

On the Relation between Language Teaching and Testing

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Abstract

For well over a decade, theoreticians have generally agreed that what is needed by linguists, language teachers, and testers is a more consistent, comprehensive, and parsimonious theory of how language works in communication, how it is acquired by children (and others), and how it comes to be related systematically through the conventions of particular grammars (i.e., of particular languages) to the common world of experience. Here a number of theoretical advances are discussed and certain implications for language teaching and testing are considered. The fundamental flaws of discrete-point approaches, including the British notional-functional syllabus, are pointed out in the light of the theory of true narrative representations (TNRs) and its corollary theories (Oller 1993, 1995, 1996a). Even isolated conversational vignettes that aim for authenticity ought, according to the theory (Taira 1992) to be subordinated to a meaningful story line (i.e., a true or at least plausible narrative). Scrambled snapshots of experience ought not to be used (cf. Al-Fallay 1994, Jespersen 1904, Oller & Richard-Amato 1983, Oller 1993). Tests also can be expected to work better as they are made more and more to resemble the kinds of language uses that ordinary discourse most commonly gives rise to, i.e., those of the TNR variety (Oller & Jonz 1994).

It is a pleasure and honor to contribute a paper about language teaching and testing on the 20th anniversary of the oldest national language teaching journal of Thailand. A lot of water has flowed into the sea since *Pasaa* was inaugurated in 1977. Various issues of the journal have reported longstanding problems

and certain advances have also been recorded. We don't ordinarily think of a scholarly journal as a friend but *Pasaa* has become a familiar companion at least to many scholars around the world. During its two decades of existence, some of our friends actually have moved on and new ones have joined us. May the present issue

of *Pasaa* not only mark a significant milestone of scholarly achievement in Thailand—a coming of age of the journal—but may it also serve as a trumpet call for better things still to come. Because knowledge can only advance through the sharing of ideas—which is the essential purpose of a journal such as *Pasaa*—we can be sure that it is a good purpose and deserves to be well served. May it be so.

The Need for a Consistent, Comprehensive, and Parsimonious Theory

While it has been popular from time to time (Spolsky 1978, 1983, 1989) to try to divide up the history of developments in our field into distinct periods, influences, or trends, the proposed boundaries, and especially the stair-step-like advances that have sometimes been described, are probably illusory. As the German polymath, G. W. F. Hegel [1770-1831] observed:

'What experience and history teach is this—that people and governments never have learned anything from history, or acted on principles deduced from it.' (in translation by Sibree 1956: 6)

Instead of progressing in the way of climbing a ladder from the bottom toward the top, as we might hope or wish, theoretical advances occur spasmodically. As the prophet Isaiah correctly noted many centuries ago, they come 'here a little, there a little; that they might go and fall backward . . .' (28:13, *King James Version*). Actual advances in thinking are only loosely coupled to experiments and even less closely to changes in practice. Genuine progress is often difficult to discern when it does occur, sometimes in some isolated corner of the world, and it stands a good chance of being ignored indefinitely or squelched before it is disseminated. Progress occurs, it seems, in fits and starts. There is usually plenty of clamoring

and no small amount of recidivism. Backsliding is as common as jungle rain.

Nevertheless, today there is a large and growing consensus among researchers and practitioners that a good theoretical understanding of how language works is essential. We need to know (1) how communication succeeds when it does, (2) how language acquisition normally proceeds in both primary and nonprimary language contexts, and (3) how grammars really function once they are internalized by normal language users.

Stephen Krashen (1982, 1984, 1985, 1993, Krashen & Seliger 1976) has aimed for an adequate theoretical perspective, as the highest priority, for more than two decades. Similarly, Jim Cummins (1981, 1983, 1984, 1989), agreeing with Canale & Swain (1980; also see Canale 1983 & Swain 1983), along with others, has repeatedly issued the call for a richer and more coherent theoretical understanding of language proficiency in relation to other mental constructs including school achievement and intelligence. During the same time, a number of other scholars agreed and participated in the needed work (Bachman 1990, Bachman & Palmer 1981, 1982, 1996, Carroll 1961, 1983, 1993, Cohen 1975, 1994, Cziko 1978, 1982, 1983, 1984, Damico 1985, Damico, Oller & Storey 1983, Fouly, Cziko & Bachman 1990, Lange 1990, Oller 1979, Oller, Chesarek, & Scott 1991, Oller & Jonz 1994, Oller & Perkins 1978, 1980, Savignon 1972, 1983, Savignon & Berns 1984, 1987, Stansfield 1990). Various theories have followed (Bachman 1990, Carroll 1993, Guerrero 1994, Oller 1993, 1996a, 1996b, 1997).

Bachman and Carroll, along with a number of others—e.g., Jensen (1980, 1995), Herrnstein (1973), Herrnstein & Murray (1994), Jacoby & Glauberman (1995)—have been concerned mainly with testing as such, but, for my part, I have always had in mind teaching,

testing, and other applications (Oller & Damico in press, Oller & Rascón in press, Oller & Wiltshire in press). While the idea has been criticized (by Hughes & Porter 1983, Davies 1984, and others), two reasons have encouraged me to believe that a fully consistent, comprehensive, and parsimonious theory of signs is possible. First, children acquire languages and relate them to all of their experience of the world. Therefore, a coherent theory of all possible signs ought to be attainable. Second, C. S. Peirce [1839-1914] (see Fisch et al. 1982-present, Hartshorne & Weiss 1931-1935, Ketner 1992) not only thought such a theory to be possible, but made some serious progress toward developing it in his logic of relations and its corollary theories. Therefore, a coherent theory of the right kind ought to at least be sought.

History Still Counts

In spite of the difficulty of figuring out history, we should not, I believe and I sincerely hope that I do not, discount the importance of past events leading up to the present state of affairs. We owe a great debt to the contributors of the distant past as well as colleagues of the present. Also, we cannot, I believe, deny that some genuine advances have occurred in the twentieth century and especially since about 1992. For instance, language teachers everywhere are indebted to pioneers like Otto Jespersen (1904) who first expressed the very sensible idea that discursive events normally are connected not only to each other (cf. Oller & Richard-Amato 1983, and Richard-Amato 1988 on the 'episode hypothesis') but also to the world of experience. He insisted that these connections ought to be reflected in curricula for language teaching. Harold E. Palmer (1921) clarified that connection further by showing the special deictic powers of commands and their intrinsic usefulness from the earliest stages of

normal language acquisition in children and in second language learners as well. This same theme would be taken up again in later years by such creative minds as Mary Finocchiaro, Caleb Gattegno, J. J. Asher, John Rassias, Stephen Krashen and Tracy Terrell, Sandra Savignon, Patricia Richard-Amato, and their followers. Nor should we forget the champions of communicative uses of language as represented in people like Emma Marie Birkmaier (1958, 1968-1971), Dwight Bolinger (1968), Mary Finocchiaro (1964), Rebecca Valette (1964, 1967), M. A. K. Halliday (1973), Leonard Newmark (1966), John Oller, Sr. (1963, 1965), and Sandra Savignon (1972, 1983; also, Savignon & Berns 1983, 1987). Many others could be mentioned. All these would oppose over a period of decades the notion that surface-forms of language could be analyzed, taught, and acquired without being related through sensible communications to the ordinary world of experience. Indeed, their voices, and a few others, continued to argue the good sense of retaining the communicative uses of language in the classroom when all the world seemed to be going the way of nonsensical analyses.

Oddly, on what I believe has proved a false trail, some even recommended pattern drills *completely* stripped of meaning (Nelson Brooks 1964, and Rand Morton 1966a, 1966b). These practitioners were inspired by the American structuralists—especially, Leonard Bloomfield (1933), Zellig Harris (1947), and Noam A. Chomsky. Later, Chomsky would revise his position repeatedly on many issues, as is to be expected of a careful thinker. It is fair to say that his theoretical position came to embrace a much broader range of issues than he entertained at the beginning (e.g., compare Chomsky 1965, 1973, on semantics, pragmatics, and other issues with 1980, 1981, 1982, 1993, 1995). Nevertheless, he and his most stalwart supporters, even to this day persist in denying

that communication as such plays *the* crucial role in language acquisition and use (Chomsky 1993, 1995, Jackendoff 1983, 1987, 1994, Pinker 1994). I have always maintained that he was wrong in this (Oller, Sales, & Harrington 1969, Oller 1970) and do so even now.

As we reflect on the history of language teaching and testing, we should also remember that Rebecca Valette and Mary Finocchiaro were among a small group of teachers *and testers* who stood among the vanguard of advocates of discourse-based integrative procedures well before the latter concepts became popular with the theoreticians. We should also recall Savignon's ground-breaking effort in 1972 reminding us all of the importance of communication. It was, unfortunately, an idea that fell upon hard times and has remained in hard times under Chomsky's leadership (1957, 1973, 1993, 1995).

I must also acknowledge that during the 1980s the research of Upshur & Homburg (1983), Bachman & Palmer (1981, 1982), Vollmer & Sang (1983), Farhady (1983) and others helped to show that the unitary competence hypothesis (UCH), which I had proposed in 1976, was incorrect. That is, I was wrong in supposing that certain results reported then and in other studies (the Appendix to Oller 1979, and in Oller & Perkins 1978, 1980), sustained the unitary competence hypothesis (the UCH). The idea that all the reliable variance in any battery of language proficiency measures could be attributed to a single general factor of language proficiency was wrong. I noted in several contexts that the UCH was the simplest of all possible hypotheses concerning language tests, and that it was thus worth ruling out, but my enthusiasm for the (false) possibility that it might be correct overshadowed all else.

Upshur & Homburg (1983), Carroll (1983), Vollmer & Sang (1983), along with others, showed that the idea, as I originally

brought it forward, was supported by an inappropriate statistical procedure—namely, principal components analysis (commended by Nunnally 1967) where principal factoring (per Harman 1967, Carroll 1983, and others) should have been preferred. The arguments of Carroll, along with those of Upshur & Homburg, I believe, were the strongest because they showed that in principle every general component (or general factor) *must be* divisible in a multitude of ways into other components (or factors). In fact, this had been evident to Spearman himself, and was certainly widely known at least from the time of L. L. Thurstone (1945) forward. Also, as Carroll (1983) noted, Nunnally (1967) had already been taken to task for the very procedure that, unfortunately, I applied. Although I admitted my errors concerning the UCH in several international meetings in 1980 (in San Francisco; Darmstadt, Germany; Singapore; and Albuquerque), the damage was hardly repairable.

In 1983, however, I showed, as John Carroll had already noted at two of the international meetings in 1980 (Darmstadt and Singapore), that even after the statistical and conceptual errors were expunged, the general factor of language proficiency still accounted for the lion's share of the total variance in almost any battery of language tests—including many passing under the headings of 'IQ', 'achievement', and even 'personality'. For instance, in one of the studies showing that a second significant factor existed in addition to the general factor, Purcell (1983) found that his two-factor solution, which included a number of attitudinal variables, accounted for a total of 72% of the total variance while a single factor solution accounted for about 70% all by itself. The fact is that a single general factor really does account for the bulk of the variance not only in language proficiency tests, but in mental tests of a wide variety including all of the

traditional IQ tests, both verbal and nonverbal. Moreover, a far more powerful theory was developed in the 1990s (cf. Oller 1993, 1995, 1996a, 1996b, 1997) showing why this result is both to be expected and why it cannot be dismissed as a statistical artifact. Moreover, the general hierarchical theory of signs (or semiotics) that has been developed is not at all incompatible with the theories of Bachman and Carroll as discussed in the next paragraph.

Nevertheless, throughout the 1980s and into the 1990s, the confirmatory investigations of Bachman & Palmer (1981, 1982 and many other authors) sought to compare rigorously the most extremely distinct theories of how best to divide up the general factor of language proficiency. Bachman (1990) summed up and evaluated his and Palmer's contributions to that research, along with the contributions of quite a few other authors. He concluded that a three-factor system is to be preferred according to the best confirmatory methods. Carroll's much more extensive investigation of nearly a century of research on mental tests of all kinds (Carroll 1993) reaches a similar, though perhaps not so definite, conclusion. Carroll supposes that an analysis with a minimum of three tiers (and where the middle tier can often be decomposed into one or more additional tiers) is appropriate for most batteries of mental tests. Carroll includes language proficiency measures as the main verbal components in IQ tests along with whatever nonverbal, performance inventories and the like may also be added into the mix. According to Carroll's extensive analysis, and his own history of work with the data on the subject, all tests have some specific components that can be broken out on the lowest tier, collected on the next one (or possibly the next several tiers) into two or more group factors, and finally joined up into the *g* or 'general factor' of intellect on the third tier.

Arthur Jensen (1980, 1995), Herrnstein &

Murray (1973, 1994), and the relatively small clique of IQ test-enthusiasts of whom these last three authors have approved, have made much in recent years of Spearman's general factor, now widely referred to as *g* (cf. Spearman 1904). Ever since 1969, Jensen has acknowledged that the best correlates of the general factor are invariably verbal tests. These are usually primary language proficiency measures though verbal tests are all too often inappropriately applied to nonnative speakers as documented by Figueroa (1989) and by Valdés & Figueroa (1994). Jensen and his supporters (including Herrnstein & Murray at least since 1973) have argued that nonverbal tests are also good predictors of the *g* factor. They see no problem in the fact that the best correlates of nonverbal measures are verbal tests in the primary language of the subjects tested. Recently, it has been shown, however, on purely logical grounds that all abstract nonverbal tests of reasonable complexity (excluding mazes and certain purely sensory-motor perceptual tasks; cf. Oller 1997; also Oller & Chavez 1997) necessarily depend on access to semantic concepts that can only be attained through a natural language system—ordinarily the primary language of the subjects tested.

Carroll (1993, 1995) disagrees heartily with many of Jensen's conclusions, but nevertheless acknowledges that almost any battery of mental tests really can be judged to consist mainly of variance attributable to an underlying general factor similar to the one first identified long ago by the inventor of factor analysis, Charles Spearman (1904). Further, Carroll's meticulous research and historical analysis also bears out the general consensus of the research showing that the best predictors of the general IQ factor are, without any significant exceptions, verbal scores. Thus, comes the question: *how much of the general factor of IQ is attributable to primary language abilities and*

how do tests of nonprimary language abilities (second language proficiencies) fit into the picture? To me, this last question has been one of the focal points of the research I have undertaken over the last 17 years or so. I have agreed with Carroll, Vollmer, Cummins, and others that what has been needed all along is a richer, more comprehensive, and more parsimonious theory.

A General Theory of Signs

Language teaching and testing over the two decades of the history of *Pasaa* have been subjects of a number of interesting controversies. The main arenas of the discussions, research, etc., have been three:

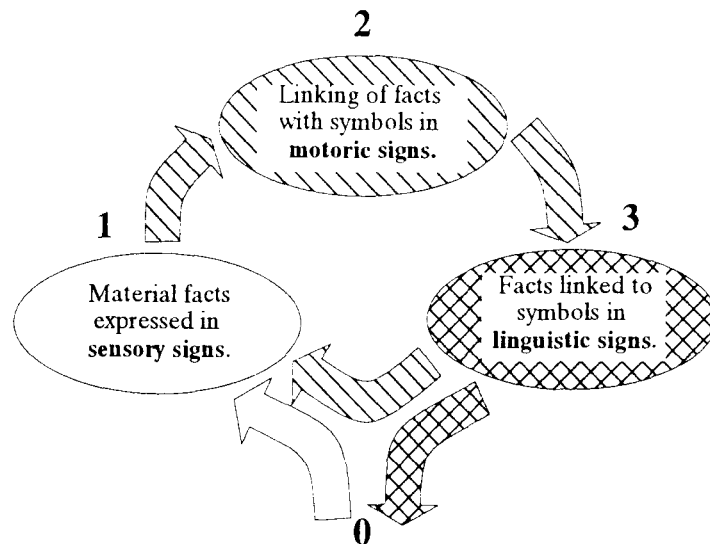
- First, there have been a host of questions concerning what role(s) should be played by the forms of language—especially, which grammatical theory to prefer.

- Second, there have been many questions about how to make language forms available, comprehensible, and retrievable from the experience of learners.

- Third, there have been questions about whether or not the world of ordinary experience has a significant role to play or whether it can safely be taken for granted.

These three arenas of investigation correspond to the three main elements of the process of making sense of discourse, also known as pragmatic mapping, and commonly called ordinary communication (e.g., Krashen 1982, Richard-Amato 1988, Oller 1993). Moreover, as recent theory shows (Oller 1996a, 1997), the three questions just laid out are intimately interrelated with one another.

In ordinary uses of language, as shown in Figure 1, sensory information from the material world of space and time (at position 0) is gathered into sensory signs (at position 1). These are attended to by sign-users with the aid of motoric signs (position 2)—acts of perception and production, and come to be linked to abstract linguistic signs (position 3)—thoughts and ideas, utterances or speech acts, conventionalized gestures (as in manually signed languages), and writing. Sensory signs, of course, are what we take to be the material facts of our experience. So long as they are indeed backed up by corresponding facts in the material space-time continuum, our perceptions (i.e. sensory signs) are valid. However, to experience perceptions of any kind, it is necessary for us to act on the world (i.e., through motoric signs). Further, all normal human beings go one step further in determining the character of their experience through words, phrases, and discourse (linguistic signs) as known through the grammatical conventions of one or more languages. Interestingly, it has been proved by exact Peircean logic that all conceivable signs are derived from just the three kinds shown in Figure 1.



... The material space-time continuum...

Figure 1. The dependence of all signs on the material space-time continuum.

How Signs Can Be Studied

Concerning sign systems, three fundamental questions can be asked. We can ask: (1) *What enables signs to be true of their subject-matter?* The field of study usually addressing this question is called **logic**, and in its purest, most rigorous and most abstract form it is called **mathematics**. Its subject-matter pertains most directly to what is normally called **semantics**. Linguists, language teachers and testers have generally not worried much about question 1 but have left it to logicians and mathematicians. (2) *What enables signs to be well-formed?* This question underlies the study of **syntax** but is usually referred to by the broader and more common term **grammar**. This question has concerned linguists a good deal and language teacher and testers too. (3) *What enables signs, any signs whatever, to be meaningful?* Oddly, this question produces a field of study that has concerned very few

thinkers besides C. S. Peirce, the great American polymath and semiotician. It has no widely accepted name. The term **rhetoric** comes close to the mark and was even suggested by Peirce, but the field that goes by that name claims a different goal than to explain the material content of signs. The subject-matter is closest to what nowadays is usually called **pragmatics** (following Charles Morris, though he did not map the territory well himself).

For reasons that will become obvious to those who study the questions carefully, the one I have put third in my list is by far the most basic and the one on which the answers to the other two questions absolutely must depend. It can be strictly proved that if a sign cannot be judged meaningful in a consistent way (from the view of its pragmatics) there is no hope of its ever being found out to be well-formed (from the view of its syntax). This may surprise many linguists, but is a proposition demonstrated

elsewhere (Oller 1996a). Also, if a sign is not well-formed (in its syntax) it cannot be true (i.e., from its semantic point of view). I will not prove these specific propositions here because it would take up too much space to do so, but I will lay in the groundwork so that anyone wishing to derive the proofs will be able to supply adequate arguments in their favor. Instead, we pass on to the most basic question and to the theory that has enabled us in a consistent, comprehensive, and parsimonious way to answer it definitively—namely, how do any signs get their meaning.

True Narrative Representations

The *most basic meaningful sign* (which happens also to be well-formed and true) is a balanced trinity of the three distinct kinds shown in Figure 1 (Oller 1993, 1996a, 1997). This kind of sign forms the *only possible basis* for the meanings of all other signs. This proposition I will prove. The most basic building block of all meaningful signs is called a **true narrative representation (TNR)**. This designation is applied because every TNR (1) signifies facts that are (2) actually true of the world of experience and (3) that are revealed in the representation as a story—a narrative—unfolding over time. This kind of sign, the TNR, is actually the most ordinary and common of all the signs that human beings employ on a regular basis.

For instance, suppose someone awakens early in the morning, hears a bird singing outside the open window, observes that it is getting light outside, and says, 'The night is past and the day has arrived.' Suppose further that their senses are working appropriately, that there really was a bird singing outside the open window, and that it really has gotten light, that the night has actually passed, and that a new day has arrived. In any case resembling this one, the

resulting representation is a TNR. Or take a couple more examples. Suppose some boy named Billy (or give him any name you like) falls from his bicycle (or pick any other event that actually happens to Billy), and some competent observer remarks, 'Billy fell off his bicycle.' This too would be a TNR. Or suppose someone performs a certain experiment. For example, Galileo drops a couple of rocks of different sizes from a certain tower at about the same time. Meanwhile, a friend on the ground observes and later reports that the stones also arrived at the ground at about the same time. The heavier stone did not fall faster as some had wrongly supposed it must. Galileo writes in his journal that the light and the heavy rock fell at the same rate. This also is an example of a TNR. In fact, TNRs are the most common variety of representations in all the world, and I will show why they are *the source of all the meaning of any signs*.

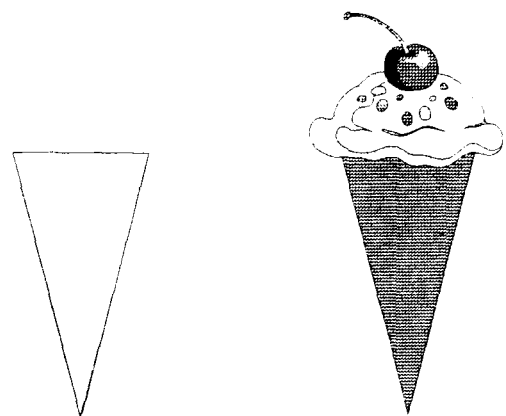


Figure 2. A triangle as an imperfect, or degenerate, representation of a cone.

In addition to TNRs, we discover that there are just four other important kinds of meaningful sign systems: **fictions**, **errors**, **lies**, and what we will call **generals**. I will show in a moment how all of these are **degenerate** in the strict mathematical sense of the term, but first let me say what is meant by **degenerate**. Suppose we use a certain diagram to represent something else. Say we use the triangle at the

left side of Figure 2 to represent the cone under the ice cream at the right hand side of that figure. In the case chosen, in Figure 2, the sign, the naked triangle, fails to represent all the properties of the object signified. For instance, the triangle on the left does not show the hollow part of the cone. It does not show the roundness of the cone if viewed from the top. It does not show its depth if viewed from the front. And so on. In such a case, the sign is **degenerate** in the sense of being *incomplete or imperfect relative to its object*. This is all that is meant by the term **degenerate**.

Compared against TNRs all other signs are formally degenerate in one or more specifiable ways. For instance, consider **fictions**. These are signs that purport to be about particular facts, but yet the facts do not have material status in the world of experience. If they did have that status, the representations would not be fictions but TNRs. Thus, fictions are degenerate with respect to the particular facts they purport to be about. The purported facts, in fictions, lack material status. For instance, ask how much the raft constructed by Tom Sawyer and Huck Finn weighed. Unless the author of that fiction, Mark Twain, should have told us, we cannot find out. The raft is a fiction and cannot be weighed as a material raft could be.

Next consider **errors**. This kind of sign includes all illusions, hallucinations, and mistakes of any kind where something in particular is mistaken for something else in particular. Suppose, for example, we think we see a certain person we know. We wave at the individual we have singled out but it is someone else, not our acquaintance. Our error is a degenerate representation in two ways. The facts are not what we supposed them to be and the representation we constructed of those facts was not the one we eventually settled on after

realizing our error. We think something like, 'There goes Marie! Uh oh! That's not Marie. It's a stranger.' We start out with a doubly degenerate error and end up with a TNR. The TNR is what enables us to discover our error. But all errors are doubly degenerate in exactly this way.

Next consider **lies**. This category includes all forms of deliberate deception. In all such cases we find a triple degeneracy. The facts are not as they are represented to be in the lie. The representation is false and will produce an error if it is believed. And, the linking of the representation with purported facts that are known to be false (by the liar) is deliberate and intended to deceive. But all lies are like this. Therefore, all lies are triply degenerate relative to TNRs. To find that any lie is in fact a lie, it is essential to replace it with one or more TNRs.

Next consider what we are calling **generals**. First, let us consider the negative definition of this term from logic. We may say in a negative way that it applies to all signs that are not **particulars**. The latter, **particulars**, are all signs that aim to or pretend at least to refer to some actual fact(s). Particulars include all TNRs, fictions, errors, and lies. In fact, we can easily prove that there are no other particulars than these four kinds because nothing can be more particular in its reference than a TNR and we have already shown that fictions, errors, and lies are degenerate forms of TNRs. A fiction is a TNR with the material facts removed from the structure (imagine doing this in Figure 1 and you will get the right idea). An error is a similar case with two of the elements of the TNR being corrupted—namely, both the sensory signs of the facts and their abstract, usually linguistic, representation. A lie is similar to a TNR except with all three of its elements corrupted—the sensory signs are misrepresented, the motoric signs are intentionally misleading, and the

linguistic signs are also distorted deliberately. Now a more corrupt sign than a lie is not possible relative to a TNR, so all that is left beyond a lie is utter nonsense. Therefore, we have exhaustively examined all the particulars that there are and we have found that only TNRs provide a valid source for any meaning. Whatever meanings fictions, errors, and lies may have must come from TNRs.

Second, let us consider the positive definition of **generals**. These are all signs that purport to be about all or no cases of a given description. For instance, take Aristotle's generalization that 'All human beings are mortal'. This proposition is a **general** because it purports to be applicable to (i.e., it at least pretends to be true of) 'all human beings'. We retain the generality of the proposition if we paraphrase it negatively as 'No human beings live forever'. The statement that 'Dogs have tails' because it must be construed as being applicable to 'dogs' generally is a **general**. Similarly, the statement that 'Baldness is caused by washing the hair' is also a **general** though it is, in most cases, false. But the question of truth or falsehood is not our concern at the moment, rather our question is whether generals are degenerate in the special sense defined above. But, alas, they are. When we compare generals to TNRs, they come up exactly as fictions did. Generals are without particular material facts until and unless they are associated with one or more TNRs. But it comes out that particulars and generals together exhaust all the universe of possible signs. This last statement holds because there are no particulars other than the kinds already examined and other than particulars there are only generals. There are no signs more general than perfectly general ones and between particulars and generals nothing can be found except plurals and these, in all actual cases, are always particulars. Therefore, TNRs are the

only nondegenerate signs in existence. Thus, it comes out that the meanings of all generals and all other particulars are utterly dependent on TNRs.

At this point, I must be brief in summarizing the next logical development from TNR-theory which is the **theory of abstraction**, or **A-theory**. The latter shows how it is possible for a child to progress from raw sensations to a well developed knowledge of the character of objects in the world of experience and their relations to persons, communities, and abstract signs. **A-theory**, as it has been developed (Oller 1996a), shows that there exists a cyclic process that produces a growing spiral leading upward through 30 distinct layers of a rich and dynamic hierarchy of signs. These begin with perceptual impressions and end with linguistic signs that are fully abstract and that have the power to sustain all kinds of inferences and reasoning. At any given level the number of signs can be added to indefinitely, but the number of surface-forms can never, of course, become infinite. However, in spite of this limitation, as sign systems reach the highest level of the hierarchy they achieve a kind of perfected generality that explains why it is that we can talk about anything conceivable. That is, A-theory shows why it is that linguistic systems normally are perfectly general sign systems with the power to integrate and subordinate all other kinds of sign systems. This last result is nonnegligibly important because it has not been possible heretofore to judge for a certainty whether or not linguistic systems were universally applicable to all possible concepts or not. It now appears that they are.

Summing up the key ideas of A-theory briefly, it may be observed that the first signs presented to the burgeoning intellect of a child are sensory impressions. From this raw material the normal child first discriminates objects

where they appear in space-time, then, prescind (separates) images of these objects from them but within the space-time context, and finally hypostatizes (abstracts to a limit) a concept of the object that becomes freed from the former space-time context(s) in which the object was first noted. This three step cyclic process, known as the **abstractive cycle**, is applied repeatedly so as to generate the entire hierarchy of signs. In fact the signs generated are all TNRs, but from these, as TNR-theory has already shown, all other signs, up to the theoretical limit of pure nonsense, must be derived. The system develops as follows: at each step upward in the abstractive cycle, a new level of sign systems is produced. At each new level any number of signs (at that level) can be produced before or after proceeding to the next level, and each time a new sign is produced, that sign product is re-entered into the stream of experience to enrich the stream itself and to provide additional material for the abstraction of other signs. Thus, the product of each phase of the abstractive cycle provides a richer basis for the next phase. Next we must consider the implications of TNR-theory (and its corollary A-theory) for theories of grammar.

Conceptions of Grammar

In a very general way, theories of grammar, not to mention the applications of those theories, have fallen short of the requirements clarified by TNR-theory. Grammarians in particular, the only theoreticians who have much influenced language teaching and testing, have tended to focus on the surface-forms of linguistic representations almost to the exclusion of all else. Concern for meaning was generally missing from theories of grammar up until the 1970s and concern for truth-value is still generally missing. However, what the **theory of**

true narrative representations, i.e., **TNR-theory**, shows is that *only TNRs can provide access to the slightest bit of material content for any signs (pragmatics), or provide a basis for well-formedness (syntax), or for judgments about the truth of any signs (semantics).*

Grammarians, however, have tended to view language in a piece-meal fashion. They have tended to take the most obvious elements of language to analyze, categorize, and reassemble into the components of discourse. This approach has a venerable history in western philosophy and has had a profound impact on language teaching and testing. Sad to say, in taking things to pieces the most important elements of all have almost universally been overlooked and effectively discarded. In particular what the linguistic theories have discarded amounts to the whole of the world of experience and all of the essential particular connections of TNRs with that world. Let us consider how and why this has happened.

At first traditional theories of grammar looked mainly to written words, phrases, etc. Later, with the advent of 'modern linguistics' during the rise of 'philology', especially during the eighteenth and nineteenth centuries, the attention of linguists (e.g., Saussure and his successors) turned to the utterances of language. They generally came to regard speech as the most basic form of language. The subtle error of this assumption has yet to be fully appreciated though it is seen in part in the special difficulties faced by speech-based theories in accounting for manually signed languages (as of the Deaf).

From the outpouring of the various competing approaches, during a period of roughly three centuries, three distinct kinds of grammatical theories could be distinguished. However, I am not claiming that the three kinds fall into a particular historical sequence. In fact, all three can be found in use still today.

However, they do form a natural logical hierarchy as follows:

- (1) There are traditional grammars that aim to analyze and categorize the 'parts of speech', i.e., noun, verb, adjective, . . . , kinds of phrases, clauses, etc. without regard for the particular times and places where these grammatical entities might be applied in the world of experience. I call these **categorical grammars**. What Chomsky formerly called 'taxonomical grammars' all fall into this group. Their degeneracy is double inasmuch as they do not take account of anything more than the material content of the signs they analyze and they do this without regard for any particular facts in the world of time and space. That is, they ignore two of the three critical coordinated systems that are found in the formal structure of TNRs. Categorical grammars ignore the time and place of the particular facts that might be, and in fact are, referred to in TNRs. These types of grammars are reflected in the experience of most elementary school English teachers and in the kinds of exercises of basic texts used to teach grammar through the secondary level in most U.S. schools. The Reed & Kellogg (1877-1909) diagramming method is still used in the most widely used English grammar and composition textbooks (e.g., Warriner 1988) today. That method of grammatical analysis, together with various linguistic taxonomies, illustrates the best results of categorical grammars. Such theories are not wrong so far as they go. On the contrary, they are generally on the right track as Chomsky (1957) noted. However, they are doubly degenerate as shown.

- (2) There are the grammatical theories championed in recent years by linguists such as Chomsky, Jackendoff, Lakoff, Chafe, Halliday, Givón, Langacker, and so forth. These

theoreticians, without any exceptions among them, have settled on **static grammars**. These are systems degenerate in at least one degree relative to TNR-theory. That is, they take account of the content of signs plus either their temporal relations (as falling into a sequence in being uttered), or their spatial relations (as in written texts), but they never account for time, place, *and* particular material content. That is, static grammars cannot fully express the structures of TNRs. Thus, the Chomskyan type grammars, including advances up through government and binding theory and principles and parameters are degenerate in at least one degree. Moreover, all of the critics of Chomskyan theory named above (and all contemporary linguists as far as I know) advocate one or another form of grammar that fails in all cases to pin down the time and place of the material content of sign relations. Therefore, all such theories are called **static** because they are fixed either relative to time or relative to place but not both. *However, they do not and absolutely cannot account for the dynamic moving relations involving the kinds of particular facts that are found in any TNR.*

- (3) Finally, there are grammatical theories that embrace the full complexity of TNRs. I call these theories **systems grammars** because they must allow for the dynamic spatio-temporal relations of particular facts moving and changing in the real space-time continuum. For instance, if I truthfully report that 'I put gas in my car' it must be the case that the gas was contained elsewhere before I put it, not in the passenger compartment, but in the gas tank of my car. Further, the tank must not have contained the gas beforehand, etc. Thus, there is a **dynamic** relation—changing over time—between the movements I perform in getting the gas into the car, while I am also taking some

account of the changes, and later when I am producing/interpreting the spoken or written words that represent those facts in a TNR. Furthermore, it is necessary that the several sets of dynamic relations just described—namely, (i) the ones involved in the facts, (ii) the ones involved in my actions, and (iii) the ones involved in producing/interpreting the linguistic representations—be closely and articulately coordinated with each other in particular relations. The first theoretician to clarify the need for a systems approach as contrasted with the other options (although he did not specify those, nor did he discover the peculiar logical traits and powers of TNRs) was C. S. Peirce in his preamble to the theory of existential graphs (cf. Hartshorne & Weiss 1933, pp. 5-6). Thelen & Smith (1994), and a few of the person they cite, also come close to idea of systems grammars.

Such dynamic coordinations of changing states of affairs is impossible to fully express from the vantage point of categorical grammars owing to their double degeneracy. Categorical grammars cannot even identify a particular fact in space or time, much less in spatial and temporal dimensions of the continuum simultaneously. Also, however, such coordinations are impossible from the vantage point of static grammars owing to their single degeneracy. From the viewpoint of a static grammar it is impossible to coordinate even a single pair of movements owing to the fact that no dynamic *particular* can even be identified much less coordinated with some other *particular*, and much less still can a three part series of dynamic particulars be coordinated with each other in the manner required of every TNR. The reason this cannot possibly be accomplished within any static grammar is that the only relations they can single out for attention are the kind found either in space (as

on a written sheet of paper) or in time (as in an utterance). However, to show how time and space are both coordinated with particular material objects in TNRs requires dynamic coordinations of (1) material objects together with their (2) spatial *and* (3) temporal coordinates. All these relations, moreover, must be taken into consideration at once. This is demonstrably impossible for static grammars (Oller 1996a). It is in fact the dynamic articulation of coordinated sequences of movements that requires a **systems grammar** rather than a mere categorical or static grammar. However, essentially all of the grammatical theories applied to language teaching and testing have been of the categorical or static kinds.

The Western Legacy

Owing to the great influence on western philosophy of Aristotle, the Greeks, Romans, the Scholastics, the Port-Royal philosophers, and those who followed them, especially Chomskyan linguists in the latter half of the twentieth century, education has benefited from an analytical view of its subject-matter, methods, and even its institutions. We have learned well how to divide and differentiate. We can split a hair if necessary and analyze it into its component parts. The twentieth century even witnessed the splitting of the atom itself, formerly thought to be indivisible. Now, if Murray Gell Mann is to be believed, it appears that Leibniz (1691) was right all along. Even the abstracted quirky quark can perhaps be divided toward a limit of infinity.

With such an inheritance from the west, it should come as no surprise anywhere in the world, therefore, that language *teaching* and *testing* have come to be regarded as separate enterprises with distinct purposes and outcomes. Nor should it surprise anyone that the natural lag between theoretical developments and their

applications in practice has resulted in analyses that fall well short of the best **static grammars**. It is also important to see that these grammars and applications of them have tended to focus on the surface-forms of language to the exclusion of nearly everything else. Especially the world of experience in the real matter-space-time continuum has been set aside or taken for granted. Indeed, in the teaching of languages—Thai, English, French, Chinese, etc.—the divisions into categories and subcategories of the surface-forms of grammar, or in some cases the notions and functions of semantics and/or pragmatics, have tended toward an unattainable limit of infinitely fine gradations. The particulars of ordinary material experience, however, as known through TNRs, have generally been denied any place in the theories and their applications.

In 1961, John B. Carroll, still the unrivaled Dean of Language Testing (and several other colleges in the great world-wide university), captured the trend in the distinction between **discrete-point** and **integrative** approaches to language testing. His distinction applied about equally well to teaching, though less has been said about discrete-point teaching in the literature. The discrete-point philosophy was clearly based in the analytical tradition of dividing to conquer. According to that view, in order to thoroughly understand a mechanism, process, or skill, it is essential to take it to pieces.

The Discrete-Point Philosophy

Linguistic science—especially that American branch of it known as 'structural linguistics'—was clearly the source of the richest and most fruitful ideas to be developed along the lines of analytic approaches to language teaching and testing. All of these, it should be remembered, tended to focus almost

exclusively on the surface-forms of speech and/or writing. Leonard Bloomfield (1933) was mainly responsible for this because he insisted that the meanings of language, as reflected in the world of experience, were too rich and varied ever to yield to analysis. Evidently he neglected to notice that children in all cultures succeed in performing the desired sort of analysis when they acquire their native languages. Edward Sapir (1921) took the better road, allowing for experience to play an important role in his thinking, but his voice was fairly well drowned out in the flood of attention accorded to the structuralism of Bloomfield and his successors.

Bloomfield promoted the idea of the 'phoneme' (the minimal sound segment that could signal a functional difference) and soon after a host of other colorful concepts came to populate the growing city of surface-forms. Roman Jakobson, and others who followed Bloomfield, showed that it was possible to split the phonemic units into a relatively small number of 'phonetic features'—about 10 to 20 at the most—that could be used, Jakobson and others believed, to provide a satisfactory account of the phonemes of all the languages of the world. There were, to be sure, some heated discussions about whether the right analytical unit had been found. The syllable, it was urged by Stetson (1945, 1951), and certain others, had been neglected, and was, after all, the only motoric element in all the phonological inventory of possibilities. Syllables were units that could be pronounced.

Nevertheless, the domain of phonology was firmly entrenched forevermore. In addition, the idea that language structures were something like molecules built up out of more elementary particles was also established during the heyday of structural linguistics. Phonemes, it was said, could be combined to form functional or

meaning bearing higher units called 'morphemes', and the latter could be combined to form 'lexemes', which could be combined to form 'phrases', 'clauses', and eventually, all the riches of linguistic discourse in all its forms. It was scarcely realized, of course, that all these combinations together would still fall well short of producing an explanation of even the simplest of TNRs.

It would also have been unrealistic to expect thorough agreement among the experts on just which divisions of the language subject-matter, as confined to surface-forms, ought to be canonized. Because experts earn their money by disagreeing with one another, many competing inventories were certain to be produced. However, one similar to the following would be proposed by some linguists even today:

- phonetic elements
- phonological elements including
 - ◇ distinctive phonetic features
 - ◇ phonemes, or simultaneous bundles of features
 - ◇ syllables, or pulses of pronounceable speech with stress, tone, etc.
 - ◇ phonological phrases carrying distinctive intonations and rhythms
- morphological/lexical elements including
 - ◇ meaningful or functional morphemes, e.g. *pre-*, and *-ed*.
 - ◇ content-bearing lexical items including
 - what are traditionally called 'words', e.g., *dog*, *the*, . . .
 - idiomatic expressions, e.g., *bite the bullet*, *don't go there*, etc.
 - common collocations, e.g., *salt and pepper*, *just a couple of*, etc.
 - verbal routines, e.g., *Hello!* *How are you?*, *Thank you for coming . . .*
- syntactic elements
 - ◇ terminal syntactic categories such as
 - noun
 - verb
 - adjective
 - adverb
 - determiner
 - quantifier
 - preposition, postposition, particle
 - conjunctions, etc.
 - ◇ phrasal categories distinguishing
 - arguments (e.g., the old-time noun phrases and the like)
 - relations (e.g., the old-time verbs, adjectives, tenses, aspects, and moods, that take certain numbers and kinds of arguments)
 - ◇ clausal categories distinguishing kinds of argument structures
 - assertions/negations
 - questions divided into
 - yes-no
 - wh- questions
 - commands (imperatives)
 - conditionals
 - hypotheticals, subjunctives
 - presupposition (before the fact), association (simultaneous with the fact), implication (after the fact)
 - . . .
- pragmatic elements (sometimes referred to as notions and functions, or variously as kinds of discourse, speech acts, and the like)
 - ◇ greetings, leave-takings, openings, and closings
 - ◇ persuasion, dissuasion
 - ◇ exposition, explanation, instruction
 - ◇ hortatory uses of language

- admonition
- asking a favor, pleading a cause, begging
- apologizing, asking forgiveness, telling someone you are a fool, etc.
- ◇ ...
- semantic elements (abstract concepts pertaining to anything imaginable that can be represented in words).

Of course, there is no end of controversies about which elements belong in which inventories, and there is no well-agreed basis for the divisions or for deciding when the component elements are to be regarded as well-analyzed and determined. Worse yet, however, lists like the foregoing can never be made complete. No matter how many additional elements might be added to some part or other of the inventory, and no matter how many different divisions or arrangements of divisions might be examined, it is certain that many others are possible and that countless new elements could be added to any one of them. Further, since languages are completely general devices, as we saw above in connection with A-theory—i.e., because languages are semantically applicable to any thought that can be conceived and because such thoughts are uncountable—it is absurd to suppose that any such list could ever be made complete.

Thus, it was the very success of the discrete-point philosophies—their power to multiply inventories of elements *ad infinitum*—that also assured us of their mathematical and logical degeneracy. Such systems of knowledge can never be completed any more than that we could reach the largest natural number by counting very rapidly. On the contrary, the idea of the 'largest' number (as Leibniz 1691 argued) involves a contradiction that needs to be

expunged from our thinking. Similarly, the hope that discrete-point analyses could ever reach an end likewise involves the same absurdity. The task set by discrete-point philosophy is like trying to count all the points on a line. There is little profit in attempting to carry it beyond some arbitrary limit of diminishing returns. John Carroll saw all this clearly, and, as a result, recommended a complementary approach that he called **integrative**.

The Integrative Philosophy

In addition to taking things to pieces, as the discrete-point philosophy attempted to do, there should be some way, Carroll argued, to get them together again. All the pieces of a clock will not function separately. Neither does a verb without any noun have a determinate meaning. What would *break* mean if nothing in particular were ever broken by anyone in particular? We can easily imagine breaking a glass bottle by accidentally dropping it on a hard tile floor. But can we imagine a meaning for *breaking* without the bottle or the tile floor? In fact, this sort of difficulty holds for every single inventory of elements or combination thereof in anyone's list of discrete elements and their divisions. What, for instance, is a phoneme without phonetic features? What is a syllable without any phonemes or without a rhythmic beat? What is an idiom without words arranged in a syntactic structure or without some semantic value and some pragmatic application? And so forth. Of course, the difficulty arises if we try to move in the opposite direction as well. What is the meaning, value, or function of any bit of discourse all by itself? Perhaps it may seem extreme to say so, but any element of language disconnected from the rest is just so much cosmic junk. It is about as useful as a part of an automobile separated from the rest of it. A carburetor arm is just a piece of metal with a

certain shape unless it is associated with a particular carburetor in the right systematic arrangement to the rest of it. If it is lost on the road somewhere, it will do the vehicle no good at all until it is reconnected where it belongs in the system.

Therefore, besides the idea of **analysis** there needed to be some notion of **synthesis**. The word that Carroll chose to contrast with the **discrete-point** philosophy was **integrative**. The choice was appropriate and the idea took hold. It soon became popular to speak of **integrative testing** and even **integrative teaching**. As soon as anyone was introduced to the distinction between discrete-point and integrative approaches, the fact that a functional whole was superior to ever so many disjointed parts was immediately evident. We might have expected the controversy to end there. In a simpler and less interesting world, it might have.

In fact, for a short while and in a few circles integrative teaching and testing did begin, in a small way, to prevail over discrete-point approaches during the 1970s and thereafter. However, the traditionalists trained in the time-honored methods of taking all things to pieces never really gave up entirely on the idea that by working harder and longer it might eventually be possible to work right down to the very last detail of any given division of any given discrete-point inventory. For instance, the British school of notional-functionalists, headed up by such outstanding scholars as David Wilkins, Henry Widdowson, and others, and with the able financial backing of the British Council, managed a marriage between the burgeoning growth of interest in pragmatics and text-linguistics with discrete-point thinking by analyzing communicative functions into whole new inventories of paradigmatically or syntagmatically related elements. For instance, they came up with marvelous new lists of

inventories of ways to apologize, greetings, leave-takings, requests, refusals, etc. Wilkins (1976: 1) embraced a distinction similar to the discrete-point versus integrative one, but he reversed the usual order. He identified an **analytic** approach with communication-based (integrative) approaches in the language classroom and a **synthetic** approach with (discrete-point) take-it-all-to-pieces and then reassemble-it methods.

Wilkins attempted to show various notions and functions, e.g., predication and attribution, through surface-forms with no contextual support: 'John is fat. John is my wife's brother. John is a pilot. Pilots are skillful.' He also used isolated phrases: 'a *fat* man, a man *with a long face*, a man *who doesn't like flying*' (1976, p. 36). But how is a person who does not know English supposed to figure out which is the predicate or attribute and which is the argument of which it is predicated or to which it is attributed? A little farther along, he gave a list of ways to request to use a phone: 'Am I allowed to use your telephone? Do you mind if I use your telephone? Do you mind me using your telephone? Would you mind if I used your telephone? Would you mind me using your telephone? Would you mind awfully if I used your telephone? If you don't mind, I'll use your telephone. You don't mind if I use your telephone, do you? I'd like to use your telephone. Would you mind? Do you mind? Do you have any objections to me using your telephone?' (p. 60) and so on and so forth for another whole page or thereabouts of requests to use the telephone.

Another variant on the same theme has been recommended by Wright (1989). He uses isolated snapshots and other pictorial illustrations to provide content for which students are supposed to invent connections with surface-forms of the target language. The

trouble is still the same. How can students invent the very connections they are supposed to be engaged in acquiring? If they can do the exercise they hardly need it, and if not, it also cannot benefit them. Either way it benefits them little or not at all.

Unfortunately, however, such analytical, partial and piece-meal approaches to language teaching, as creative as they were, nonetheless resulted in never-ending tasks of trying to complete all the lists of lists. The genius of the work was in taking an integrative idea and analyzing it in all of its facets. Bruce Fraser, George Lakoff, John Ross, James McCawley, Asa Kasher, and even Widdowson and Wilkins had correctly noted that language is used to achieve certain purposes in discourse—e.g., performatives were among Ross's contribution along with their syntactic peculiarities. All this provided the integrative basis. However, the idea of analyzing each of the notions/functions of language into lists of exemplary phrases, sentences, or vignettes led right back to the time-honored discrete-point method. The end of the task, however, could never be reached for reasons already noted. There cannot be any list of all the ways there are to apologize, much less to greet, to take leave, to turn down or accept an invitation, to invite, etc., in any given language because all the ways to accomplish any one of these objectives are uncountable, and the functions themselves cannot reasonably be exhausted by any list.

As a result, generations of students were produced who could greet, apologize, take leave, accept or refuse an invitation, etc., in ever so many different ways but who could not carry on a meaningful conversation. They found no way outside the classroom to get situations to arrange themselves in anything other than the normal episodic order. The notional-functional students were just lucky when they landed on a

situation calling for one of the items in a list well practiced, but this was certain to happen so rarely that most of their practice was unhelpful. More often than not, they were lost in a world of unfamiliar linguistic puzzles. They could not achieve the functions in their second language that they had easily achieved as children in their primary language(s).

Proposing a General Theoretical Solution

TNR-theory and its corollaries (A-theory and systems grammar) afford a distinct alternative. These theories collectively constitute a general theory of signs that is consistent, comprehensive, and parsimonious. No concept or premise is accepted until its necessity has been proved. As a result, the entire system advances in the manner of a connected series of logico-mathematical proofs. The upshot of the series of tightly integrated proofs for language teaching and testing is relatively unsurprising, though not inconsequential.

First, the practice of using narratives, preferably true ones or at least highly plausible fictions, as done by Oller, Sr. (1963, 1965; also Oller & Oller 1993) is vindicated. The same principle holds for testing as well as for teaching and helps to explain the superiority of authentic discourse and procedures based on it as applied to both contexts (Al-Fallay 1994, Taira 1992).

Second, isolated bits and pieces of discourse, surface-forms, cut loose from their moorings in experience ought *never to be used in language classrooms for teaching or for testing*. And, by the same token, neither should scrambled snapshots of experience be dropped on students out of the blue—er, uh, . . . tell me what's happening in this picture. How about this one? Etc. Neither should such surface-oriented methods be used in linguistic analyses that aim to test or examine the adequacy of one or

another grammatical theory or hypothesis derived from a grammatical theory. For reasons explored in detail elsewhere (Oller 1996a) it is now well understood that isolated bits and pieces of language taken from their dynamic systematic contexts in ordinary experience (as described by TNRs) are too indeterminate with respect to their meaning and thus their well-formedness to be decisively applied in the testing of grammatical theories.

Third, the reasons for the superiority of episodically connected discourse structures (cf. Al-Fallay 1994, Taira 1992, Oller 1993, Oller & Jonz 1994) as contrasted with disjointed conversational or other vignettes dropped out of the blue sky can now be accounted for in a

straightforward way.

Fourth, many other hypotheses have been both explicitly derived and tested in a wide variety of fields and all of the experimental studies in question have yielded the predicted results (Oller 1995, 1996a, 1997). In some cases these results have been surprising, but in no cases have they contradicted TNR-theory or its corollaries. Therefore, we have every reason to suppose that the theory in general has actually resulted in the advances claimed and that hypotheses carefully derived from it can be followed, with reasonable caution and corresponding confidence, both in experimental and practical applications.

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