Macrothink Institute™

International Journal of Linguistics
ISSN 1948-5425
2011, Vol. 3, No. 1: E1

An Argument for Systems Grammar

John W. Oller, Jr.

Department of Communicative Disorders, University of Louisiana

PO Box 43170, Lafayette, LA, USA

Tel: 1-337-482-6722 E-mail: joller@louisiana.edu

Abstract

What elements of sign systems constitute the necessary and sufficient "proper" domain(s) for theories of grammar? What categories, entities, and relations must grammars include within their scope in order to account for language—its existence in human communities, its comprehensibility and acquisition by children, and its ordinary meaningful uses by the various communities of the world? The point of this paper is that a dynamic systems grammar—the sort that takes valid account of particular persons, bodily entities, events, and the dynamic relations between them is required.

Keywords: Cognitive linguistics, Functional grammar, Government and binding, Grammatical theory, Optimality theory, Peircean semiotics, Pragmatics, Principles and parameters, Systems theory, True narrative representations

1. Introduction

Contrary to Bloomfield's assertion that the world of experience is too complex—infinitely so—to be included within the scope of linguistic analysis (Bloomfield, 1933), it is the purpose of this paper to argue that the dynamic pragmatic relations between language and its users in the world of experience place the infinitely variable unique particularities of the time, space, and matter world entirely within the proper domain of grammatical theory. The strictly formal logical argument—a mathematical one in the sense of C. S. Peirce's "exact logic" (1865/1982, 1897, 1898/1933b, 1898/1992)—does not depend at all on the historical examples used to illustrate it. They are used only for the purposes of making the argument comprehensible and to show its relevance to historical and contemporary theories of grammar. To the extent that the formal argument is valid, it shows that a dynamic systems approach to grammar is required—one that includes a common world with real particulars consisting of actual bodily entities, events, and competent observers all of which must be counted as within the scope of the grammar itself. Of the three formally distinct types of grammars defined and illustrated, only grammars of the third type—the systems variety—measure up to the requirements that must be met.

Though the conclusion of the argument to be presented here, together with all of its essential premises, are strictly formal and fully abstract, the discussion is historically grounded by referring to grammatical theories that have actually been advocated. It is true that none has been sufficiently developed so as to account for any single one of the 6,909 distinct living languages currently catalogued (Lewis, 2009, retrieved March 28, 2011, from http://www.ethnologue.com/web.asp), but all three of the types to be defined are actually instantiated (at least in part) in the writings of various theoreticians over the last three centuries and, especially, in the last half dozen decades. It should also be noted that whether those advocates would agree with the account of their work suggested here may have bearing with respect to the historical accuracy, but, again, the formal argument remains unaffected by any adjustments that might be required with respect to the historical particulars used to illustrate it. The point of the historical examples is merely to illustrate the types of grammars defined here. However, nothing in their definition, nor in the differences between the abstract types defined, depends at all on the particular choices of examples used to illustrate the types. Rather the argument hangs only on the defining principles for building up the abstract theories in question.

Type A grammars are those categorial theories dependent on relations of the "is a" variety used to define parts of speech, phrases, and higher units in grammatical theories characterized by Chomsky (1957) as traditional grammars. Here such grammars—based as they are on "the segmentation and classification, especially of sentences by means of the immediate constituent analysis" (Duerscheid, 2009)—are referred to as Type A grammars. They formed the basis, according to Chomsky, for what he and his early disciples called phrase structure grammars (Postal, 1964) and according to Duerscheid's more recent analysis were heavily influenced by Ferdinand de Saussure's *Cours de linguistique générale* which was reconstructed from student notes around 1912 (see de Saussure, 1906/1959). The defining trait of all such Type A theories of language is that they are grounded in abstract classes of

units arranged in strings and hierarchies. The classes in question are fully abstracted from actual time, place, or physical matter. The most extreme variants of Type A theories, perhaps, are optimality theories along with principles and parameters approaches. While the latter theories might very indirectly take account of abstract features of material things, as well as of time and place, their very abstractness ensures that the material substance of bodily objects in actual contexts of experience must remain outside the scope of grammar—a necessary exclusion according to de Saussure as well as the even more restrictive approaches of Bloomfield (1933), Harris (1951), and the early generative approach of Chomsky (1957).

Type B grammars—exemplified best by cognitive and functionalist theories as advocated and instantiated in writings of Langacker (1987, 1991), Givón (1989), and in Chomsky's government and binding theory (Chomsky, 1982, 1988), and in embodiment theories of Lakoff and Johnson (1980; also Johnson, 1992) and others (Gallese, 2007; Gibbs, 2003; Glenberg, 1997; Glenberg & Robertson, 1999; Hindmarsh & Heath, 2000; Ignatow, 2007)—are differentiated from the Type A grammars by the insistence of the Type B advocates, in one way or another, that it is essential to consider some sort of abstract description of the material (experiential or at least phenomenological) context in which grammatical units, strings, and hierarchical structures are applied. The defining trait of Type B grammars is that they incorporate at least two aspects of the minimally triadic contexts of linguistic meanings by picking at least a pair of the elements of the matter, space, and time triad. However, Type B grammars stop short of treating real, material, particular bodily entities of actual space time contexts as elements of the grammar.

Type C grammars, by contrast with A and B, are best exemplified in the theory of true narrative representations (TNR theory; Oller, 1993, 1996a, 1996b) where the system of relations between actual persons, things, and event sequences is fully embraced in the theory. The resulting grammatical theory may be termed a "systems grammar" (Oller, Chen, Oller, & Pan, 2005). The term "systems" is used as applied by C. S. Peirce (1898/1933b; also see Hartshorne & Weiss, 1931-1935) and as elaborated more recently in theories of child language development (Oller, Oller, & Badon, 2006), communication disorders (Oller, Oller, & Badon, 2010) and in applications to human neuroarchitecture, genetics, fetal development, and immune systems (Oller, 2010). The defining trait of Type C theories is that they make the particulars of the material world—persons, things, events, and the sorts of relations that connect them as expressed in true narrative representations (TNRs) into the grammar itself. In the following sections, each type of theory is examined critically.

1.1 Type A: Atemporal Categorial Grammars

Grammatical theories relying at their basis on atemporal relations of the member-to-class kind can only produce Type A grammars. These grammars depend on the "is-a" relation described by Chomsky (1957). Such a grammar is equipped to express that a word such as *car* belongs to the class of nouns, or *put* to the class of verbs, and so on. Grammars of this type are **atemporal categorial-grammars**. They are atemporal because the member-to-class relation is indifferent to time and place. If something is a car, for instance, it is a car no matter where it may be found or when, and the word *car* is a noun irrespective of whether or not it is

presently being used as such at this, that, or another moment. The category seems to take some account of the shape, function, and substance of whatever linguistic units it proposes to categorize, but it abstracts away from any particulars to such a degree that its categories do not actually contain any real exemplars of any kind.

Lexicalist approaches to the study of grammar generally rely on "is-a" relations, as do semantic characterizations of lexical meanings and categorial descriptions of syntactic forms and functions. Some theoreticians advocating this line of approach to the building up of grammatical theories insist that the whole grammar, or nearly all of it, can be placed in the lexicon (e.g., see Bates & Goodman, 1997 and their references). The chief explanatory weakness of Type A grammars is that they cannot express spatial or temporal relations between parts of structures. At least they cannot do it in a natural way. The next best thing is to do so in terms of the classification of those structures regarded as if they were timeless (or Saussurean "synchronic") entities (or simultaneities) created, as-it-were, *ex nihilo*, and without a history of development or a future involving particular pragmatic applications.

Although Type A theories stress a necessary aspect of conventional sign-systems (languages), they are incomplete theories. They are especially well suited to the representation of member to class relations, but are peculiarly strained when called on to account for part to whole relations, and they are explicit in rejecting the possibility of incorporating concrete particulars, or the dynamic historical relations between such entities, as their elements or classes.

1.2 Type B: Static Relational Grammars

Having shown elsewhere (Oller & Kennedy, 1994) that Givón's functional typology and Langacker's cognitive grammar suffer from the same fundamental limitation as Chomsky's GB-theory (to be discussed here), I will not deal with those theories further in this paper. In GB-theory (to be shown here to be a Type B theory) the syntactic relation between a verb such as *put* and its arguments such as *the gas* and *in the car* is expressed as a particular kind of "D-structure" (deep structure). Chomsky says he defines these "configurationally" in terms of the "*grammatical functions* (subject, object, etc.)" which he renames "*A-positions*"—what have sometimes been called *argument positions*" of which "all and only those that are assigned θ-roles (*θ-positions*) are lexically filled at D-structure, namely, with elements bearing these θ-roles [thematic roles]. . ." (1982, p. 5).

It can be shown that the grammatical relations defined by Type B grammars, across the board, are necessarily regarded as *faits accomplis* which are manifested as in a left-to-right sequence as on a sheet of paper (or in a static three-dimensional spatial relation), or in a before-after relation in time (e.g., the order of elements in an utterance or sequence of manual signs). That is, all Type B theories—ones leading to **static relational grammars**—in the final analysis end up by describing static part-to-whole relations along with timeless member-to-class relations, and, as I will show, they are powerless to reveal the crucial dynamism of ordinary conventional sign-systems. They are well-suited to account for two dimensional relations of the sort found on a sheet of paper, or of the kind found in a recording of a conversation where a certain element occurs before (or after) another. However, they cannot naturally display a changing relation that involves actual persons, events, and relations that unfold over time as

in a drama, play, or in actual experience.

It is interesting that embodiment theories, largely indistinguishable from affordance theories, aimed to supply the need to bring material elements into the purview of grammatical theories (Kaschak & Glenberg, 2000) in order to account more fully for the dynamics of ordinary discourse processing. Some, notably Barsalou (1999), went so far as to suggest that perceptual symbol theory (a strong variant of embodiment theory) could dispense with abstract symbols by putting perceptual elements (icons of some sort) in their place. While it has been shown by strict mathematical logic that abstract symbols must be grounded at first in perceptual icons (Oller, 1996a; Peirce, 1897; and as implicit in Tarski, 1936/1956, 1944/1949) which are accessed through indexes as argued empirically by Ballard, Hayhoe, Pook, and Rao (1997) and by Harnad (1990), this does not mean that fully abstract symbols can be entirely replaced by icons.

As Pylyshyn (2001, 2002) has pointed out, some of the embodiment theories have made the mistake of elevating the material world to a commanding position above fully abstract conventional symbols. The error in attempting that move, as shown in the strict logical proofs by Peirce, Tarski, and more recently in the general theory of signs (Oller, 1993, 1996a, 1996b; Oller, Chen, Oller, & Pan, 2005) is that without prior abstractions there is no way to determine the slightest smidgin of meaning. Material objects in and of themselves, by virtue of their material existence, can determine nothing about themselves. Only competent observers can determine the boundaries, qualities, locations, velocity, relations, etc., of material entities by associating them with abstract symbols which come to be vested with meaning in the process of that association. Without any such association of material facts with abstract symbols, no meaning whatever can be determined in the least degree. It was for this reason that Peirce insisted on defining the pragmatic conception of meaning exclusively in terms of abstract conceptions rather than in terms of the material things themselves (see the *Collected Writings of Charles Sanders Peirce* edited by Hartshorne & Weiss, 1931-1935, but especially Volume 5 on *Pragmatism and Pragmaticism*). The world of space, time, and matter, Peirce insisted, is only known through abstract representations of it.

Therefore, any effort to accomplish with material entities (bodily things, persons, or physical relations between them) the representational functions of fully abstract concepts is certain to fail. It is analogous to building iconic replicas of all possible objects and relations to carry around in a giant backpack. Even if the icons of objects could be shrunk to the size of electrons, any such plan would hardly account for an infinitesimal part of the general representational power of any natural language system. As a result, it is necessary to find a more dynamic and more abstract approach to grammatical theory.

1.3 Type C: Dynamic Systems Grammars

Third, there are **dynamic systems grammars**, or Type C grammars, that embrace the fact that in ordinary experience language-users apply representations of predicate-argument relations so fluidly that the changing relations of material arguments must be continuously tracked over space and time as their arguments move about (or are moved about). Therefore, the predicate-argument relations must be adjusted dynamically with respect to their tensional

arrangements. It is the underlying purpose of this paper to show that Type A and Type B grammars cannot express the sort of dynamic changes that natural languages depend on in ordinary discourse. More specifically, it is the purpose to show here that a dynamic systems grammar is required as argued by Thelen and Smith (1994) with reference to early cognition and child language acquisition.

Much earlier, in 1898, Peirce anticipated the essence of the present discussion when he wrote of the contrast between his own "logic of relatives" and the "ordinary logic of classes":

> Where ordinary logic talks of classes the logic of relatives talks of *systems*. A *system* is a set of objects comprising all that stand to one another in a group of connected relations. Induction according to ordinary logic rises from the contemplation of a sample of a class to that of the whole class; but according to the logic of relatives it rises from the contemplation of a fragment of a system to the envisagement of the complete system (1898/1933b, p. 9).

Peirce explains that the logic of relatives makes possible a dynamic view of systems as they change over time. It was through his "existential graphs" that Peirce sought to "put before us moving pictures of thought" where his objective was to render "literally visible before one's very eyes the operation of thinking *in actu*" (1898/1933b, pp. 10-11). Whether he succeeded in this, or to what extent, is not the issue here. What is at stake here is the dynamism of thought and linguistic representation that Peirce had in mind to capture and express in dynamic systems of connected relations.

2. Differential Explanatory Power

Between the logic of classes, a logic which is analogous in all relevant respects to Type A theories of grammar, and the logic of relatives, analogous to Type C or systems grammars, there are intermediate static relational grammars of Type B. A subsidiary aim of this paper is to show that Chomsky's theory of government and binding (GB-theory) is a Type B theory. The higher goal of this paper, however, is to show that both Type A and Type B theories lack the power to represent the changing tensional relations over time and space of enduring material arguments.

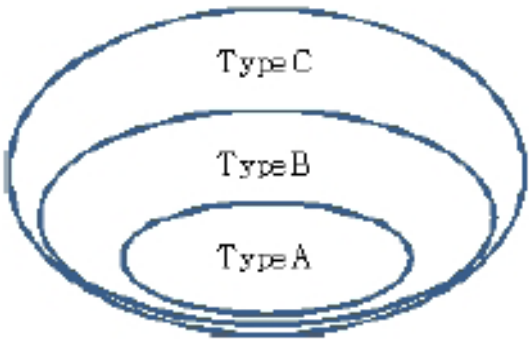

Figure 1. The logical relation of the three types of grammars.

As suggested in Figure 1, it can readily be shown that Type A grammars are a proper subset of Type B grammars which are a proper subset of Type C grammars. Further, each type of grammatical theory has its special kind of generality and explanatory power. Type A grammars are peculiarly suited to express relations between the syntacticized and phonologically manifested icons of any conventional symbol whether it is relatively simple or complex. What they are best suited to reveal is the generalized (but atemporal, purely semantic) meaning (or function) of any sign. Type B grammars go a step further. In addition to incorporating all that the Type A grammars offer, those of Type B are especially suited to show generalized syntactic relations within a given discursive structure once it is constructed and already construed. They are essential to the expression of the connections within and across structural parts of a hierarchically organized structure. Similarly, Type C grammars presuppose the results of both the foregoing (Types A and B) but add the capability of expressing and explaining the dynamic connection of discursive systems to the particular changing (non-repeating) states of affairs of the material world.

To see why Type C grammars are required, a simple example grounded in a true story will serve. In fact, as noted above (and demonstrated in logicomathematical proofs by Peirce, Tarski, etc.), the sort of true representations to be exemplified, forms the necessary basis for the grounding of meaningful sign systems in general. The relevant proofs can be summed up in the observation that without valid associations between abstract symbols and instantiated material particulars, the meaning of any abstract conventional representation would remain undiscoverable. That said, however, it is important to realize that nothing in language acquisition, nor in the logical proofs concerning the foundational status of what have been called true narrative representations (TNRs), hinges on the particular associations chosen to illustrate or instantiate the meanings of any particular one or ones. Any TNR that could be understood as well as the ones chosen would serve as well. *Nothing in the theoretical discussion hinges on the particular examples chosen*.

With that caveat in mind, consider the statement,

(1) *Put some gas*, as an admonition made by a certain man to his son-in-law, before the latter left a certain town in New Mexico with the former's daughter on board. Suppose further that the son-in-law in question had run out of gas two days earlier and that the man offering the advice had been obliged to drive out to a remote area of the desert near Las Cruces with a couple of gallons of gas.

In view of the fact that all these suppositions and their representations fit the facts of the matter (i.e., they are "true" in the most ordinary and mundane sense of the term), the relation between the imperative suggestion and the facts at hand when the advice was given, bear the special marks of a TNR. It could be paraphrased as "You need to put some gas in your car, so you can get where you are going." Interestingly, the surface form, "Put some gas," was spoken by a man whose first language was Spanish—a language in which it is not necessary to specify where the gas should be put. As a discourse element, the admonition reminded all the competent observers on hand of the implied true narrative about the younger man's having run out of gas and ending up stranded miles from his intended destination a couple of

days earlier.

The entire narrative, summed up in part in the exemplary utterance, and in the two preceding paragraphs, is true because it conforms to the material facts represented. It is a narrative representation because it is part of a story unfolding over time in the experience of one or more competent observers. It is true (in the mundane simplest sense of the word "true") because the facts deliver all that the representations of them claim. It is a representation on account of the fact that the events referred to here occurred in the past and are presented now in this paper to anyone who may read it, just as the author is now reading it, in a way that signifies the particular facts of the story told. The three essential parts of the TNR consist of (1) its symbolic surface forms, *S*; (2) its material iconic components constituted by the persons, the car, the road, time frame, and the actual events that occurred that may be construed as its complex object, *O*; and (3) the acts of the interlocutors involved in the production and comprehension of the valid indexical associations, the π mappings, between the *S* and its *O*. The whole structure can be summed up in the mapping relation described as $S\pi O$.

It has already been demonstrated through the theory of TNRs (Oller, 1996a, 1996b, amplifying proofs of Peirce and Tarski) that TNRs are the only representations among all those that are logically possible that are (1) determinate with respect to their meaning, (2) connected to the material space-time continuum, and (3) also generalizable with respect to what they mean. The proofs of these "pragmatic perfections" of TNRs form the logical groundwork for what follows. It seems unlikely that they will be refuted owing to the Peircean method of "exact logic". As he explained, unlike the proofs of Euclid depending at many points on unproved axioms—leading often to false conclusions—Peirce's method requires beginning with that which cannot be reasonably doubted and incorporating no additional propositions into the theory without first having proved them to be necessary. Such a rational method, as Peirce argued constitutes its own "deduction and proof". He described it this way:

> Hegel makes a great boast of the fact that his Logic developes [sic—Peirce preferred this spelling] its own method. Mine pursues a rational method of which the logic itself is but the deduction and proof. Moreover I am not forced to make my book unintelligible in order to follow mine, but on the contrary it is the very procedure which perspicuity demands. Another thing; Hegel never deduces the necessity of considering what he considers before considering it; but I never introduce a distinction without having deduced the necessity for it. (1865/1982, p. 340)

The purpose of the present paper, therefore, is not to defend the logical method (for it stands or falls on its own merits), but to show that the dynamic (moving and changing tensional) relations that obtain between the material arguments of TNRs—which would include in example (1), the person addressed, the gas, the car, etc.—require a Type C theory. We may note that the person doing the commanding is an argument in the example at hand, as are the relevant facts and events connected through those several arguments (both the ones in the

foreground and those in the background). It is easy to see, however, that the material arguments of TNRs must always be vastly richer (though not necessarily a great deal more numerous) in their pragmatic reality than the signs that represent them.

For instance, there is nothing in the surface-form of (1) to show the color, make, or model of the car in question—nor where the men were standing when the one spoke to the other, nor how tall they were, who else was present, etc., etc. There is nothing in the surface-form of the command to suggest that the gas was to be put in the gas-tank of a particular car. Nor is there anything to show that the gas was to be put in the tank prior to departure from Las Cruces to Albuquerque on that same day; nor that the former was the point of departure and the latter the destination; nor how many travelers would be riding in the car; nor that the departure was then underway; etc., etc., *ad infinitum*.

In fact, for any material argument as a part of any possible TNR, the actual dynamic relations that the argument engages (with which it is intrinsically connected) in space and time must always be an extended portion of the space-time continuum. What is more, to the extent that the supposed space-time connections really are part of a continuum, they are also connected with the whole of it. Thus, every TNR is in principle infinitely richer than the syntacticized relations manifested in the surface-forms of any conventional representation.

It seems rather that any natural language, or any derivative sign system as well as biosemiotic systems (per my 2010 argument in *Entropy*), can be understood only to the extent that its signs can be put in a dynamic relation not merely to themselves (though the proofs already cited show that this is a necessary pre-requisite to conventional sign-systems), but also to the changing material facts of ordinary experience. That is, the intelligent language-user understands relative to a TNR such as the one shown in example (1) that the gas needs to go into the tank of the car that is about to be driven to Albuquerque; that the son-in-law is being admonished to put it there; that the reason for the admonition is the fact that the same individual ran out of gas on the highway out in the New Mexico desert just a couple of days earlier; and so forth.

With respect to any well-determined sign-system (and every TNR can be shown to be such a sign-system), it can be rigorously demonstrated that an infinitude (i.e., a perfected continuum in Peirce's terms; Peirce, 1898/1992) of tensional relations between one or more arguments and the space-time context is naturally and relatively completely comprehended. All of this follows from the principle of inductively inferring a whole system from a fragment. Hence, the essential element of the case is already made: Type C theories are required for all TNRs in principle and since all meaningful signs without exception depend on deriving any meaningful content from TNRs, Type C theories of grammar are the only ones that can, in principle, account for any meaningful signs at all. However, to complete the whole argument, it may be useful to show even more explicitly why Type A and Type B grammars cannot do what is required and, in view of its pivotal importance in the history of grammatical theories, to show that Chomsky's GB-theory is a Type B grammar.

2.1 Type A Grammars Are Inadequate

The proof that Type A grammars cannot explain dynamic, changing relations is straightforward. It is impossible that material particulars could be adequately comprehended in atemporal member-to-class relations. Such relations are based, as Peirce showed, on the resemblance or similarity in some respect of the members that go to make up the class (1898/1933b, pp. 9-10), yet the individual particulars of material situations have, *in their particularity* (which is dynamic, changing, and nonrepeating), none of the general character of the member-to-class relation. Therefore, in their particularity, such dynamic relations cannot be fully comprehended by the member-to-class relation.

Type A grammars are also relatively powerless to show part-to-whole structural relations (the nuts and bolts of syntactic, morphonological, or phonotactic relations). They can only point to any particular structure by reference to the generalized class(es) to which that structure and others like it belong. Thus, Type A grammars are obliged to regard any given structure as a totality, relative to similar totalities. Though the totality in question may actually be part of another logically higher totality, each of the structures in question, regardless whether it be part or whole from any given point of view, is, within any Type A theory, definable only by its class membership relations. However, these, being general, cannot adequately represent the rich particularity of dynamic material relations changing over time.

2.2 Type B Grammars Are Inadequate

Next, we come to Type B grammars concerning which there are two distinct goals: first, to show that static representations of part-to-whole relations (grounded as they are in the relation of "contiguity" as Peirce noted; 1893/1933a, p. 61) are powerless to represent the full richness of the infinitude of dynamic and changing relations between the material arguments of ordinary discourse; and, second, to show that Chomsky's GB-theory is a Type B theory.

The first goal is met by showing that any static relation can only account for some single moment (an instant in time) relative to one or more continuously changing relations that are not in fact instantaneous, but are extended (literally stretched out) in space and time. Therefore, any Type B grammar must fail to represent the rich dynamism of relations between material arguments in any ordinary TNR. And, further, owing to the dependence of all other meaningful signs on deriving their meaning from TNRs, every Type B theory will fail in general to account for any parasitic meaningfulness of fictions, errors, lies, or various grades of nonsense which must also depend on meanings abstracted from TNRs. So, the first goal of this section is achieved.

It remains, then, to show that Chomsky's GB-theory is a Type B grammar. He repeatedly notes that his theory of grammar (or rather the family of theories that he is recommending) are "configurationally" determined by what he calls "grammatical functions" (Chomsky, 1982, pp. 5ff). Therefore, it is essential to discover how his configurational determinations are made. Early on, he says plainly that "the lexicon specifies properties of phonetic form and meaning that are not determined by rule" (p. 5). Thus, in GB-theory, arguments are mainly defined by "lexically filled" noun phrases (NPs) at the level of what Chomsky has termed

"D-structure" as generated by the "base component" (pp. 4-5). Toward the end of his discussion of how arguments are determined and how they can be linked through syntactic "chains" with various positions in discourse, Chomsky concludes that there are four categories. An argument may be expressed in an "R-expression (neither anaphor nor pronominal), pronominal, anaphor, pronominal anaphor" (p. 83). Interestingly, the term "R-expression" is an abstraction from "referring expression", but just how does any such "R-expression" perform its service of referring to something else?

In light of TNR-theory, we must ask, where and how does the material argument itself get incorporated into the system by being attached to any referring expression? To refer to the example at hand from the prior discussion in this paper, how would the R-expression pointing to, say, the guy that ran out of gas, or the man who is warning him not to do it all over again on the way home, etc., get connected to the person in question? Or how would the gas referred to get connected to the gas that remains to be put in the car? Or how is the car to be gassed up going to be identified in Chomsky's GB-theory?

Chomsky says, ". . . to categorize expressions according to this approach, we first take them to be tokens of a certain type [hence, he invokes the member-to-class relation of Type A theory], then ask what the category of this type is (R-expression, etc.), and finally turn to the application of the binding theory and other principles [i.e., here he invokes the part-to-whole relations of Type B theory]" (p. 83). He says, "We can proceed roughly in the following fashion. Suppose that we assume some domain D of 'entities', which are accorded no ontological status (apart from mental representation)" (p. 83). For this maneuver, Chomsky does not give any justification in his 1982 book, but elsewhere in another book in 1988 (also see Chomsky, 1995), he denies that there is any principled basis for so much as distinguishing a mind from a body—much less is there any reason to suppose a substantial difference between the real world and whatever may be imagined.

He wrote, "there is no definite concept of body. . . . The mind-body problem can therefore not even be formulated. The problem cannot be solved because there is no clear way to state it. . . . Similarly, we cannot pose the problem of other minds" (p. 145). Peirce, on the other hand, asserted that "the difference between the Inward [mental] and the Outward [bodily] worlds is certainly very, very great, with a remarkable absence of intermediate phenomena" (1893/1933a, p. 61). Elsewhere, Peirce (ca. 1904 /1998, p. 303) described the contrast as the difference between "being and being represented." The problem this distinction presents for Chomsky is that possible worlds (as distinct from the real world) only have whatever properties may come from being represented but lack the peculiar particularities that come with being real. With respect to the intermediates between being and merely being represented, the relatively few phenomena that bridge the gap pragmatically are invariably TNRs (per proofs already cited, especially, Peirce, 1897; Oller, 1996a, 1996b). TNRs are the only signs that connect the material and mental realms through real actions that syntactically link pragmatic (material entities, relations, etc., manifested in dynamic contiguities unfolding over time) with semantic categories (mental or conceptual entities, classes, sets, etc., manifested in similarities). This is what is meant by the term pragmatic mapping (Oller, 1993, 1996a, 1996b, 2010).

Returning to Chomsky (1982), he says "an R-expression is one that inherently selects an element of D in the following sense: if overt, it denotes an element of D by virtue of its inherent properties; if nonovert, it is a variable ranging over a subset of D denoted by its NP-antecedent" (p. 83) and so forth for the three remaining categories he identified earlier. Each of the four classes of expressions, in other words, must either be tied to a lexically filled NP (that "inherently selects an element of D") or to some other variable that is tied back to an "NP-antecedent" which similarly "inherently selects an element of D" (p. 83). Everything goes back to structures (part-to-whole relations) grounded in nothing but their abstract "inherent" relations to abstract categories. The real world is left outside the grammar entirely. Thus, Chomsky concludes, "Proceeding along these lines, we may assign expressions to their categories, then applying the binding theory and other principles to the constructions in which they appear" (p. 84).

But let us examine more closely how any lexically filled NP can "inherently select an element of D" (p. 83). So that we may focus attention appropriately, consider example (2) below. It gives a true narrative statement about the events that followed the admonition given in example (1) above:

(2) John put gas in the car after his father-in-law suggested that he should do so.

Consider the argument of the expression *John* in this sentence. How do the "inherent" properties of this expression "select" the particular argument at issue? How does the interpreter of the narrative (or the teller of the story) know which of the possible discourse entities of "domain D" is involved here?

In fact, the inherent properties of the expression are as well suited to any person named *John* (any John that ever lived) as they are to the one intended. But, it is evident that the mere expression, even though it may correctly be designated as an R-expression in GB-theory, has no power whatsoever to inherently distinguish any particular John from any other. In fact, as Peirce argued long ago, every proper noun is a general and empty predicate unless and until it is associated with some particular logical object(s). Yet no object can be determined by a general predicate on the basis of the inherent properties of the abstract predicate or its mere association with other abstract predicates; rather, the object must be indexically singled out for attention by one or more sign-users.

What is more, as TNR-theory makes plain and as Peirce's logic of relatives had shown much earlier, an indexical connection between the surface-form of the expression and its logical object is essential in order for any predicate to become vested with any particular meaning of any kind. Another proof of the same conclusion can be derived from the fact that every TNR must have at least one non-empty material argument. The proof of this intermediate step is that every predicate without any material argument is perfectly general and, thus, not a particular TNR at all until at least one material argument be attached to it in order to provide it some particular material content. Without such content it can neither be a narrative sign, nor can it be "true" in the mundane, simple sense of a TNR. In fact, as an abstract conventional sign, if it is never (and has never been) attached to any material object whatsoever, it cannot have any meaning at all. Regardless how distinctive its "inherent"

properties might seem within and of themselves, as abstractions in and of themselves they cannot conceivably capture any actual content unless associated in some manner with the real world via one or many TNRs.

Clinching the case, the argument just made holds for every conceivable R-expression and for all of the other categories that might be linked to them in one way or another in GB-theory. It might seem to some readers of Chomsky that he can slip out of the just noted cul-de-sac by reference to "some contextual indication" (1982, p. 83) that would determine the argument of an R-expression or its attached elements in a syntactic chain. But this road is twice barred. First, because no ontological status can be permitted to a context (or domain) that is not granted to the material objects that populate that context, in denying ontological status to bodies as distinct from mental representations, Chomsky has effectively denied such status to the whole of the D domain. Chomsky has excluded reference to any real referents by disallowing existential and material being (ontological status) to material objects as distinct from mere representations of them in perceptions, motoric acts, and linguistic signs. Second, the escape route is closed off by the nature of contexts in general. They are absolutely powerless, without the aid of one or more bodily present, and competent observers to define, differentiate, or determine themselves in any way (cf. arguments in Oller, 1996b). Without the assistance of a competent observer—the sort of prop that was essential to Albert Einstein's arguments about relativity and all that follows from them—no object in any domain whatsoever can produce, interpret, or in any way attach itself to any general sign-system of any kind. Therefore, GB-theory is proved to be a Type B theory. It is powerless to represent anything other than static relations holding between particular instances of perfectly general expressions.

2.3 Type C Grammars by Contrast

Next, suppose examples (1) and (2), or in fact any conceivable TNR were reckoned with from the vantage-point of a dynamic systems grammar (Type C theory). If the material arguments of such structures are accorded material being (existentially and ontologically real material being), through dynamic indices linking the material bodily objects at play in space and time with their referring expressions and through their predicates linking all of these elements with each other, a remarkable simplification is achieved. The entire continuum of relationships between any object and itself (what we call the space-time history of any enduring bodily object)—e.g., between the John of examples (1) and (2) and the same person who is now typing these lines on his computer—can be represented in as few as three motoric acts embodied in a single dynamic index. Suppose, for instance, that John remembers himself standing next to the automobile and hearing his father-in-law issue the admonition recorded above as example (1).

Suppose further that the same individual has lived, breathed, and moved through space and time from that former place and time to the present location where he is now while writing these words in this theoretical argument. By the act of attending to and recording the former sequence of events and now attending to and recording the present experience, plus a third mental act of connecting the former segments of time to each other by memory, the entire

continuum of changing relations is embraced in these simple acts. If the indexical linking of such acts is admitted to occur in a series of mental operations, a single dynamic index (assisted by the included symbols and icons) covers the whole relevant history involving the various persons referred to, the gas, the car, and the sequence of events from then until now.

The reader may validly imagine what this writer remembers: driving to the gas station that day, pumping the gas through a hose into the tank, paying for the gas, etc. Related to these events, and prior to them, it is possible to visualize (either by imagination for the reader or by memory for the writer) the family out on the highway when he ran out of gas, walking to a farm to use a phone, his wife's father driving out to meet them with a can of gas well after sundown, and so on. Thus, a dynamic systems grammar that introduces the intelligent observer-actor as a player in the drama can work. It is a very different kind of theory from either Type A or Type B.

3. Conclusion

Crucial to systems grammars—as argued by proponents of embodiment theories—are the intelligent embodied actor/perceivers who define and track arguments and must themselves be counted among the salient and important material arguments of any actual discourse carried on in conventional sign-systems. Therefore, linguists, psychologists, philosophers, biologists, and semioticians in general gain a great deal in making the leap to systems grammars. There is no actual danger, as implied by Chomsky (1982) and as he has sometimes argued overtly (1988, 1995), in granting ontological status to the real material world. On the contrary, if theoreticians make this necessary step, their theories achieve greater coherence, consistency, and a vast simplification. To account for all possible worlds, it is necessary and theoretically advantageous to accord special status to the world that actually has been, is, and is to come.

The real common world is here, and human beings are bodily in it, as shown in every ordinary linguistic TNR ever constructed. Regardless what reasonable doubts we have about representations of the world formulated by ourselves and others, those doubts cannot justify the presumption of complete agnosia concerning the world we are in. On the contrary, even reasonable doubts about representations of our own existence or about the world in which we entertain those doubts, all invariably pertain to (and refer to) ourselves, others, and the world in which we have and express those reasonable doubts along with many things concerning which we are not doubtful. Otherwise, no reasonable doubts—no comprehensible ones—could either be expressed or understood. They could not even be represented. Therefore, rather than trying to make all the possible worlds that can be imagined—or impossible ones for that matter—equal to the one where we engage in such imaginations, the humbler and more honest alternative is to acknowledge our undeniable predicament in this real and common world of experience. Here we are in these bodies, in this vast space, with what appears to be very little time.

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