriel Weinreich's observation that, "Language is its own metalanguage." But after the frame change, I knew that, as a metalanguage, English, at least, was its own worst enemy. And I knew that there was something more than mysticism to Whorf's ideas. At this point, curiously enough, when everything seemed to fall into place for me, it became much harder to talk to others about the new facts. For now I was speaking across the chasm of frame conflict.

I mention these things because I want to suggest at the outset that the discussion that follows is a marvelous opportunity for one of those failures to communicate which we are concerned to prevent. It is a little bit like the joke about Whorf. If I am right in what I believe about frames, then it may well be difficult to convince you, because the frames I am talking about exist in you and will resist the change. For my part, in writing this, I have made strenuous efforts to remember what it was like before I shifted frames, and how long it took before the "new facts" made sense to me. At the same time, I should like to request that you, on your side, make yourselves receptive to what may be a serious alteration of consciousness. To use Schön's terminology, we are engaged perforce in frame restructuring, and special effort is called for.

The conduit metaphor

What do speakers of English say when communication fails or goes astray? Let us consider (1) through (3), some very typical examples,

- (1) Try to *get your thoughts across* better
- (2) None of Mary's *feelings came through to me* with any clarity
- (3) You still haven't *given me any idea* of what you mean,

and do as Schön has suggested – take them as problem-setting stories, as descriptions of "what is wrong and what needs fixing." Are there metaphors in the examples? Do these metaphors set the directions for possible problem-solving techniques? Although (1) through (3) contain no fresh metaphors, there is in each case a dead metaphor. After all, we do not literally "get thoughts across" when we talk, do we? This sounds like mental telepathy or clairvoyance, and suggests that communication transfers thought processes somehow bodily. Actually, no one *receives* anyone else's thoughts directly in their minds when they are using language. Mary's feelings, in example (2), can be perceived directly only by Mary; they do not really "come through to us" when she talks. Nor can anyone literally "give you an idea" –

since these are locked within the skull and life process of each of us. Surely, then, none of these three expressions is to be taken completely at face value. Language seems rather to help one person to construct out of his own stock of mental stuff something like a replica, or copy, of someone else's thoughts – a replica which can be more or less accurate, depending on many factors. If we could indeed send thoughts to one another, we would have little need for a communications system.

If there are dead metaphors in (1) through (3), then, they all seem to involve the figurative assertion that language *transfers* human thoughts and feelings. Notice that this assertion, even in its present, very general form, leads already to a distinct viewpoint on communications problems. A person who speaks poorly does not know how to use language to send people his thoughts; and, conversely, a good speaker knows how to transfer his thoughts perfectly via language. If we were to follow this viewpoint, the next question would be: What must the poor speaker do with his thoughts if he is to transfer them more accurately by means of language? The surprising thing is that, whether we like it or not, the English language does follow this viewpoint. It provides, in the form of a wealth of metaphorical expressions, answers to this and other questions, all of which answers are perfectly coherent with the assumption that human communication achieves the physical transfer of thoughts and feelings. If there were only a few such expressions involved, or if they were random, incoherent figures of speech arising from different paradigms – or if they were abstract, not particularly graphic images – then one might just succeed in dismissing them as harmless analogies. But in fact, none of these mitigating circumstances comes into play.

Typical solutions to the unskilled speaker's communications problems are illustrated by (4) through (8).

- (4) Whenever you have a good *idea* practice *capturing it in words*
- (5) You have to *put each concept into words* very carefully
- (6) Try to *pack more thoughts into fewer words*
- (7) Insert those *ideas* elsewhere in the *paragraph*
- (8) Don't *force your meanings into* the wrong *words*.

Naturally, if language transfers thought to others, then the logical container, or conveyer, for this thought is words, or word-groupings like phrases, sentences, paragraphs, and so on. One area of possible difficulty is then the insertion process. The speaker might be generally unpracticed or careless about this, and so be admonished with (4) or (5). As (6) shows, he could fail to put enough meaning in. Or, according to (7), he could put the right meanings in, but put them in the wrong place. Example (8), which stretches common sense most seri-

ously, indicates that he might put meanings into the words which somehow do not fit in them, thus presumably deforming these meanings. It might also be, of course, that the speaker puts too much meaning into words. And there are expressions for this as well.

(9) Never *load a sentence with more thoughts* than it can hold.

In general, this class of examples implies that, in speaking or writing, humans place their internal thoughts and feelings within the external signals of the language. A more complete listing may be found in the Appendix.

The logic of the framework we are considering – a logic which will henceforth be called the *conduit* metaphor – would now lead us to the bizarre assertion that words have “insides” and “outsides.” After all, if thoughts can be “inserted,” there must be a space “inside” wherein the meaning can reside. But surely the English language, whatever metaphysical meanderings it may have been guilty of thus far, cannot have involved us in this kind of patent nonsense. Well, a moment’s reflection should nudge anyone into remembering that “content” is a term used almost synonymously with “ideas” and “meaning.” And that recollection is quite meaning-full (sic) in the present context. Numerous expressions make it clear that English does view words as containing or failing to contain thoughts, depending on the success or failure of the speaker’s “insertion” process.

(10) That *thought is in* practically every other word

(11) The *sentence was filled with emotion*

(12) The *lines may rhyme, but they are empty of both meaning and feeling*

(13) Your *words are hollow* – you don’t mean them.

Or, in general, there is another class of examples that imply that words contain or convey thoughts and feelings when communication is successful. We assert, without batting an eyelash, that “the meaning is right there in the words.” Further instances are to be found in the Appendix.

It may be that the fault in a communication failure does not lie with the speaker. Perhaps, somehow, the listener has erred. In the framework of the conduit metaphor, the listener’s task must be one of extraction. He must find the meaning “in the words” and take it out of them, so that it gets “into his head.” Many expressions show that English does view the matter in this way.

(14) Can you actually *extract coherent ideas from that prose?*

(15) Let me know if you *find any good ideas in the essay*

(16) I don’t *get any feelings of anger out of his words.*

Curiously, my initial work on these expressions suggests that it is easier, when speaking and thinking in terms of the conduit metaphor,

to blame the speaker for failures. After all, receiving and unwrapping a package is so passive and so simple – what can go wrong? A package can be difficult or impossible to open. But, if it is undamaged, and successfully opened, who can fail to find the right things in it? Thus, there are graphic and powerful expressions which blame particularly writers for making the package hard to open, as in (17) through (19).

(17) That *remark is completely impenetrable*

(18) Whatever *Emily meant, it’s likely to be locked up in that cryptic little verse forever*

(19) He writes *sentences in such a way as to seal up the meaning in them.*

But, apart from readers and listeners “not paying attention to what’s there in the words,” the conduit metaphor offers little explanation for failing to “find” enough thoughts or the right thoughts in “what someone says.” Should someone discover too many thoughts, however, we have a wonderfully absurd expression faulting him for this.

(20) You’re *reading things into* the poem.

The power of the framework to enforce consistency of rationale even when the results are inane should be apparent here. We must see the reader as having surreptitiously made use of his power to insert thoughts into words when he should have restricted himself purely to extraction. He sneaked those thoughts into the words himself, and then turned around and pretended that he found them there. Perhaps because the problem of too much meaning occurs more often in reading, we have never developed the corresponding expression for speaking – “hearing things into the poem.” Instead, we use “reading things into” for both modalities. Once again, further examples appear in the Appendix.

Perhaps we should pause at this point and set up some apparatus for generalizing what we have seen so far. It is not the numbered sentences above that are important, but rather the expressions in italics. These expressions could appear in many different utterances and take many different forms, and we have as yet no way of isolating what is crucial to them. Notice, for instance, that in every example there has been one word, such as “ideas,” or “thoughts,” or “meanings,” or “feeling,” which denotes internal conceptual or emotional material. Apart from what seem to be minor stylistic co-occurrence restrictions, these and other terms like them can be substituted freely for one another. Thus, it is irrelevant to an example which one of these is present, and it would be helpful to have some abbreviation for the entire group. Let us picture each person as having a “repertoire” of mental and emotional material. This will allow us to say that any term denoting a *repertoire member*, abbreviated “RM,” will fit, say, as object in (1) and

produce an example utterance. Underlying (1), (2), and (3), then, are what we shall call "core expressions," which can be written as follows.

- (21) get RM *across* [underlying (1)]
 (22) RM *come through* (to someone) [underlying (2)]
 (23) give (someone) RM [underlying (3)].

The parentheses in (22) and (23) indicate optional compliments. Examples (4) through (20), in addition to a term from the RM group, all contain another term, such as "word," "phrase," "sentence," or "poem." These words, in their basic senses at least, designate the external physical patterns of marks or sounds that do pass between speakers. Such energies, unlike the thoughts themselves, are received bodily, and are what information theorists would have called "signals." If we adopt this generic name for the second group, and abbreviate it as "s," then the core expressions for (4) through (6) are,

- (24) capture RM *in s* [underlying (4)];
 (25) put RM *into s* [underlying (5)];
 (26) pack RM *into s* [underlying (6)].

In the Appendix, the core expression is always given first, and then followed by one or two examples. Obviously, each core expression can be responsible for a very large number of different sentences.

The conduit metaphor, and the core expressions which embody it, deserve a great deal more investigation and analysis. My listing of the core expressions is most likely far from complete, and the logical reverberations of this paradigm affect both the syntax and the semantics of many words which are not themselves part of the core expressions. Later on, we shall focus on one such reverberation, which affects the entire s group. Apart from this, however, we shall have to be content to close the present discussion with a brief characterization of some further types of core expression.

Our examples thus far have been drawn from the four categories which constitute the "major framework" of the conduit metaphor. The core expressions in these categories imply, respectively, that: (1) language functions like a conduit, transferring thoughts bodily from one person to another; (2) in writing and speaking, people insert their thoughts or feelings in the words; (3) words accomplish the transfer by containing the thoughts or feelings and conveying them to others; and (4) in listening or reading, people extract the thoughts and feelings once again from the words. Beyond these four classes of expressions, there are a good many examples which have different, though clearly related, implications. The fact that it is quite foreign to common sense to think of words as having "insides" makes it quite easy

for us to abstract from the strict, "major" version of the metaphor, in which thoughts and emotions are always contained in something. That is, the major framework sees ideas as existing either within human heads or, at least, within words uttered by humans. The "minor" framework overlooks words as containers and allows ideas and feelings to flow, unfettered and completely disembodied, into a kind of ambient space between human heads. In this case, the conduit of language becomes, not sealed pipelines from person to person, but rather individual pipes which allow mental content to escape into, or enter from, this ambient space. Again, it seems that this extension of the metaphor is aided by the fact that, somewhere, we are peripherally aware that words do not really have insides.

In any case, whatever the cause of the extension, there are three categories of expressions in the minor framework. The categories imply, respectively, that: (1) thoughts and feelings are ejected by speaking or writing into an external "idea space"; (2) thoughts and feelings are reified in this external space, so that they exist independent of any need for living human beings to think or feel them; (3) these reified thoughts and feelings may, or may not, find their way back into the heads of living humans. Some outstanding examples of minor framework expressions are, for the first category,

- put RM down on paper*
 (27) Put those thoughts down on paper before you lose them!
pour RM out
 (28) Mary poured out all of the sorrow she had been holding in for so long.
get RM out
 (29) You should get those ideas out where they can do some good.

And for the second category,

- RM float around*
 (30) That concept has been floating around for decades.
RM find way
 (31) Somehow, these hostile feelings found their way to the ghettos of Rome.
find RM EX LOC
 (32) You'll find better ideas than that in the library.
 (33) John found those ideas in the jungles of the Amazon, not in some classroom.

(EX LOC here stands for any locative expression designating a place other than within human beings, that is, an *external locative*.)

And for the third category,

absorb RM

- (34) You have to "absorb" Aristotle's ideas a little at a time.
RM go over someone's head
- (35) Her delicate emotions went right over his head.
get RM into someone's head
- (36) How many different concepts can you get into your head in one evening?

For further examples, see the Appendix.

The toolmakers paradigm

In order to investigate the effect of the conduit metaphor on the thought processes of speakers of English, we need some alternate way of conceiving of human communication. We require another story to tell, another model, so that the deeper implications of the conduit metaphor can be drawn out by means of contrast. Simply speaking, in order to engage in frame restructuring about human communication, we need first an opposing frame.

To begin this other story, I should like to suggest that, in talking to one another, we are like people isolated in slightly different environments. Imagine, if you will, for sake of the story, a huge compound, shaped like a wagon wheel (see figure 9). Each pie-shaped sector of the wheel is an environment, with two spokes and part of the circumference forming the walls. The environments all have much in common with one another – water, trees, small plants, rocks, and the like – yet no two are exactly alike. They contain different kinds of trees, plants, terrain, and so on. Dwelling in each sector is one person who must survive in his own special environment. At the hub of the wheel there is some machinery which can deliver small sheets of paper from one environment to another. Let us suppose that the people in these environments have learned how to use this machinery to exchange crude sets of instructions with one another – instructions for making things helpful in surviving, such as tools, perhaps, or shelters, or foods, and the like. But there is, in this story, absolutely no way for the people to visit each other's environments, or even to exchange samples of the things they construct. This is crucial. The people can only exchange these crude sets of instructions – odd looking blueprints scratched on special sheets of paper that appear from a slot in the hub and can be deposited in another slot – and nothing more. Indeed, since there is no way to shout across the walls of the sectors, the people only know of one another's existence indirectly, by a cumulative series of inferences. This part of the story, the no visiting and no exchange of indigenous materials rule, we shall call the postulate of "radical subjectivity."

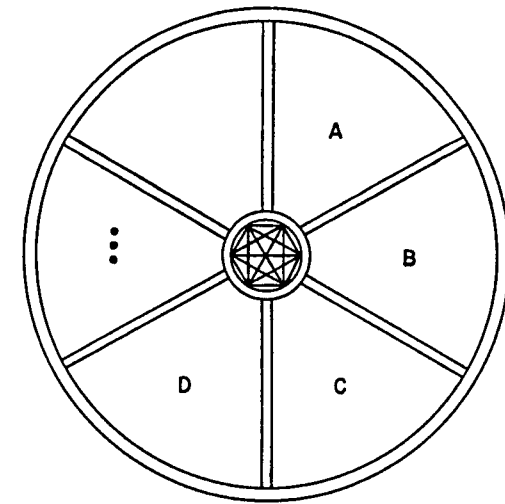


Figure 9. The toolmakers paradigm.

In the analogy, the contents of each environment, the "indigenous materials," represent a person's repertoire. They stand for the internal thoughts, feelings, and perceptions which cannot themselves be sent to anyone by any means that we know of. These are the unique material with which each person must work if he is to survive. The blueprints represent the signals of human communication, the marks and sounds that we can actually send to one another. We shall have to ignore the question of how the system of instructions became established, even though this is an interesting part of the story. We shall simply assume that it has reached some sort of steady state, and shall watch how it functions.

Suppose that person *A* has discovered an implement that is very useful to him. Say he has learned to build a rake and finds he can use it to clear dead leaves and other debris without damaging the living plants. One day person *A* goes to the hub and draws as best he can three identical sets of instructions for fashioning this rake and drops these sets in the slots for persons *B*, *C*, and *D*. As a result, three people struggling along in slightly different environments now receive these curious sheets of paper, and each one goes to work to try to construct what he can from them. Person *A*'s environment has a lot of wood in it, which is probably why he has leaves to rake in the first place. Sector *B*, on the other hand, runs more to rock, and person *B* uses a lot of rock in his constructions. He finds a piece of wood for the handle, but begins to make the head of the rake out of stone. *A*'s original rake

head was wood. But since it never occurred to him that anything but wood would be available or appropriate, he did not try to specify wood for the head in his instructions. When *B* is about halfway finished with the stone rake head, he connects it experimentally to the handle and realizes with a jolt that this thing, whatever it is, is certainly going to be heavy and unwieldy. He ponders its possible uses for a time, and then decides that it must be a tool for digging up small rocks when you clear a field for planting. He marvels at how large and strong person *A* must be, and also at what small rocks *A* has to deal with. *B* then decides that two large prongs will make the rake both lighter and better suited to unearthing large rocks. *

Quite happy with both his double-bladed rock-pick and his new ideas about what this fellow *A* must be like, person *B* makes three identical sets of instructions himself, for his rock-pick, and inserts them in the slots for *A*, *C*, and *D*. Person *A*, of course, now assembles a rock-pick following *B*'s instructions, except that he makes it entirely of wood and has to change the design a little if a wooden, two-pronged head is to be strong enough. Still, in his largely rockless environment, he cannot see much use for the thing, and worries that person *B* has misunderstood his rake. So he draws a second set of more detailed instructions for the rake head, and sends them out to everyone. Meanwhile, over in another sector, person *C*, who is particularly interested in clearing out a certain swamp, has created, on the basis of these multiple sets of instructions – the hoe. After all, when you are dealing with swamp grass and muck, you need something that will slice cleanly through the roots. And person *D*, from the same sets of instructions, has come up with a gaff. He has a small lake and fishes quite a bit.

Although it would be interesting to get to know *C* and *D*, the primary heroes of this story are persons *A* and *B*. We return now to them for the climax of the great rake conversation, in which, to everyone's surprise, some real communication takes place. *A* and *B*, who have had profitable interchanges in the past, and thus do not mind working quite hard at their communications, have been caught up in this rake problem for some time now. Their instructions simply will not agree. *B* has even had to abandon his original hypothesis that *A* is a huge man who has only small rocks to deal with. It just does not fit the instructions he is getting. *A*, on his side, is getting so frustrated that he is ready to quit. He sits down near the hub and, in a kind of absent-minded display of anger, grinds two pebbles together. Suddenly he stops. He holds these rocks up in front of his eyes and seems to be thinking furiously. Then he runs to the hub and starts scribbling new instructions as fast as he can, this time using clever iconic symbols for

rock and wood, which he hopes *B* will understand. Soon *A* and *B* are both ecstatic. All sorts of previous sets of instructions, not just about rakes, but about other things as well, now make perfect sense. They have raised themselves to a new plateau of inference about each other and each other's environments.

For purposes of comparison, let us now view this same situation once again, as the conduit metaphor would see it. In terms of the radical subjectivist paradigm for human communication, what the conduit metaphor does is permit the exchange of materials from the environments, including the actual constructs themselves. In our story, we would have to imagine a marvelous technological duplicating machine located in the hub. Person *A* puts his rake in a special chamber, pushes a button, and instantly precise replicas of the rake appear in similar chambers for *B*, *C*, and *D* to make use of. *B*, *C*, and *D* do not have to construct anything or guess about anything. Should person *B* want to communicate with *C* and *D* about *A*'s rake, there is no excuse for him sending anything except an exact replica of that rake to these people. There will still be differences in environments, but learning about these is now a trivial matter. Everything *B* has ever sent to *A* has been constructed largely of rock, and *A* is thus perfectly aware of his neighbor's predicament. Even if the marvelous machine should falter now and again, so that artifacts arrive damaged, still, damaged objects look like damaged objects. A damaged rake does not become a hoe. One can simply send the damaged object back, and wait for the other person to send another replica. It should be clear that the overwhelming tendency of the system, as viewed by the conduit metaphor, will always be: success without effort. At the same time, it should be similarly obvious that, in terms of the *toolmakers paradigm*, and the postulate of radical subjectivity, we come to just the opposite conclusion. Human communication will almost always go astray unless real energy is expended.

This comparison, then, brings to light a basic conflict between the conduit metaphor and the toolmakers paradigm. Both models offer an explanation of the phenomenon of communication. But they come to totally different conclusions about what, in that phenomenon, are more natural states of affairs, and what are less natural, or constrained, states. In terms of the conduit metaphor, what requires explanation is failure to communicate. Success appears to be automatic. But if we think in terms of the toolmakers paradigm, our expectation is precisely the opposite. Partial miscommunication, or divergence of readings from a single text, are not aberrations. They are tendencies inherent in the system, which can only be counteracted by continuous effort and by large amounts of verbal interaction. In this view, things will naturally

be scattered, unless we expend the energy to gather them. They are not, as the conduit metaphor would have it, naturally gathered, with a frightening population of wrong-headed fools working to scatter them.

As many scholars have pointed out (Kuhn, 1970a; Butterfield, 1965), such shifts in the notion of what a thing does "naturally," that is, if left to its own devices, are the stuff of which scientific revolutions are made. If the earth holds still at some center point, then it is the motions of celestial bodies that must be theorized about and predicted. But if the sun is at that center point, then we must theorize about the motion of the earth. In this regard, the present situation is a little curious. The toolmakers paradigm is very much in accord with the long-postulated connection between information, in the mathematical sense, and the entropy expression of the second law of thermodynamics (Cherry, 1966, pp. 214-17). The second law states that if left to their own devices, all forms of organization always decrease in time. Successful human communication involves an increase in organization, which cannot happen spontaneously or of its own accord. Thus, the shift in viewpoint of the toolmakers paradigm merely seems to bring the model of human communication into line with a previously extant paradigm from the physical sciences. But even though, mathematically, information is expressed as negative entropy, debate and confusion have always surrounded this connection. And it may be that this confusion springs, in part at least, from the dominant position occupied by the conduit metaphor in our language. For the conduit metaphor is definitely in conflict with the second law.

But I do not want to argue too strongly either for or against either of these models in this paper. I do not want to attempt any "appeal to the facts" at this point. For the real question here is to what extent language can influence thought processes. To me, from my vantage point now, it seems that the toolmakers paradigm and radical subjectivism simply form a coherent, common-sense view of what happens when we talk—a common-sense view which finds support in everything from this second law of thermodynamics to recent work in artificial intelligence or cognitive psychology. But if my major claim is true—that the conduit metaphor is a real and powerful semantic structure in English, which can influence our thinking—then it follows that "common sense" about language may be confused. I confess that it took nearly five years for me to come around to radical subjectivism as "common sense." What stood in the way was never a counter-argument, but rather the simple inability to think clearly about the matter. My mind would seem to go to sleep at crucial moments, and it was only the mounting weight of more and more evidence that finally

forced it to stay awake. Thus, there is the likelihood that arguments about these models either will not be needed, or alternatively, if they are needed, will fall on deaf ears until the biasing effect of the conduit metaphor has been dealt with. Most important, then, is some survey of the evidence that the conduit metaphor can and does influence our thinking.

Semantic pathology

Let us assume now, for the sake of argument, that it is agreed that communication functions as the toolmakers paradigm suggests, and not as the conduit metaphor would have it. And let us assume further that the conflicting implications of the two frames are theoretically interesting or even important. You may well grant me these things and still hold that the conduit metaphor expressions in everyday language do not really influence, or confuse, our thought processes. After all, all of us succeeded in shifting mental gears and thinking about language in terms of the toolmakers paradigm right here in the present discussion. The conduit metaphor did not prevent us from doing this. Where really is the problem? How can anything troublesome arise from a conceptual frame that we were able to discard so easily? This is the question to which we shall address ourselves now. Can the conduit metaphor really bias our thinking? And if so, how?

To begin with, it must be made clear that no speaker of English, not even your author, has discarded the conduit metaphor. Thinking in terms of the toolmakers paradigm briefly may, perhaps, have made us aware of the conduit metaphor. But none of us will discard it until we succeed in bringing about an entire series of linked changes in the English language. The logic of the framework runs like threads in many directions through the syntactic and semantic fabric of our speech habits. Merely becoming cognizant of this in no way alters the situation. Nor does it appear that one can adopt a new framework and develop it while ignoring the cloth of the language. For everywhere one runs into the old threads, and each one pushes conversation and thought back a little way toward the established pattern. No matter how otherworldly this may seem, there is some exceedingly poignant evidence that it has occurred and continues to occur.

The precise claim being made here is important. It has to do, I think, with one of the ways in which people commonly misunderstand the Whorf hypothesis. I do not claim that we cannot think momentarily in terms of another model of the communication process. I argue, rather, that that thinking will remain brief, isolated, and fragmentary

in the face of an entrenched system of opposing attitudes and assumptions.

I have not been able to gather hard statistics about the number of core expressions arising from the conduit metaphor. Indeed, inasmuch as the concept of a "core expression" is itself somewhat loose, and inasmuch as it is difficult in some cases to decide whether an expression should or should not be listed, I am not sure whether hard statistics can ever be assembled. Nevertheless, the present tally of conduit metaphor expressions is about 140. If one looks about for alternative ways of speaking about communication—ways which are either metaphorically neutral, or metaphorically opposed to the conduit framework—the list of expressions numbers between 30 and 40. A conservative estimate would thus be that, of the entire metalingual apparatus of the English language, at least seventy percent is directly, visibly, and graphically based on the conduit metaphor.

Whatever influence the remaining thirty percent might have appears to be weakened beyond this direct proportionality by several factors. First, these expressions tend to be the multisyllabic, latinate abstractions ("communicate," "disseminate," "notify," "disclose," and so on) which are neither graphic nor metaphorically coherent. Thus, they do not present an alternative model of the communication process, which leaves the notion of "putting ideas into words" as the sole available conception. Second, most of them can be used with the adjunct "in words" ("in s," more generally), thereby losing their neutrality and lending added support to the conduit metaphor. "Communicate your feelings using simpler words," for example, succeeds in avoiding the conduit metaphor, whereas, "Communicate your feelings *in* simpler words," does not. And finally, to the extent that etymologies are relevant, many of these expressions have roots which spring directly from the conduit framework ("express," "disclose," etc.). See Part Two of the Appendix for this listing.

The simplest, and perhaps most convincing illustration of our dependence on the conduit metaphor core expressions is a test that can be performed by anyone. Familiarize yourself with the listings in the Appendix. Then begin to become aware of, and try to avoid, conduit metaphors. Every time you find yourself using one, see if you can replace it with a neutral expression, or some circumlocution. My experience in teaching classes which dealt with this subject has been that I am constantly called to account by my students for using the expressions I am lecturing about. If I speak very carefully, with constant attention, I can do fairly well at avoiding them. But the result is hardly idiomatic English. Instead of walking into a classroom and

asking, "Did you get anything out of that article?", I have to say, "Were you able to construct anything of interest on the basis of the assigned text?" If one should look, I daresay even the present article is not free from conduit metaphor expressions. I ended the preceding section with a minor framework, category three example, (141) in the Appendix, when I wrote: "The arguments will fall on deaf ears." Practically speaking, if you try to avoid all obvious conduit metaphor expressions in your usage, you are nearly struck dumb when communication becomes the topic. You can say to your wayward student, "Try to communicate more effectively, Reginald," but it will not have nearly the impact of, "Reginald, you've got to learn how to put your thoughts into words."

But even if you could avoid all such obvious conduit "metaphorisms," this would still not free you from the framework. The threads, as I said, are nearly everywhere. To see that they go much deeper than just a list of expressions, I should like to resurrect a concept from pre-transformational semantics. In his *Principles of Semantics*, Stephen Ullmann (1957, p. 122) makes use of the term *semantic pathology*. A semantic pathology arises "whenever two or more incompatible senses capable of figuring meaningfully in the same context develop around the same name." For some time, my favorite English illustration of this was the delicate and difficult problem of distinguishing sympathy from apology. That is, "I'm sorry" can mean either "I empathize with your suffering," or "I admit fault and apologize." Sometimes people expect apologies from us when we only wish to sympathize, in which case saying, "I'm sorry," is either the perfect hedge or the opening line of a fight. Other times, people think we are apologizing when they see no need for us to apologize and respond with, "That's alright, it wasn't your fault."

As I studied the conduit metaphor, however, I came to rely on this example less and less. I kept coming across terms which were ambiguous between what we have here called "repertoire members" and what we have called "signals." I would find a word which, in its basic sense, referred to some grouping of the marks or sounds which we do exchange with one another. But then I would use it in sentences and realize that it could refer just as easily and just as often to segments of human thought or emotions. Consider the word "poem," for example. In (37) through (39),

(37) The poem was almost illegible

(38) The poem has five lines and forty words

(39) The poem is unrhymed,

this word clearly refers to a text, some signals involving either marks

or sounds. For sake of clarity, let us call the *word-sense* operating here $POEM_1$ (for an operational definition of "word-sense," see Reddy, 1973). Now notice that, in (40) through (42),

(40) Donne's poem is very logical

(41) That poem was so completely depressing

(42) You know his poem is too obscene for children,

the most probable referent of the word is not a text, but rather the concepts and emotions assembled in the reading of a text. I say "most probable" here because it is possible to imagine contexts in which the referent is actually once again a text. Suppose, for instance, (41) is uttered by a teacher of penmanship about a child's hasty copy of some poem. Barring such unusual contexts, however, "poem" in these examples refers to conceptual and emotional material. The word-sense functioning here we shall call $POEM_2$. Example (43) can be read with either $POEM_1$ or $POEM_2$.

(43) Martha's poem is so sloppy!

It is easy to see that this ambiguity of the term "poem" is intimately related to the conduit metaphor. If the words in language contain the ideas, then $POEM_1$ contains $POEM_2$, and metonymy, a process of meaning extension second in importance only to metaphor, takes over. That is, when two entities are always found together in our experience, the name of one of them – usually the more concrete – will develop a new sense which refers to the other. Just as $ROSE_1$ (= the blossom) developed $ROSE_2$ (= the shade of pinkish red) by metonymy, so $POEM_1$ gave rise to $POEM_2$. For, in terms of the conduit metaphor, the two are seen as existing together, the second within the first, and all the conditions for metonymy are met. As long as we are happy with the conduit metaphor, then this ambiguity is in no way problematic, and is certainly not a semantic pathology.

But now consider what happens to the linguistic idealist who wants to think about communication in terms of the toolmakers paradigm and radical subjectivism without making any changes in the English language. In this new model, the words do not contain the ideas, and so $POEM_1$ does not contain $POEM_2$. Instead, it is of greatest importance to preserve a principled distinction between $POEM_1$ and $POEM_2$. There is in most cases only one $POEM_1$, one text, to worry about. But because of the differences in repertoires from one person to the next, and because of the difficult task of assembling these mental and emotional materials on the basis of the instructions in the text, it is obvious to our theorist that there will be as many $POEM_2$'s in existence as there are readers or listeners. These internal $POEM_2$'s will only come to resemble one another after the people expend some energy talking

with one another and comparing notes. There is now not the slightest basis for a metonymical extension of $POEM_1$ to $POEM_2$. If we had viewed language in terms of the toolmakers paradigm historically, these two profoundly different concepts would never have been accessed by the same word. Talking about an entire series of slightly, or even terribly, different entities as if there were only one would obviously have led to communicative disaster.

We see, then, that things have taken a troublesome turn for our linguistic idealist. This ambiguity of the word "poem" is for him a real and severe semantic pathology. Other speakers, who accept the conduit metaphor, can be perfectly blasé about it. But he cannot. It befuddles the very distinction he is most concerned to make and bring others to make. More troublesome still is the fact that this pathology is global. It is not an isolated development in the language, involving only the word "poem." I have discussed "poem" here as a paradigm case for the entire class of words in English which denote signals. Analogous examples are available for all of the *s* words discussed in a previous section – "word," "phrase," "sentence," "essay," "novel," and so on. Even the word "text" has the two senses, as evidenced by (44) and (45).

(44) I am tired of illegible texts

(45) The text is logically incoherent.

In addition, all the proper names of texts, poems, plays, novels, speeches, and the like share this ambiguity. Notice,

(46) *The Old Man and the Sea* is 112 pages long

(47) *The Old Man and the Sea* is deeply symbolic.

As I became aware of this systematic, widespread semantic pathology, I was, of course, far less impressed with the difficulties caused by, "I'm sorry." For here was a case that involved more words than any pathology I had ever heard of. Furthermore, this case showed that semantic structures could be completely normal with respect to one view of reality, and at the same time, pathological with respect to another view. Or in other words, here was some strong evidence that language and views about reality have to develop hand in hand. Finally, I also noticed that this new, potential pathology affected what might be called the "morphosemantics" of the words involved. Suppose, for example, we pluralize the word "poem." As shown in (48),

(48) We have several poems to deal with today,
this produces a form whose most natural referents are a number of $POEM_1$'s, that is, a series of different texts. It would be quite unnatural to utter (48) and mean that there were several internal $POEM_2$'s, Michael's $POEM_2$, Mary's $POEM_2$, Alex's $POEM_2$, and so on, all constructed

from the same POEM₁, which were to be discussed on a given day. What this means is that, although POEM₁, pluralizes with the change in morphology, the other sense, POEM₂, is lost in this change. In the case of proper names, pluralization is even more problematic. For most names of texts, there is no morphology defined for the plural. How should our budding radical subjectivist pluralize *The Old Man and the Sea*? Does he say, "Our internal *The Old Man and the Sea-s*"? Or should it be, "Our internal *Old Men and the Sea*"? And notice that it will not help him very much to use (49), or (50).

(49) Our versions of the poem

(50) Our versions of *The Old Man and the Sea*.

For if, in (49), the word "poem" means POEM₁, then this phrase applies to variants of the text – which is not what he wants to say. On the other hand, if "poem" means POEM₂, then he is still in trouble. Now it sounds like there is one proper and correct POEM₂, available to us all, which we may however, for reasons of taste, alter slightly. The radical subjectivism, the absolute nontransferability of any "correct" POEM₂, is muddled completely by (49) and (50). This most important fact, that there is one POEM₁ but necessarily many POEM₂'s, cannot be expressed easily, consistently, or at all naturally.

This discussion, though it says by no means all that could be said, provides an initial illustration of what would happen to someone who really tried to discard the conduit metaphor and think seriously and coherently in terms of the toolmakers paradigm. He would face serious linguistic difficulties, to say the least, and would quite clearly have to create new language as he restructured his thought. But, of course, he would be likely to do this *only* if he shared our present awareness of the biasing power of the conduit metaphor. So far as I know, none of the thinkers who have tried to present alternate theories of language and the nature of meaning have had this awareness. Thus, the conduit metaphor has undercut them, without any knowledge on their part of what was happening. Of course, the problems caused by this confusion in aesthetics and criticism are legion, and it is easy to document my claims by analysis of works in this area. However, a more convincing documentation – indeed, the most convincing documentation one could wish for is to be found in the historical development of *mathematical information theory*. For here, if ever, with both a concept-free algebra of information, and working machines to use as models, the effect of the conduit metaphor should have been avoided. But, in fact, it was not. And the conceptual basis of the new mathematics, though not the mathematics itself, has been completely obscured by the semantic pathologies of the conduit metaphor.

The framework of mathematical information theory has much in

common with our toolmakers paradigm. Information is defined as the ability to make nonrandom selections from some set of alternatives. Communication, which is the transfer of this ability from one place to another, is envisioned as occurring in the following manner. The set of alternatives and a *code* relating these alternatives to physical signals are established, and a copy of each is placed at both the sending and receiving ends of the system. This act creates what is known as an "a priori shared context," a prerequisite for achieving any communication whatsoever. At the transmitting end, a sequence of the alternatives, called the *message*, is chosen for communication to the other end. But this sequence of alternatives is not sent. Rather, the chosen alternatives are related systematically by the code to some form of energy patterns which can travel quickly and retain their shape while they do travel – that is, to the signals.

The whole point of the system is that the alternatives themselves are not mobile, and cannot be sent, whereas the energy patterns, the "signals" are mobile. If all goes well, the signals, when they arrive at the receiving end, are used to duplicate the original selection process and recreate the message. That is, using the relationships of the code and the copy of the original set of alternatives, the receiving end can make the same selections that were made earlier on the transmitting end when the message was generated. Quantification is possible in this framework only because one can set up measures of how much the received signals narrow down the possible choices of preexistent alternatives.

In terms of our toolmakers paradigm, the predefined set of alternatives of information theory corresponds to what we have called the "repertoire." The environments of the persons in the wagon-wheel compound all have much in common – otherwise their system of instructions would not work at all. The "signals" of the mathematical theory are exactly the same as our "signals" – the patterns that can travel, that can be exchanged. In the world of the compound, they are the sheets of paper sent back and forth. Notice now, that, in information theory, as in our paradigm, the alternatives – the "messages" – are not contained in the signals. If the signals were to arrive at the receiving end, and the set of alternatives was damaged or missing, the proper selections could not be made. The signals have no ability to bring the alternatives with them; they carry no little replica of the message. The whole notion of information as "the power to make selections" rules out the idea that signals *contain* the message.

Now, this may be abundantly clear when spelled out in this fashion. And it seems to remain clear as long as information theory is restricted to simple, technical applications. But as most of you know, this theory

was hailed as a potential breakthrough for biology and the social sciences. And numerous attempts were made to extend its range of application to include human language and behavior (see Cherry, 1966). Such attempts, of course, were not simple and technical. They required a very clear understanding, not so much of the mathematics of the theory, but rather of the conceptual foundations of the theory. By and large, these attempts were all accounted to be failures. I think that the reason for these failures was the interaction of the conduit metaphor with the conceptual foundations of information theory. As soon as people ventured away from the original, well-defined area of the mathematics, and were forced to rely more on ordinary language, the essential insight of information theory was muddled beyond repair.

The destructive impact of ordinary language on any extensions of information theory begins with the very terms the originators (Shannon and Weaver, 1949) chose to name parts of the paradigm. They called the set of alternatives, which we have referred to here as the "repertoire," the *alphabet*. It is true that in telegraphy the set of alternatives is in fact the alphabet; and telegraphy was their paradigm example. But they made it quite clear that the word "alphabet" was for them a technical coinage which was supposed to refer to *any* set of alternative states, behaviors, or what have you. But this piece of nomenclature is problematic when one turns to human communication. For years I taught information theory in a nonmathematical way to future English teachers, using the term "alphabet." Always this seemed to confuse them, though I never could fathom why, until one year, a student put up her hand and said, "But you can't call the alternatives the *signals*." Now it is strange, on the face of it, that Weaver, particularly, who was very concerned about applying the theory to human communication, would have let this go unnoticed. It confuses the all important distinction between signals and repertoire members. Substituting the present term, "repertoire," for "alphabet" made my teaching much easier.

But another mistake in terminology makes it seem probable that Shannon and Weaver were never quite clear themselves about the importance of this distinction to their own system. Consider the choice of the term "message" to represent the selection of alternatives from the repertoire. "Message," as the following examples show, partakes of the same semantic pathology as "poem."

(51) I got your message (MESSAGE₁), but had no time to read it

(52) Okay, John, I get the message (MESSAGE₂); let's leave him alone.

For information theory, this is extremely confusing, because MESSAGE₁ means literally a set of signals, whereas MESSAGE₂, means the repertoire

members involved with the communication. For conduit-metaphor thinking, in which we send and receive the MESSAGE₂ within the MESSAGE₁, the ambiguity is trivial. But for a theory based totally on the notion that the "message" (MESSAGE₂) is never *sent* anywhere, this choice of words leads to the collapse of the paradigm. Shannon and Weaver were very careful to point out that the "received signals" were not necessarily the "transmitted signal" because of the possible intervention of distortion and noise. But they blithely wrote the word "message" on the right, or receiving side of their famous paradigm (Shannon & Weaver, 1949, p. 7). At the very least they should have written "reconstructed message" there. In their theory, something is *rebuilt* on that right side which, hopefully, resembles the original message on the left side. The ambiguity of the word "message" should have led them to regard this word as a disaster and never to consider it for use.

If they did not, I believe it is because their thought processes were responding to the biasing effect of the conduit metaphor. Weaver, it seems, could not hold the theory clearly in mind when he spoke of human communication, and used conduit metaphor expressions almost constantly. "How precisely," he asked, "do the transmitted symbols convey the desired meaning [*italics mine*]?" (p. 4) Or he compared two "messages, one of which is *heavily loaded with meaning* and the other of which is pure nonsense." (p. 8) In truth, it seems that he still thought of the MESSAGE₂, the repertoire members, as being sent across the channel, even though this destroys the notion of information as selective power. Weaver hedges significantly when he describes the action of the transmitter. It "changes," he says, "the *message* into the *signal* [*italics Weaver's*]." (p. 7) Really, ~~this is~~ a strange description. A code is a relationship between two distinct systems. It does not "change" anything into anything else. It merely preserves in the second system the pattern of organization present in the first system. Marks or sounds are not transmuted into electronic pulses. Nor are thoughts and emotions magically metamorphosed into words. Again, this is conduit-metaphor thinking. There is no justification whatsoever in information theory for talking about communication this way.

It is worth noting that Shannon, who actually originated the mathematics, may have had a more coherent understanding than Weaver. At some points in his own exposition, Shannon used exactly the right ordinary language terms. He wrote, "The *receiver* ordinarily performs the inverse operation of that done by the transmitter, reconstructing the message from the signal" (p. 34). But it still does not seem that he perceived the damage done to the paradigm by his own and Weaver's conduit metaphorisms.

Quite the same thing can be said for other ways of speaking asso-

ciated with information theory. They do violence to the theory, yet support and uphold the conduit metaphor admirably. Consider "encode" and "decode." These mean to put the repertoire members "into" code, and then take them out of code, respectively. Or think about the term "information content." The theory conceives of information as the power to reproduce an organization by means of nonrandom selections. Signals *do something*. They cannot *contain* anything. If the conduit metaphor is capable of influencing thought processes, then why has an entire generation of information theorists talked in this confusing and detrimental way? One would have to suppose that Weaver and many researchers who have followed him were simply bent on professional destruction. It seems easier to believe that the English language has the power to lead them astray.

A recent anthology collecting psychological and sociological efforts to create a communication theory for human interactions points out in the introduction that "investigators have yet to establish a completely acceptable definition of communication" (Serenio & Mortensen, 1970, p. 2). Then it goes on to say,

Those models based upon a mathematical conception describe communication as analogous to the operations of an information processing machine: an event occurs in which a *source or sender transmits a signal or message* through a *channel* to some *destination or receiver* [italics from anthology]. (p. 71)

Notice the statement, "transmits a signal or message." Here, twenty-one years after Shannon and Weaver, the same confusion persists—can the "message" be sent, or not? And it persists in almost every article of the volume. Consider one more brief example. "The theory [of information] was concerned with the problem of defining the quantity of information contained in a message to be transmitted. . . ." (p. 62). Note that here information is *contained* in a transmitted "message." If the author means MESSAGE₁, then he is thinking in terms of the conduit metaphor, and saying that information is contained in the signals. If he means MESSAGE₂, then he is saying that repertoire members, which are transmitted inside of signals, have inside of *them* something called information, which can be measured. Either way, the insight of information theory has been overwhelmed.

Social implications

I should like to conclude with some remarks on the social implications of the situation we have outlined. If the English language has a less

than accurate idea of its own workings, and if it has the power to bias thought processes in the direction of this model, what practical impact does this have? We have seen evidence that the conduit metaphor can confuse serious attempts at theory building—but does it matter at all to the man on the street, to mass culture, to federal policymaking?

I must limit myself here to suggesting two ways in which the conduit metaphor does matter to all speakers of English. To discuss the first way, I would like to return to the "stories" told in an earlier section and add a final sequel.

It came to pass, one year, that an evil magician, who was an expert at hypnosis, flew over the toolmakers' compound. Looking down, he saw that, despite the formidable handicaps, *A, B, C,* and *D* were doing quite well with their system of instruction sending. They were very aware that communicating was hard work. And their successes were extremely rewarding to them, because they retained a distinct sense of awe and wonder that they could make the system work at all. It was a daily miracle, which had improved their respective standards of living immensely. The evil magician was very upset about this, and decided to do the worst thing he could think of to *A, B, C,* and *D*. What he did was this. He hypnotized them in a special way, so that, after they received a set of instructions and struggled to build something on the basis of them, they would immediately forget about this. Instead, he planted in them the false memory that the object had been sent to them directly from the other person, via a marvelous mechanism in the hub. Of course, this was not true. They still had to build the objects themselves, out of their own materials—but the magician blinded them to this.

As it turned out, the evil magician's shrewdness was profound. For even though, objectively, the communications system of the compound had not changed one bit, it nevertheless fell very quickly into disuse and decay. And as it crumbled, so did the spirit of harmony and communal progress that had always characterized the relations of *A, B, C,* and *D*. For now, since they would always forget that they had assembled an object themselves and thus bore a large share of responsibility for its shape, it was easy to ridicule the sender for any defects. They also began to spend less and less time working to assemble things, because, once the mental block descended, there was no feeling of reward for a job well done. As soon as they finished an assembly, the hypnosis would take effect, and suddenly—well, even though they were worn out, still, it was the other fellow who had done all the hard, creative work of putting it together. Any fool could take a finished product out of the chamber in the hub. So they came to resent, and

therefore abandon, any assembly jobs that required real work. But this was not the worst effect foreseen by the evil magician when he cast his peculiar spell. For, indeed, it was not long before each of the persons came to entertain, privately, the idea that all the others had gone insane. One would send instructions to the others for some device of which he was particularly proud, just as he had always done. Only now of course he believed that he sent, not instructions, but the thing itself. Then, when the others would send him instructions in return, to confirm their receipt of his, he would assemble the object, forget, think that they had returned him the thing itself, and then stare in horror at what he saw. Here he had sent them a wonderful tool, and they returned to him grotesque parodies. Really, what could explain this? All they had to do was to successfully remove his object from the chamber in the hub. How could they change it so shockingly in performing an operation of such moronic simplicity? Were they imbeciles? Or was there perhaps some malice in their behavior? In the end, *A*, *B*, *C*, and *D* all came privately to the conclusion that the others had either become hostile or else gone berserk. Either way, it did not matter much. None of them took the communications system seriously any more.

Among other things, this sequel attempts to sketch some of the social and psychological effects of believing that communication is a "success without effort" system, when, in fact, it is an "energy must be expended" system. I am sure that no one has failed to realize that, to the extent that the parable applies, the evil magician is the English language, and his hypnotic spell is the bias imparted to our thought processes by the conduit metaphor. This model of communication objectifies meaning in a misleading and dehumanizing fashion. It influences us to talk and think about thoughts as if they had the same kind of external, intersubjective reality as lamps and tables. Then, when this presumption proves dramatically false in operation, there seems to be nothing to blame except our own stupidity or malice. It is as if we owned a very large, very complex computer—but had been given the wrong instruction manual for it. We believe the wrong things about it, and teach our children the wrong things about it, and simply cannot get full or even moderate usage out of the system.

Another point from the story worth emphasizing is that, to the extent that the conduit metaphor does see communication as requiring some slight expenditure of energy, it localizes this expenditure almost totally in the speaker or writer. The function of the reader or listener is trivialized. The radical subjectivist paradigm, on the other hand, makes it clear that readers and listeners face a difficult and highly crea-

tive task of reconstruction and hypothesis testing. Doing this work well probably requires considerably more energy than the conduit metaphor would lead us to expect.

But we are still a long way from government policy in these effects. Let us turn, then, to the second example of the impact of the conduit metaphor, which will help to close this gap. The expression employed in (51), number 113 in the Appendix,

(51) You'll *find* better *ideas* than that *in* the *library*,

is derived from the conduit metaphor by a chain of metonymies. That is, we think of the ideas as existing in the words, which are clearly there on the pages. So the ideas are "there on the pages" by metonymy. Now the pages are in the books—and again, by metonymy, so are the ideas. But the books are in the libraries, with the final result that the ideas, too, are "in the libraries." The effect of this, and the many other minor framework core expressions is to suggest that the libraries, with their books, and tapes, and films, and photographs, are the real repositories of our culture. And if this is true, then naturally we of the modern period are preserving our cultural heritage better than any other age, because we have more books, films, tapes, and so on, stored in more and bigger libraries.

Suppose now that we drop the conduit metaphor and think of this same situation in terms of the toolmakers paradigm. From this point of view, there are of course no ideas in the words, and therefore none in any books, nor on any tapes or records. There are no ideas whatsoever in any libraries. All that is stored in any of these places are odd little patterns of marks or bumps or magnetized particles capable of creating odd patterns of noise. Now, if a human being comes along who is capable of using these marks or sounds as instructions, then this human being may assemble within his head some patterns of thought or feeling or perception which resemble those of intelligent humans no longer living. But this is a difficult task, for these ones no longer living saw a different world from ours, and used slightly different language instructions. Thus, if this human who enters the library has not been schooled in the art of language, so that he is deft and precise and thorough in applying instructions, and if he does not have a rather full and flexible repertoire of thoughts and feelings to draw from, then it is not likely that he will reconstruct in his head anything that deserves to be called "his cultural heritage."

Quite obviously, the toolmakers paradigm makes it plain that there is no culture in books or libraries, that, indeed, there is no culture at all unless it is reconstructed carefully and painstakingly in the living brains of each new generation. All that is preserved in libraries is the

mere opportunity to perform this reconstruction. But if the language skills and the habit of engaging in reconstruction are not similarly preserved, then there will be no culture, no matter how large and complete the libraries may become. We do not preserve ideas by building libraries and recording voices. The only way to preserve culture is to train people to rebuild it, to "regrow" it, as the word "culture" itself suggests, in the only place it can grow – within themselves.

The difference of viewpoint here between the conduit metaphor and the toolmakers paradigm is serious, if not profound. Humanists appear to be dying these days, and administrators and governments seem to feel few compunctions about letting this occur. We have the greatest, most sophisticated system for mass communication of any society that we know about, yet somehow mass communication becomes more and more synonymous with less communication. Why is this? One reason, at least, may be that we are following our instruction manual for use of the language system quite carefully – and it is the wrong manual. We have the mistaken, conduit-metaphor influenced view that the more signals we can create, and the more signals we can preserve, the more ideas we "transfer" and "store." We neglect the crucial human ability to reconstruct thought patterns on the basis of signals and this ability founders. After all, "extraction" is a trivial process, which does not require teaching past the most rudimentary level. We have therefore, in fact, less culture – or certainly no more culture – than other, less mechanically inclined, ages have had. Humanists, those traditionally charged with reconstructing culture and teaching others to reconstruct it, are not necessary in the scheme of the conduit metaphor. All the ideas are "there in the library," and anyone can go in and "get them." In the toolmakers paradigm, on the other hand, humanists themselves *are* the repositories, and the only real repositories of ideas. In the simplest of terms, the conduit metaphor lets human ideas slip out of human brains, so that, once you have recording technologies, you do not need humans any more.

I am suggesting, then, that, in the same way that "urban renewal" misled the policymakers discussed in Schön's paper, the conduit metaphor is leading us down a technological and social blind alley. That blind alley is mass communications systems coupled with mass neglect of the internal, human systems responsible for nine-tenths of the work in communicating. We think we are "capturing ideas in words," and funneling them out to the greatest public in the history of the world. But if there are no ideas "within" this endless flood of words, then all we are doing is replaying the myth of Babel – centering it, this time, around a broadcasting tower.

APPENDIX

A partial listing of the metalingual resources of English

This appendix is divided into two parts. The first lists expressions arising from the logic of the conduit metaphor; the second lists expressions which are either metaphorically neutral or involve logics alternative to the conduit metaphor. Further search for expressions, along with a more elaborate means of analyzing and classifying, will be required before either collection can be termed complete. In some cases, in Part One, core expressions which I have placed in one category could with justification be placed in a different category as well. These and other niceties must await later exposition. One or two examples follow each expression.

Part One: The conduit metaphor

I. THE MAJOR FRAMEWORK

- A. Implying that human language functions like a conduit enabling the transfer of repertoire members from one individual to another.
1. get RM across (to someone)
"You'll have to try to get your real attitudes across to her better."
"It's very hard to get that idea across in a hostile atmosphere."
 2. put RM across (to someone)
"If you salesmen can't put this understanding across to the clients more forcefully, our new product will fail."
 3. give RM (to someone)
"You know very well that I gave you that idea."
 4. give RM away
"Jane gives away all her best ideas."
 5. get RM from someone
"Marsha got those concepts from Rudolf."
 6. RM get through (to someone)
"Your real feelings are finally getting through to me."
 7. RM come through (to someone)
"Apparently, your reasons came through to John quite clearly."
"What comes through most obviously is anger."

8. RM come across (to someone)
"Your concepts come across beautifully."
 9. RM make it across (to someone)
"Your thoughts here don't quite make it across."
 10. let someone have RM
"Oh come on, let me have some of your great ideas about this."
 11. present someone with RM
"Well, you have presented me with some unfamiliar thoughts and I think I should let them settle awhile."
 12. send RM (to someone)
"Next time you write, send better ideas."
 13. language transfers RM
"Language transfers meaning."
- B. Implying that, in speaking or writing, humans place their internal repertoire members within the external signals, or else fail to do so in unsuccessful communication.
14. put RM into s
"It is very difficult to put this concept into words."
 15. capture RM in s
"When you have a good idea, try to capture it immediately in words."
 16. fill s with RM
"Harry always fills his paragraphs with meaning."
 17. pack s with RM
"A good poet packs his lines with beautiful feelings."
 18. pack RM into s
"If you can't pack more thought into fewer words, you will never pass the conciseness test."
 19. load s with RM
"Never load a sentence with more thought than it can carry."
 20. load RM into s
"John loads too much conflicting feeling into what he says."
 21. insert RM in s
"Insert that thought elsewhere in the sentence."
 22. include RM in s
"I would certainly not include that feeling in your speech."
 23. burden s with RM
"You burden your words with rather terribly complex meanings."
 24. overload s with RM
"Harry does not exactly overload his paragraphs with thought."
 25. stuff RM into s
"You cannot simply stuff ideas into a sentence any old way!"

26. stuff s with RM/full of RM
"You have only a short time, so try to stuff the essay with all your best ideas."
"You can stuff the paper full of earthshaking ideas – that man still won't notice."
 27. cram RM into s
"Dickinson crams incredible amounts of meaning into her poems."
 28. cram with RM/full of RM
"He crammed the speech with subversive ideas."
"Harry crammed the chapter full of spurious arguments."
 29. unload RM in s
"Unload your feelings in words – then your head will be clearer."
 30. force RM into s
"Don't force your meanings into the wrong words."
 31. get RM into s
"I can't seem to get these ideas into words."
 32. shove RM into s
"Trying to shove such complicated meanings into simple sentences is exceedingly difficult."
 33. fit RM into s
"This notion does not seem to fit into any words."
- C. Implying that signals convey or contain the repertoire members, or else fail to do this in unsuccessful communication.
34. s carry RM
"His words carry little in the way of recognizable meaning."
 35. s convey RM
"The passage conveys a feeling of excitement."
 36. s transfer RM
"Your writing must transfer these ideas to those who need them."
 37. s display RM
"This essay displays thoughts I did not think Marsha capable of."
 38. s bring RM (with it)
"His letter brought the idea to the French pilots."
 39. s contain RM
"In terms of the rest of the poem, your couplet contains the wrong kind of thoughts."
 40. s have RM-content/RMA-content
"The introduction has a great deal of thought-content."
"The statement appears to have little emotional content."
"The speech has too much angry content."

("rma" stands for adjectives appropriate to repertoire members.)

41. RM be in s
"That thought is in practically every phrase!"
 42. s be pregnant with RM
"His words, pregnant with meaning, fell on receptive ears."
 43. s be fraught with RM
"The poem is fraught with dire thoughts about civilization."
 44. s be saturated with RM
"The last stanza is saturated with despair."
 45. s be hollow
"Your words seem rather hollow."
 46. s be full of RM
"The oracle's words were full of meaning."
 47. s be without RM
"The sentence is without meaning."
 48. s have no RM
"Sam's words have not the slightest feeling of compassion."
 49. s be empty (of RM)
"His lines may rhyme, but they are empty of either meaning or feeling."
"The sentences are empty; they say nothing to me."
"What the candidates have said is so much empty sound."
 50. s be void of RM
"The entire chapter is void of all useful ideas."
 51. s's RM/RM of s
"The thought of this clause is somehow disturbing."
"This paragraph's thought is completely garbled."
 52. s be bursting with RM
"The poem is bursting with ecstasy!"
 53. s be overflowing with RM
"The line is overflowing with pure happiness."
 54. RM show up in s
"This idea shows up in the second paragraph."
 55. s hand RM (to someone)
"But this sentence hands us a completely different idea."
- D. Implying that, in listening or reading, humans find repertoire members within the signals and take them into their heads, or else fail to do so in unsuccessful communication.
56. get RM out of s/from s
"I have to struggle to get any meaning at all out of the sentence."
"I got the idea of patience from your statement."

57. get the RM in s into one's head
"Everybody must get the concepts in this article into his head by tomorrow or else!"
58. extract RM from s
"Can you really extract coherent thoughts from that incredible prose?"
59. RM arise from s
"The feeling arises from the second paragraph."
60. see RM in s
"We will see this thought several times again in the sonnet."
61. find RM in s
"John says that he cannot find your idea anywhere in the passage."
63. come upon RM in s
"I would be quite surprised if you came upon any interesting concepts in Stephen's essay."
64. uncover RM in s
"John admits that we uncovered those ideas in the ode, but still doesn't believe that Keats put them there."
65. overlook RM in s
"Don't overlook the idea of fulfilled passion later on in the passage."
66. pay attention to RM in s/what's in s
"You rarely pay enough attention to the actual meaning in the words."
"Please pay attention to what's there in the words!"
67. reveal RM in s
"Closer reading reveals altogether uncharacteristic feelings in the story."
68. miss RM in s
"I missed that idea in the sentence completely."
69. s be impenetrable
"The poem is meant to be impenetrable – after all, Blake wrote it."
70. RM be locked up in s
"Whatever she meant, it's likely to be locked up in that cryptic little verse forever."
71. RM be sealed up in s
"It's as if he wrote the sentences in such a way as to seal up the meaning in them."
72. RM be hidden (away) in s
"The attitudes I want to show you are hidden away someplace in the last chapter."

73. RM be/get lost in s
"Mary has good ideas, but they get lost in her run-on sentences."
74. RM be buried in s
"Yes, but the man's thought is buried in these terribly dense and difficult paragraphs."
75. RM be sunk in s
"The thought is there, although I grant that it's sunk pretty deep in paradoxical language."
76. lay bare RM in s
"John's analysis really lays bare the ideas in the chapter."
77. bare RM in s
"You have bared the hidden meanings in the sentence."
78. unseal RM in s
"To unseal the meaning in Wittgenstein's curious phrases is no easy task."
79. expose RM in s
"You have exposed certain feelings in the essay of which the author would not be proud."

II. THE MINOR FRAMEWORK

- E. Implying that, particularly when communications are recorded or delivered in public, speakers and writers eject their repertoire members into an external "space."
80. get RM out
"I feel some responsibility to get these ideas out where they can do some good."
81. get RM into circulation
"Try to get your feelings about the merger into circulation among the board members."
82. put RM into circulation
"We intend to put these new concepts into circulation among actual teachers."
83. put RM forth
"IBM put forth the idea that they had been mistreated."
84. pour RM out
"Mary poured out her sorrows."
85. pour RM forth
"You come over and pour forth your anger and expect me to take it all in!"
86. bring RM out
"Dr. Williams brings out some unusual thoughts on the matter."

87. s put RM forth
"IBM's legal brief puts forth the idea that they have been mistreated."
88. s brings RM out
"The essay brings out unusual thoughts on the matter."
89. bring RM forth
"That child brought forth feelings I couldn't cope with."
90. RM leak out
"Your thoughts will leak out anyway."
91. get RM down on paper
"Get your insights down on paper at once."
92. put RM down on paper
"Perhaps you could put this feeling of sympathy down on paper and send it to your brother."
93. set RM down on paper
"Can you set the latest idea down on paper and let me take it?"
94. lay RM out on paper
"Lay your thoughts out on paper where you can see them."
95. let RM drop
"Someone let drop the idea of continuing anyway."
96. let RM slip out
"Who let this understanding slip out?"
97. deliver self of RM
"He delivered himself of a great deal of anger."
98. RM pour out
"Interesting ideas just seem to pour out of that man."
99. RM flow out
"Don't let your feelings flow out so freely when he's around."
100. RM gush out/forth
"Let your emotions gush right out - that's what we're here for."
"All these thoughts can't gush forth at once, you know."
101. RM ooze out
"Her sympathy just oozes out."
102. RM escape someone's lips
"That idea will never escape Mary's lips."
103. throw out RM
"I just want to throw out some new ideas for you folks to look at."
104. throw RM EX LOC
"You can't just throw ideas onto the page any old way!"
"Mary throws her ideas at the reader too fast."

- (EX LOC stands for *external locative*, that is, any expression denoting a place external to the speaker or writer's head.)
105. toss out RM
"I shall begin the class by tossing out some apparently very simple thoughts."
106. blurt out RM
"You always blurt out your feelings before anyone is ready to cope with them."
- F. Implying that repertoire members are reified in this external "space," independent of any need for living humans to think or feel them.
107. RM float around
"That concept has been floating around for centuries."
108. RM circulate
"Those precise thoughts began circulating shortly after your birth."
109. RM move
"In America, ideas tend to move from the coasts to the middle of the country."
110. RM make its/their way
"The concept made its way very quickly into the universities."
111. RM find its/their way
"These feelings found their way to the ghettos of Rome."
112. RM arrive
"A fantastic idea arrived in the mail this morning!"
113. RM travel
"The notion traveled from Russia to China that communism would have to be modified."
114. find RM in/at L
"You won't find that idea in any bookstore!"
(L stands for any edifice or room containing reading matter.)
115. RM be in/at L
"I'm sure those thoughts are already in the library."
116. find RM in B
"You can find that idea in several books."
(B stands for those physical objects that normally contain writing - i.e., "magazines," "newspapers," etc., and also expressions like "on microfilm.")
117. RM be in B
"I'm sure those thoughts are in some magazine."

118. RM be on radio/television/tape/records
"That kind of anger has never been on television."
119. immerse self in RM
"He immersed himself in the fresher ideas of topology."
120. bury self in RM
"Don't bury yourself in these concepts in any case."
121. lose self in/among RM
"She lost herself among her intense feelings."
"She lost herself in the feeling of grief."
122. wander among RM
"Harry was now free to wander happily among the ideas of the more learned hedonists."
123. kick RM around
"We were kicking around some of Dave's ideas."
124. toss RM back and forth
"They tossed your thoughts back and forth for over an hour, but still could not make sense of them."
125. throw RM around
"That professor throws around esoteric ideas like it was going out of style."
- G. Implying that the reified repertoire members may or may not find their way once again into the heads of living humans.
126. absorb RM
"You have to absorb Plato's ideas a little at a time."
127. RM sink in
"Harry just won't let certain kinds of thoughts sink in."
128. take RM in
"You have to learn to take in your friends' emotions and react sensibly to them."
129. internalize RM
"Marsha has obviously not internalized these ideas."
130. catch RM
"It was a notion I didn't catch right away."
131. get RM
"We didn't get that idea until very late in the semester."
132. RM come to someone
"Then the thought came to me that you might have already left."
133. RM come to mind
"Different ideas come to mind in a situation like this."
134. RM come to someone's ears
"The thought of doing things differently came to my ears in

- a very curious fashion."
135. soak up RM
"You should see him soak up ideas!"
136. stuff someone/someone's head with/full of RM
"That have already stuffed his head full of radical ideas."
137. cram (RM)
"I'm cramming history tonight for tomorrow's exam."
"Cramming most of the major ideas of organic in a single night is impossible."
"I'm sorry, but I have to cram this afternoon."
138. shove RM into someone/someone's head
"I've shoved so many ideas into my head today I'm dizzy."
139. RM go over someone's head
"Of course, my ideas went right over his head."
140. RM go right past someone
"It seems like the argument went right past him."
141. RM fall on deaf ears
"Her unhappy feelings fell on deaf ears."

Part Two: Other metalingual resources

Many of the expressions below can be used with common adjuncts to form statements that support the conduit metaphor. Thus, it is only when they are used without these adjuncts that they can be thought of as alternatives. To make this apparent, I shall present starred examples which show how easily the neutrality of these expressions can be lost. There are also expressions which appear to involve the conduit metaphor in one reading, but not in another. These I shall flag with a question mark.

I. Alternatives to Categories IA, IB, and IE of the Conduit Metaphor: Expressions which do not imply that language functions like a conduit, or that speaking and writing are acts of insertion into the words or ejection into an external space.

1. speak of/about RM (to someone) (NLI s)
"Please speak to me more clearly about your feelings."
(NLI stands for any *non-locative instrumental*, such as "with," "by means of," etc. To be ruled out here are the *locative instrumentals*, "through words," and "in words," which signal the conduit metaphor.)
"Speak to me of your feelings using simpler words."
*"Speak to me of your feelings in simpler words."

2. talk of/about RM (to someone) (NLI s)
"Mary talked about her new ideas."
"Harry talked about his ideas using very complex sentences."
*"Harvey talked about his ideas through very complex sentences."
3. write of/about RM (to someone) (NLI s)
"John can write of his feelings with real clarity."
*"Try to write about your feelings in simpler words."
4. state RM (to someone) (NLI s)
"State your thoughts plainly."
*"State your thoughts in other words, please."
- ?5. communicate (of/about) RM (to someone) (NLI s)
"Is that the feeling you are trying to communicate?"
*"Why not communicate this thought in the next paragraph?"
6. tell someone of/about RM (NLI s)
"John told you about those ideas yesterday."
*"Mary told me about her sorrow in graphic sentences."
7. inform someone of/about RM (NLI s)
"I informed them of my changing ideas."
*"Did you inform him of your feelings through words he could understand?"
8. mention RM (to someone) (NLI s)
"You should never have mentioned the idea to Harry."
"When I mentioned the thoughts to John, I used the same words I used with you."
*"When I mentioned the thoughts to John, I did it in the same words I used with you."
9. express RM (to someone) (NLI s)
"I cannot express these feelings accurately."
*"Perhaps you should express your concepts through other words."
10. report RM (to someone) (NLI s)
"You can report your ideas using layman's language."
*"Report your feelings in different words."
- ?11. describe RM (to/for someone) (NLI s)
"Describe those concepts for me again."
*"Rich described his feelings in beautiful words."
- ?12. sketch RM (for someone) (NLI s)
"We only have time to sketch the ideas right now."

- *"When you sketch a thought, don't do it in such complicated sentences."
- ?13. impart RM (to someone) (NLI s)
 "It's difficult to impart ideas to a class like this."
 *"I'll have to impart the idea in different words."
14. give notice of RM (to someone) (NLI s)
 "What she gave notice of was her feeling of isolation."
 *"You gave notice of your attitude in words you should not have used."
15. make RM known (to someone) (NLI s)
 "When did you make your idea known to her?"
 *"You may have tried to make your anger known to them, but you did it in words that were bound to fail."
16. advise someone of/about RM (NLI s)
 "Did you advise them about your feelings?"
 *"You certainly advised him of your ideas in the right phrases."
17. apprise someone of/about RM (NLI s)
 "Mary did not apprise John of her thoughts."
 *"John apprised the repairman of his feeling through the simplest of words."
- ?18. acquaint someone with RM (NLI s)
 "I acquainted them with your feelings."
 *"You cannot acquaint him with the idea in those words."
19. enlighten someone about RM (NLI s)
 "How will you enlighten Mary about your thoughts?"
 *"If you enlighten them about the concept in those words, he may never speak to you again."
- ?20. disclose RM (to someone) (NLI s)
 "When you get ready to disclose the ideas, let me know."
 *"I would disclose the thoughts first in German, and only later in English."
21. notify someone of/about RM (NLI s)
 "Have you notified anyone of these new feelings?"
 *"Notify your readers of this idea immediately in the first paragraph."
22. announce RM (to someone) (NLI s)
 "You should not announce these attitudes to the group."
 *"You certainly could announce these ideas in different words."
23. bring news of RM (to someone)
 "Henry brought news of Jeri's ideas."

24. bring tidings of/about RM (to someone)
 "Someone should bring tidings of these thoughts to the world at large."
25. give account of RM (to someone) (NLI s)
 "He could not give a clear account of Einstein's ideas."
 (Starred examples exist for any core expression with the NLI s adjunct. But since the format of these should be clear by now, I shall cease to provide such examples at this point.)
26. discuss RM (with someone) (NLI s)
 "I have never discussed my thoughts with John."
27. converse about RM (with someone) (NLI s)
 "You should learn to converse intelligently about your feelings."
28. exchange words about RM (with someone)
 "John and I exchanged words about our feelings."
29. have verbal interchange about RM (with someone)
 "The class had several verbal interchanges about the new concepts."
- ?30. publish RM (NLI s)
 "When are you going to publish your ideas?"
- ?31. make RM public (NLI s)
 "John does not know how to make his attitudes public."
- ?32. disseminate RM (NLI s)
 "How can we disseminate such ideas?"
- II. Alternatives to Categories IC and IF of the Conduit Metaphor: Expressions which do not imply that words contain or convey meanings, or that ideas exist independent of human beings in an abstract "space."
33. s symbolize RM
 "Words symbolize meanings."
 "Gestures can symbolize various emotions."
34. s correspond to RM
 "The sentence corresponds to my thoughts."
35. s stand for RM
 "Sentences stand for human thoughts."
- ?36. s represent RM
 "Language represents our thoughts and feelings."
- ?37. s mean/have meanings (to someone)
 "I hope my words mean something to you."
 (It appears that we make up for the poverty of this category by reusing many Category I expressions with s words,

as opposed to humans, as subjects. Thus, "John's words tell us of his ideas," or "This sentence states your thoughts plainly." Whether this personification of the signals is linked to the conduit metaphor or not, I have not yet determined. The conduit metaphor does view words as containing ideas just as humans do, however, which could provide motivation for the transfer. That is, the signals could be "giving us the ideas they contain," just as, in speaking, humans "give us the ideas they contain." This question will have to await deeper analysis.)

III. Alternatives to Categories ID and IG of the Conduit Metaphor: Expressions which do not imply that reading and listening are acts of extraction, or that reified ideas reenter human heads from an abstract "space."

38. understand s/RM – but not *understand RM in s

"I have some trouble understanding the sentence."

"I can rarely understand his thoughts."

*"I have never understood the meaning in that essay."

39. comprehend s/RM – but not *comprehend RM in s

"Have you comprehended the sentence?"

"She does not comprehend my thoughts."

*"John comprehends few of the thoughts in Mary's paper."

?40. grasp s – but not *grasp RM or *grasp RM in s

"I have not yet grasped the sentence."

*"I have had little time to grasp his thoughts, especially the meaning in the last chapter."

41. construct a reading for s

"It is easy to construct a reading for that sentence."

42. build a reading for s

"How do you build readings for sentences like that?"

?43. get reading for s

"How did you get that reading for that phrase?"

?44. interpret s

"I find it hard to interpret his paragraphs."

45. follow s

"I could follow his sentences easily."

Metaphor, Induction, and Social Policy: The Convergence of Macroscopic and Microscopic Views

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Metaphor can be studied in many different ways and at many different levels, any one of which may lead to valid insights into the nature of metaphoric generation, comprehension, and appreciation. The insights of any one approach to metaphor are perhaps most convincingly validated when they converge with the insights of a distinctly different approach, leading the student of metaphor to much the same conclusions, without regard to the particular method from which the conclusions derived.

In his lucid and enlightening analysis of generative metaphor, Schön has reached conclusions strikingly similar in many ways to those we have reached in our analyses of metaphor and induction. As anyone might expect, where two independent research programs are involved, there are a number of theoretical issues that are addressed by one of the research programs but not by the other. However, in the central core of overlapping issues, there is clear convergence in the conclusions we have independently drawn. In this chapter we should like to point out and discuss the sources of convergence.

What follows is divided into three sections. In order to relate our work to Schön's, it is necessary in the first section to say something about the motivation, approach, theory, and methods that underlie the work in our laboratory on metaphor and induction. These underpinnings of our research differ in many respects from Schön's. Then, it is possible in the second section to draw parallels between our conclusions and those of Schön regarding metaphor, induction, and social policy. In the third section, we restate five basic questions about metaphor posed by Verbrugge and McCarrell (1977) and by Schön, and discuss how they are answered, or at least addressed, within our view of metaphor.

Metaphor and induction

This section is divided into three parts. In the first two, we describe two different lines of research that address the relationship between