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Intrinsic constraints on language: Grammar and hermeneutics

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Abstract

Functional and pragmatic approaches to grammar, and to language more broadly, are well known. All of these approaches, however, accept a core aspect of sentences, or utterances, as consisting of encodings of propositions. They proceed on their functional and pragmatic explorations with this much, at least, taken for granted. I wish to argue, to the contrary, that the functional characteristics of utterances penetrate even to the level of the structure – the grammar – of supposed propositional encodings. More specifically, I argue that the structure that is taken as a structure of propositional encodings is not that at all, but is instead a structure of functionally organized action. *Constraints* on such structures, in turn – constraints on grammars – emerge as intrinsic constraints on that functional organization. My point will of necessity be made programmatically, since to fill it out completely would be to complete a functional version of universal grammar.

The mere logical possibility of intrinsic constraints on the grammatical possibilities of language refutes attempts to construe grammatical constraints as logically arbitrary. Typically, because grammatical constraints *are* construed as being (logically) arbitrary, some additional explanation of the constraints is required should those constraints be shown or argued to be universal. That additional explanation is usually some equally logically arbitrary innateness postulate. I will show that the possibility of intrinsic grammatical constraints invalidates standard arguments for such innateness – specifically, that such a possibility invalidates the poverty of the stimulus argument.

Grammatical constraints are not the only characteristics of language that are intrinsic to its nature. I also show how phenomena of implicature, the hermeneutic circle, and forms of creative language can be understood as being naturally emergent in the functional nature of language. Most broadly, then, intrinsic constraints constitute a rich realm for exploration in attempting to understand language.

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1. Introduction

Functional and pragmatic approaches to grammar, and to language more broadly, are well known (Dik, 1978; Foley and van Valin, 1984; Kuno, 1987; Sgall et al., 1986; Silverstein, 1976). All of these approaches, however, accept a core aspect of sentences, or utterances, as consisting of encodings of propositions. They proceed on their functional and pragmatic explorations with this much, at least, taken for granted. I wish to argue, to the contrary, that the functional characteristics of utterances penetrate even to the level of the structure – the grammar – of supposed propositional encodings. More specifically, I argue that the structure that is taken as a structure of propositional encodings is not that at all, but is instead a structure of functionally organized action. *Constraints* on such structures, in turn – constraints on grammars – emerge as intrinsic constraints on that functional organization. My point will of necessity be made programmatically, since to fill it out completely would be to complete a functional version of universal grammar (Foley and van Valin, 1984).

The mere logical possibility of intrinsic constraints on the grammatical possibilities of language refutes attempts to construe grammatical constraints as logically arbitrary. Typically, because grammatical constraints *are* construed as being (logically) arbitrary, some additional explanation of the constraints is required should those constraints be shown or argued to be universal. That additional explanation is usually some equally logically arbitrary innateness postulate. I will show that the possibility of intrinsic grammatical constraints invalidates standard arguments for such innateness – specifically, that such a possibility invalidates the poverty of the stimulus argument.

Grammatical constraints are not the only characteristics of language that are intrinsic to its nature. I also show how phenomena of implicature, the hermeneutic circle, and forms of creative language can be understood as being naturally emergent in the functional nature of language. Most broadly, then, intrinsic constraints constitute a rich realm for exploration in attempting to understand language.

2. Subject-predicate structure

2.1. Representations as relational structures

Wittgenstein's *Tractatus* model of representation proposed that representations are constituted by something akin to pictures or blueprints of that which is represented (Wittgenstein, 1961). More specifically, representation is constituted by relational structures, in which the points in the structures are in correspondence with basic objects in the world, and the relationships among those points are in correspondence with the relationships among those basic objects in the world. This is an isomorphism, or correspondence, or encoding, model of representation.

The critical feature that I wish to point out about this model is that, in such a view of representation, *there is no subject-predicate distinction*. Pictures, blue-prints, diagrams, maps, and a host of other forms of representation do not have any subject-

predicate organization (Coffa, 1991). Yet a subject-predicate organization is intrinsic to what is taken to be (encodings of) propositions, and, therefore, intrinsic to standard models of language – including functional and pragmatic approaches.

2.2. A category error

I do not accept Wittgenstein's model of representation (Bickhard, 1987, 1993; Bickhard and Campbell, 1992). For one problem, pictures, blueprints, diagrams, maps, and so on all require an interpreter in order for them to function as representations – they have to be taken as, interpreted as, representations in order to *be* representations. That is not a problem for external representations such as pictures, maps, and so on, but it commits a fundamental logical error – a category error – to assume that mental representation could be of the same form as such external representation (Bickhard and Terveen, in press). Specifically, mental representationality, whatever else it is, is involved in *doing* the interpreting of external representations. To model internal representationality as of the same form as external representations, then, commits to an infinite regress of internal homunculus interpreters, each interpreting the representations produced by the interpretations of the preceding homunculus. There is *much* more to be said about the problems of such approaches to representation (Bickhard, 1987, 1991, 1992a, 1993; Bickhard and Campbell, 1992; Bickhard and Terveen, in press; Campbell and Bickhard, 1992), but that is not my focal concern here.

2.3. Functional representation

In spite of not accepting Wittgenstein's Tractarian model of representation, the model of representation that I do propose nevertheless yields representations as constituted by relational organizations – they differ from Wittgenstein's in that the relations are functional, and the nature of the representations is functional, not that of a picture – not that of encoded correspondences with what is represented. I will not focus here on elaborating that model of representation (see Bickhard, 1980, 1987, 1992a, 1993; Bickhard and Campbell, 1992), but wish to explore some consequences of the general notion of representation as relational organization (augmented by a few additional properties of the model I propose) for language.

2.4. How to modify a relational structure

To begin this exploration, note that, although relational organizations do not have a subject-predicate structure, if we wish to modify such a structure, or indicate how to modify such a structure, there are two tasks which face us, and which force a logical subject-predicate organization: (1) we must specify which part of the relational structure is to be changed, and (2) we must specify what changes are to be made, which operations are to be performed.

The simple point, then, is that, though representations per se do not have a subject-predicate structure, actions for modifying them, or for indicating modifications

of them, will. This is in stark contrast to standard conceptions of representation, in which propositional encoding is taken to be the fundamental character of *all* representation.

2.5. Utterances

I have argued that utterances are precisely such indications of, or invocations of, operations on representations, where representations are taken to be constituted by certain kinds of relational organizations (Bickhard, 1980, 1987, 1992a; Bickhard and Campbell, 1992). In this view, utterances are not themselves representations, but are tools for operating on representations and changing them into resultant representations (to a first approximation). In this view, a subject-predicate organization is not characteristic of representation, but, nevertheless, is characteristic, necessarily characteristic, of utterances.

2.6. Many intrinsic constraints

The central claim of this paper is that there are *many* such constraints on how operations on relational structures could be invoked, not just this subject-predicate example, and that those constraints provide a fundamental frame, or set of constraints, on the grammar of language.

The logical subject-predicate organization is one major example of such a constraint (Coffa, 1991; Bickhard, 1980; Strawson, 1974). I will illustrate a little further how this program could be carried out with a few more steps of exploration of how such subject and predicate specifications could occur – what the resources available for, and constraints upon, such specifications might be.

3. Universal grammatical constraints: The grammar of function

3.1. How to specify subjects and predicates

Wittgenstein's structures are structures of names, names which bear relationships to each other (Coffa, 1991; Bickhard, 1987). Specifying a point in the structure is not problematic in this view: you just name it (invoke the name of it). The representational structures that I argue for are functional: all relationships are functional relationships, and the points or nodes in the structures have no identity beyond that of occupying *that* position within the overall functional organization. Specifying a location in such a functional organization *is* problematic: there are no names of the points. So how could it be done?

3.2. Differentiation

The solution I propose is that, although no names are available, nevertheless locations in the relational organization can be specified by *differentiating* them within

the overall organization. These organizations are representations, and some part of the overall organization will already be picked out as being the focus of attention, or focus of processing, if you prefer (Bickhard, 1980, 1987; Bickhard and Campbell, 1992) – in an organization of functional states and relations, some such state (or set of states) will be the currently active states. If we consider the structure to be modeled as points (locations) connected by arcs (functional relations), the problem will be to trace our way from some initial location in the graph to some desired location in the graph.

An obvious strategy for doing this will be to invoke a particular one of the relations that lead away from the current location in the structure, thereby invoking a trace to the next location in the structure, connected to the first point by the arc corresponding to the relation invoked. By iterating such invocations of traces along connecting arcs, and assuming that the overall graph is connected (it must be connected if all arcs are functional, and all functional relations are arcs: if any part of the graph were unconnected, it could never be functionally reached, and, therefore, would not functionally exist at all), we can proceed from any initial point in the graph to any desired point in the graph. Specifications of 'subject' locations in the structure, then, can proceed via iterated invocations of differentiations of which next arc to follow.

Such invocations must be differentiations, not names, because the arcs, just like the points, don't have individuating names either. The arcs are comprised of particular functional relationships of particular representations, and do not have the generality for names of them to be possible – these specifics of representation and function have likely never occurred before and will likely never occur again. The arc *types*, however, will in general be forms of functional relationships that occur repeatedly throughout experience, and general invocations of such types will be possible. Invocations of such types, in turn, can differentiate which instance, which token, of that type is to be followed from the currently specified location in the graph. Specification within the graph, therefore, is and must be via differentiation (Bickhard, 1980; Bickhard and Campbell, 1992).

This notion of functional differentiation has interesting similarities with Saussure's notion of contrastive differences (Harris and Taylor, 1989) as being central to meaning. Issues of meaning in this model, however, are constituted quite differently than for Saussure (Bickhard, 1980; Bickhard and Campbell, 1992), so the similarities hold only for a relatively surface level of analysis.

3.3. Differentiation of operators

Specification of what changes, what operations, are to be performed at a location can proceed, interestingly, similarly to the specification of 'subject' location. Subject locations are differentiated via invocations of functional, representational, relations that trace from a current location to the desired one. Invocations of functional relation types, in this usage, invoke such traces. One powerful means of specifying changes to be made, of specifying predicates, is to similarly invoke functional-representational types, but for such invocations to evoke, not traces, but constructions of instances – tokens, arcs – of those functional-representational types. Once a location

representing 'ball' is differentiated, a new arc of a type representing 'red' might be constructed – constructed via the same sort of differentiating invocation, but yielding a construction in this instance rather than a tracing (Bickhard, 1980).

3.4. Contextual resources

Such representational type invocations are not the only means by which tracings and constructions can be specified, though they are powerful and ubiquitous means. Another class of tools will be those that invoke tracings or constructions that depend not only on the particular current location in the graph, but also on local structures in the graph. A major constraint on such methods is that whatever structural characteristics are being depended upon in this manner must be recoverable by an audience – and this is non-trivial. 'I', for example, evokes a differentiation that presupposes some unique organization that represents the speaker, and that is present for both utterer and audience; 'the ball' presupposes some unique organization that represents a ball, and is recoverable for both utterer and audience (Bickhard, 1980; Kaplan, 1979). There can even be forms of differentiation that invoke differentiations of the same differentiation-*form* as one that is locally available – perhaps very recent in the context – but that is invoked in slightly different, though still local, context in the graph, and, therefore, yields a differentiation of something different than the original invocation of that type of differentiation. Partee's famous sentence ''The man who gave his paycheck to his wife is wiser than the man who gave it to his mistress'' is a nice example (Partee, 1972). 'it' in this sentence invokes the same form of differentiation as 'his paycheck', specified earlier in the sentence, but, in this new context, that *form* or *type* of differentiation no longer differentiates the first man's paycheck, but, instead, differentiates the second man's paycheck (Bickhard, 1980; Bickhard and Campbell, 1992 – see also: Wilson, 1984; King, 1987, 1991, 1993).

3.5. Invoking representational types

The basic types of arcs will be basic types of functional representational relationships. Invoking an arc type, then, will often involve invoking a type of representation or representational relationship. Of (intrinsic) necessity, operations must be sensitive to properties of what they operate upon (Bickhard, 1980).

3.6. Functional presupposition

A critical constraint on the operation of such differentiating invocations is that the functional presuppositions of the operations be met. There are many forms of such presuppositions, and corresponding constraints and properties (Bickhard, 1980). I will illustrate with one or two.

Quite generally, if an arc type is invoked for a location for which an arc-instance of that type does not exist (in specifying a subject) or is impossible (in specifying a predicate construction), then the action will misfire. It will not succeed in specifying a differentiation. 'red' cannot, normally, be successfully invoked at a location repre-

senting 'prime number', or at a location representing 'balls' where no red one has been specified (except as a construction). Operations must operate locally (if they operated globally, they would never repeat, and, therefore, never be learnable), and different operations presuppose different local conditions.

3.7. Dependencies

This induces dependency relations among operator types. Some types of operators, or concatenations of operators, may construct or differentiate the sorts of local conditions that are required for some other types of operators. Operator types that require the sorts of conditions constructed by other types will, in general, be dependent on invocations of those other types. And such dependencies must be made good locally in order for the conditions of dependency to be recoverable, or discoverable. Contextual conditions that are perfect for some operator type do no good for an invocation of that operator type if those perfect conditions are a thousand arcs away from the currently differentiated location in the graph.

3.8. Categorial grammatical categories

Types of operators, then, will involve relationships to each other in terms of what other types of operators they will form when concatenated, with a full alteration in the underlying relational organization constituting a basic type – a full sentence. Conversely, starting with such a full operator type, derivative types can be defined in terms of how they can be used as constitutive of already defined types, with this hierarchy of recursive definitions being built upon the base type of a full specification of a location in the graph and a change at that location. Such definitions of types recapitulates the sorts of grammatical type definitions to be found in categorial grammars, but it does so in terms of functional operator types, not sub-propositional encoding types (Bickhard, 1980; Bickhard and Campbell, 1992; Montague, 1974). In this manner, the general subject matter of grammar is recaptured, but in a fundamentally different way from standard conceptualizations of grammar.

3.9. Constraints on dependencies

Dependencies among operator types, and the necessity for those dependencies to be honored locally, impose their own consequent constraints:

(a) If an operator type is dependent upon particular conditions of context, then those conditions, and, therefore, whatever would construct those contexts, are *obligatory*: without such contexts, the operators cannot function.

(b) If an operator type is dependent upon particular conditions of context, then those conditions must hold in a *unique* single contextual location in the graph.

(c) If an operator type is dependent upon particular conditions of context, then that unique single contextual location in the graph must be recoverable from the currently functionally active location in the graph – that required location, and the operator invocations that construct it, must '*command*' the dependent operator

instance in the sense that the dependent instance can function only with respect to the context created by the context creators. The context must be recoverable for the dependent instance; conversely, the dependent instance must be uniquely recoverable relative to the context creators.

(d) Both sides of this symmetry of constraints follow from the necessity that the operators function *locally*: the context creator operators and the context-dependent operators must be locally 'pairable' with each other.

Note that 'local in a graph' is equivalent to 'local in an utterance'. If too much 'utterance' intervenes between context creators and context-dependent operators, those intervening operators will shift away from, or alter, the necessary context. Special modifications within an utterance, such as affixes, can aid such pairing, but it must be recoverable somehow.

3.10. Universal Grammar

What I have just done is to reconstruct the four key principles of Koster's version of Chomsky's Universal Grammar:

(a) obligatoriness
(b) uniqueness of the antecedent
(c) c-command of the antecedent
(d) locality (Koster, 1987: 9)

I have done so, however, in a decidedly non-UG manner. In particular, I have argued that such principles are required by the very functional nature of what language *is*. They are constraints, *intrinsic* constraints, on how language could possibly be what it is and function the way it functions (Bickhard, 1980, 1987, 1992b). In this view, such constraints are *not* merely arbitrary innate properties that just happen to be genetically imposed on language.

3.11. Poverty of the stimulus arguments

The mere logical possibility of such intrinsic constraints on the structure of utterances is already enough to eliminate the primary support for such innateness claims: the poverty of the stimulus argument (Chomsky, 1975, 1980, 1988; Piattelli-Palmarini, 1980). That argument claims that the empirical experience of the child is inadequate to specify the grammar of the child's language, and, therefore, that there must be innate constraints on language in order for such language learning to be possible. The empirical constraints are inadequate, therefore there must be innate constraints. But this argument presupposes that experience and genes exhaust the possible sources of constraint on language and language learning. Intrinsic constraints form an entire category of constraints that Chomsky – and those who have adopted Chomsky's argument form – have ignored. The mere logical possibility of such constraints falsifies the presumed exhaustiveness of the experience–genetics dichotomy as sources of constraint. The mere logical possibility of such constraints, then, ren-

ders the poverty of the stimulus argument logically invalid (Campbell and Bickhard, 1992).

It should also be noted that the primary argument for mental representation being propositionally structured is that language is propositionally structured (e.g., Fodor, 1975). Insofar as the account I have outlined of *propositionally* structured utterances being derived from *relationally* structured representations is even minimally a logical possibility, it renders those arguments for the propositional structuring of mental representation logically invalid.

3.12. Universality as intrinsicness

What I have done above is to elaborate in a little more detail how that invalidity manifests itself with respect to particular constraints, arguably universal constraints, on language. Koster argues that his principles are so austere, so prescinded from content, so arbitrary, that they are radically autonomous and independent of specifics of language. They must be, then – so his argument goes – innate, because they are so remote from the content of actual linguistic experience that they could not be learned. Note here the invalid reasoning based on the false experience–genetics dichotomy (Campbell and Bickhard, 1992).

In so abstracting the principles of Universal Grammar, however, Koster has made it even easier to show how they can be reconstructed as functional constraints, intrinsic and therefore *necessary* functional constraints, on language – neither learned nor innate. Just as it is impossible, intrinsically impossible, to release the cup from your hand and *then* to move the cup to your lips (Russell, 1987), so also is it impossible to invoke a graph operator that presupposes conditions that are not locally present. Complex actions, including utterances as complex actions, do involve intrinsic constraints on what actions can be performed when, in what order, and with what dependencies among them. Just as such constraints can prescind from the details of what is being acted upon – such as general dependency relations – so also do the constraints on complex operations on representational relational graphs prescind from the contents of those representations. Koster's abstract renderings of grammatical constraints, then, rather than supporting autonomy and innateness, has simply become abstracted enough to connect fairly readily with intrinsic functional constraints.

3.13. Innate supports

The invalidity of the *argument* for innateness, of course, does not preclude the possibility of there *being* innate supports for language learning. The absolute necessity for language learning to occur in order for an individual to survive in evolutionary times *might* well be sufficient reason for innate supports to help insure such language learning. But such supports will not have the arbitrariness supposed in typical discussions – they cannot be arbitrary, but must support acquisition of the intrinsically necessary functional abilities. They will not have the determinative character supposed – they cannot be determinative, because the determinations are already

intrinsic to what language is. They cannot be investigated in the manner that such proposed constraints normally are – evidence for a constraint, relative to a full space of logical possibilities, does not strongly support an innateness hypothesis, because the constraint may be already present intrinsically: the hypothesis space functionally available to the child may already be severely reduced and constrained intrinsically. They do not support autonomy – the constraints are intrinsic, in their most general form, to the organization of any complex interaction: grammatical constraints are particularizations of such general intrinsic constraints on actions and interactions.

3.14. Other approaches

I aimed toward Koster's principles in this paper mostly because they are already abstracted in such a way as to make the outlining of functional connections easy. There is also a nice irony in such an attempt toward radical autonomy and innateness being just the thing required to provide an alternative to autonomy and innateness. But there is nothing logically special about UG with respect to its appropriateness for investigation of intrinsic functional constraints. As mentioned above, for some purposes, categorial grammars are more appropriate. Still more broadly, relational, dependency, constructive, and so on, approaches to understanding the organization and constraints on organization of language ought to be fruitfully investigatible from a fully functional, a fully pragmatic, perspective – the underlying processes of language must ultimately be functional processes. Such investigations, however, can involve far-reaching changes in the approach being explored: fundamental changes are required even for categorial grammars (Bickhard and Campbell, 1992; Campbell and Bickhard, 1992), and the undoing of the standard framework for UG has been illustrated above.

4. Non-grammatical intrinsic constraints: Implicature and hermeneutics

There are many more intrinsic constraints on the properties of language and utterances, some classically grammatical, some not. I illustrate with abbreviations of two. I alluded to there being, in general, an utterer and an audience in typical language situations, but did not attend to any constraints that follow from that. Here is one.

4.1. Implicature

The local conditions upon which some operator invocations depend must be locally available, recoverable, by both the utterer and the audience. Coordinating such parallel movements within and operations upon the representational relational graphs in multiple persons is decidedly non-trivial (Bickhard, 1980, 1987; Lewis, 1969). One way in which this may manifest itself is when the utterer invokes operators that are dependent on local conditions that are not locally recoverable by the audience. The utterance, or parts of it, presuppose context that the audience doesn't have. One possible solution in such a case is to reconstruct what that needed context

must be, and add it to the understood representations shared between utterer and audience. That is, if a presupposition falsely presupposed to be shared between utterer and audience can be recovered by the audience, it may be simply 'made true' by being added to (or changed in) the graph. For example, if I say "The meeting will be at four", you might realize that there is to be a meeting, and that you are likely expected to attend. More broadly, the rendering of initially false presuppositions as true provides a general approach to phenomena of implicature (Bickhard, 1980).

Both the presuppositions, and the possibilities of recovering such presuppositions even if initially not available, follow inherently from the nature of utterances as operations on coordinated representational graphs. The presuppositions are inherent in the context dependencies of the operators: invocation of an operator presupposes an appropriate context. The possibility of recovering such presuppositions even if initially not available follows from the general problem-solving nature of understanding an utterance or part of an utterance (Bickhard, 1992a, and below), and the inherent constraint that contexts and context-dependent operators must be locally pairable – this constraint makes the problem of understanding potentially solvable.

4.2. The hermeneutic circle

The second property of language that I would like to outline has already been alluded to. The determination of what operations to perform on underlying graphs (including operations of differentiation), and the determination of the consequences of those operations, is not necessarily perspicuously or uniquely determined by utterances. Instead, interpreting an utterance may involve some problem solving to figure out what contexts are being presupposed and, correspondingly, what consequences of previous utterances or sentences are being presupposed. The fact that utterances invoke operations on underlying graphs makes utterances always and intrinsically context dependent – dependent upon the context on which those operations are supposed to operate – and recovery of those contexts and the consequences of the operations upon them are not necessarily transparent.

In relatively simple, well rehearsed, instances of language, there may not be much of this sort of problematicness present, and the understanding of the utterance – the performance of the invoked operations – may run off seemingly smoothly and algorithmically. But, in difficult cases, such as psychotherapy, children's language learning, the investigation of historical texts, some legal contexts, ambiguous and difficult to process sentences, and so on, this problematicness is clearly manifested. In such cases, problem solving is required: what is the best understanding of situational context and of operations upon and within that context, given the constraints available in both general context and in utterance? Solving such problems will, in general, involve trial and error constructions, variation and selection processes, that iterate constraining considerations among the aspects of context and parts and aspects of utterances – among parts and wholes of utterance and context. This process is called the hermeneutic circle (Bickhard, 1987; Gadamer, 1975, 1976; Heidegger, 1962; Ricoeur, 1977). It too is an intrinsic property of language. In this case, it is intrinsic to the fact that the contexts and operations are not epistemologically immediate:

interpretation may involve iterated variation and selection problem solving because interpretation may involve problems, and *all* problems are subject to iterated variation and selection problem solving (Bickhard, 1992a, 1993; Campbell, 1974). The hermeneutic circle, like other properties of language, is a specialization of more general properties of interaction to the case of language interactions.

4.3. Creative language

The possibilities of such problem solving in the service of interpretation underlie a language property of fundamental importance. If the context for an invoked operator is not transparently appropriate for an operator of that type, the process doesn't just halt. As long as we do not interpret the utterance as an error, we can and will attempt to figure out how that context could be construed in such a manner that that operator could function upon it. Conversely, if we want to invoke an operation for which we have no available type of operator, we might find that an invocation of some 'inappropriate' type, in *this* context, might do the job: for example, ''I chalked the wall'' or ''I'm souping'' or ''Will you chocolate my milk?'' in children's language. When necessary, tools in the toolbox can sometimes get jobs done that they weren't 'designed' for (Bickhard, 1987; Wittgenstein, 1953). This is the source of analogy, metaphor, and creative language in general (Bickhard and Campbell, 1993; Campbell and Bickhard, 1992). In effect, we work out the interpretations via working out implicatures. I have argued that this is the core nature of language, and that standard usages are habituated, 'frozen', implicatures (frozen metaphors) that no longer have to be recovered via problem solving (Bickhard, 1980). But all language *origins*, both evolutionarily and for the child, will involve such creation followed by correction and habituation – at its core.

5. Conclusion

I have argued for the existence of numerous and central constraints on the properties of language, constraints that are intrinsic to the nature of language. The major focus has been on constraints on the structure of utterances that generally fall in the realm of grammar. In fact, the core principles of one version of Chomsky's Universal Grammar constraints have been connected with intrinsic functional constraints on how utterances could possibly work. This is in drastic contrast with the typical arbitrariness, autonomy, and innateness that are claimed for such constraints. Two additional properties of language were shown to follow readily, and intrinsically, from language characteristics already alluded to: presupposition and implicature, and the hermeneutic circle and creative language.

Many deep properties of language, then, ranging from grammatical constraints to the hermeneutic circle, are intrinsic properties. They are intrinsic to the nature of utterances as problematic operations on underlying representational relational organizations. Such intrinsic properties are neither environmental nor genetic in origin, and their explanation is non-arbitrary: in fact, their explanation is that they are

intrinsically *necessary*. There is nothing exhaustive about this discussion of intrinsic constraints: intrinsic constraints constitute a powerful and underexplored realm of explanations and understandings of language.

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