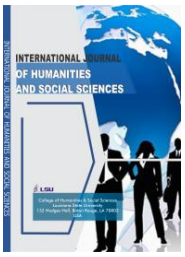
The Conceptual–Intentional Interface as a Window into the Mind: How Minimalist Legibility Conditions Constrain Theories of Meaning and Thought



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Abstract

The Strong Minimalist Thesis (SMT) holds that language is an optimal solution to the conditions imposed by the systems that must read its outputs. Of these conditions, legibility at the conceptual–intentional (C–I) interface is the most consequential, because it ties the design of syntax to the character of thought. This paper examines what follows, and what does not follow, from that tie. It argues, firstly, that legibility is a relational constraint. It limits the syntactic objects that can be built, but it also limits any account of the C–I system invoked to explain them, which must be specified independently of the syntax it is meant to explain. Secondly, it argues that the minimalist architecture favors a view of lexical concepts as instructions for assembling mental representations, and supports a view on which hierarchical, event-structured, displaced thought is distinctively shaped by syntax while much conceptual life remains independent of it. Thirdly, it shows that the framework redraws the debate over linguistic relativity by locating variation chiefly in the lexicon and in externalization. The paper closes by addressing circularity and rival-architecture objections and by outlining a humanistic reading on which syntax is a system for expressing thought, a window into, and not a mirror of, the conceptual mind.

Keywords: *Minimalist Program, Conceptual–intentional Interface, Legibility Conditions, Language and Thought, Internalist Semantics.*

I. Introduction

Few ideas in the study of language have travelled as far beyond linguistics as the suggestion that human language is, at bottom, a system for expressing thought. The suggestion has deep roots. Humboldt (1836/1999) described language as a generative activity that makes infinite use of finite means, and the rationalist tradition that Chomsky (1966) traced in Cartesian Linguistics treated the creative aspect of ordinary language use as the visible sign of an inward capacity of mind. Generative grammar inherited that picture, yet for several decades it pursued the formal side of the capacity with comparatively little attention to what the formal side was for. The minimalist program shifted that emphasis by asking how far the design of the language faculty can be explained by the demands of the systems it must serve (Chomsky, 1993, 1995b).

The most compact statement of the idea is the Strong Minimalist Thesis (SMT): “language is an optimal solution to legibility conditions” (Chomsky, 2000a, p. 96). The conditions in question are those imposed at the two interfaces through which the language faculty connects with the rest of the mind: the sensorimotor (SM) system, which handles externalization in sound or sign, and the conceptual–intentional (C–I) system, which handles thought, reference, inference, and the planning of action. Of the two, the C–I interface has a special standing. A language faculty whose outputs could not be read by any system of thought would hardly be a language faculty at all, which is why the C–I interface is treated as conceptually necessary in a way that the particular details of the SM interface are not (Chomsky, 1995b, 2007).

This paper takes that standing seriously and asks what follows from it. If syntactic objects must be legible to the C–I system, two inferences become tempting. The first runs from thought to syntax. Facts about the C–I system should explain why syntax has the properties it has. The second runs the other way: facts about syntax should tell us something about the C–I system, and therefore about the structure of concepts and the nature of thought. The second inference is the more adventurous, and it is the one that gives the minimalist program its philosophical interest. It is also the one most exposed to the charge of circularity, because a system whose properties are inferred from the syntax it is then said to explain cannot supply independent support for the explanation.

The argument is organized around four questions. What does it mean for a syntactic object to be legible, and to what? What does legibility imply about the structure of human concepts? What does it imply about the nature of thought, and about the relation between thought and language? And how does the resulting picture bear on older debates about linguistic relativity and the nature of meaning? The paper is conceptual rather than empirical. It synthesizes published theoretical and experimental work and reports no new data. Its central claim is that minimalist legibility conditions constrain theories of meaning and thought in a limited but real way. They rule out some views of concepts and of the language–thought relation, they favor others, and they leave a great deal open, including, importantly, the question of how much thought lies outside language altogether.

Interface Legibility in the Minimalist Architecture

From Conceptual Necessity to the Strong Minimalist Thesis

The minimalist program begins from a question about design: what must a language faculty be like if it meets only the demands that are, in Chomsky's phrase, virtually conceptually necessary? Language must provide a way of forming complex expressions from simpler ones, and the resulting expressions must be usable by the systems of thought and of articulation or signing that surround it (Chomsky, 1995b). Everything else, including the elaborate apparatus of earlier government-and-binding theory with its several levels of representation and construction-specific rules, becomes a candidate for elimination or derivation. The Strong Minimalist Thesis turns this methodological attitude into an empirical conjecture: that the properties of the faculty can be explained by interface conditions together with general considerations of computational efficiency (Chomsky, 2000a, p. 96). Freidin (2021) observes that the thesis was not formulated in the original 1995 collection but emerged in the work that followed, and that its formulation has shifted over time among legibility conditions, the precise form of Merge, and principles of efficient computation.

Chomsky (2005, pp. 4–6) places the thesis within a three-factor framework. The properties of a language are due to a genetic endowment specific to the language faculty, to experience, and to principles of structural architecture and computational efficiency that are not specific to language. The more of syntax that can be assigned to the third factor and to interface conditions, the less must be attributed to a rich, language-specific genetic endowment. This is the point at which minimalism makes contact with evolutionary biology: a language faculty that is largely the product of general principles and interface demands is easier to reconcile with the apparent recency of the capacity in human evolution (Berwick & Chomsky, 2016; Hauser et al., 2002).

The core computational operation is Merge, which takes two syntactic objects and forms the set containing them. Applied to elements drawn from the lexicon it is External Merge; applied to an object and one of its own parts it is Internal Merge, the minimalist reconstruction of displacement (Chomsky, 2001, 2008). Because Merge can reapply to its own outputs, it yields unboundedly many hierarchically structured expressions, which is the discrete infinity that Humboldt's formula and the Cartesian tradition had pointed to. Hauser et al. (2002, pp. 1570–1573) distinguished the faculty of language in the narrow sense (FLN), possibly confined to recursion, from the faculty in the broad sense (FLB), which includes the SM and C–I systems that are shared in part with other species. Fitch et al. (2005) later clarified that this was a hypothesis to be tested and not a settled claim. The distinction matters here because it implies that the C–I system is, for the most part, not part of language proper. It is a neighboring system with its own history and its own properties, and the language faculty is built to fit it.

Legibility, Full Interpretation, and the Traces of the C–I Interface in Syntax

If, syntax is shaped by what the C–I system can read, the traces of that shaping should be visible in syntactic architecture. Several are commonly cited. The first is Full Interpretation, the requirement that every element of a representation receive an interpretation at the interface (Chomsky, 1986, 1995b). Elements that the C–I system cannot interpret, such as uninterpretable formal features, must be eliminated before the derivation is handed over, and the need to do so drives much of the feature-checking machinery of the minimalist literature (Chomsky, 2000a, 2001). The second is the phase-based organization of derivations. Chomsky (2001, 2008) proposed that the derivation is transferred to the interfaces in chunks rather than all at once, which reduces computational load and gives the C–I system units of a size it can process, such as propositional and event-denoting domains. The third is labeling. Chomsky (2013) argued that a syntactic object must be assigned a label for the C–I system to interpret it, since the system must know what kind of object it is receiving, and that the need for labels helps explain why certain movement configurations are forced.

A fourth trace is what Chomsky (2000a, 2008) calls the duality of semantics. External Merge is associated with argument structure, the relations among predicates, agents, themes, and the like. Internal Merge is associated with discourse-related and scopal properties such as topic, focus, and quantifier scope. If displacement were an imperfection, an unmotivated quirk of language, one would not expect it to line up so neatly with a distinct class of interpretive effects. On the minimalist view, the fit suggests that the C–I system draws on two kinds of information, one concerning who did what to whom and the other concerning how that information is organized for a point of view, and that syntax supplies each by the cheapest means available.

The Asymmetry of the Interfaces

A distinctive and contested minimalist claim is that the two interfaces are not on a par. Chomsky (2007) and Berwick and Chomsky (2016) argue that the mapping to thought is the primary one and that externalization in sound or sign is an ancillary process that must solve a difficult problem, namely linearizing hierarchical structure for a channel that delivers elements one at a time. Several considerations are offered in support: the structure-dependence of syntactic rules, which cannot be explained from linear properties of the signal; the modality independence of language, since sign languages show the same core design; and the apparent complexity and variability of externalization compared with the relative uniformity of the underlying structures. On this view the C–I interface is where language comes closest to optimal.

The claim has critics. Pinker and Jackendoff (2005) argue that much of the language faculty is specifically adapted for communication and that the minimalist emphasis on recursion neglects the many properties of language that serve that function. Fedorenko et al. (2024) review evidence from neuroscience and cross-linguistic study to argue that language is better seen as a tool for communication than as a tool for thought. The dispute is not merely about evolutionary history. If the C–I interface is primary, syntax can legitimately be used as a window onto thought. If communication is primary, syntax tells us as much about the demands of transmission as about those of thought, and the window is clouded. The remainder of this paper adopts the first position only conditionally, as a working hypothesis whose consequences are worth tracing, and returns to the dispute below.

What Legibility Presupposes About the C–I System

Legibility Is a Relational Notion

A representation is legible only to some reader. To say that syntactic objects are legible at the C–I interface is therefore to say something about the reader as well as about the objects: that the C–I system has the capacities needed to interpret what it receives. The SMT inherits this relational character. Its content depends on what is assumed about the interface conditions, and the thesis is empirically empty until those conditions are specified in a way that does not simply repeat the syntactic analysis they are meant to justify.

The standard minimalist characterization of the C–I system is deliberately thin. It is a collection of systems of thought and action that access the expressions generated by language and use them for reasoning, reference, inference, planning, and the like (Chomsky, 1995b, 2000b). The word conceptual points to the stock of concepts that expressions can draw on; the word intentional points to

the uses to which expressions are put in referring, asserting, questioning, and acting. That thinness is partly principled, since on the FLB hypothesis the C–I system is shared with other cognitive functions and is not the business of linguistics alone (Hauser et al., 2002). But it creates a methodological hazard.

Two Directions of Inference

There are two ways to use legibility in theory construction. In the top-down direction, one specifies independently what the C–I system can read and derives the properties of syntax from those specifications. In the bottom-up direction, one takes the properties of syntax as given and infers from them what the C–I system must be like. Minimalist practice has leaned heavily on the second direction, in part because the first requires a mature theory of the conceptual system, which does not yet exist. The result is that statements about legibility often function as redescriptions of syntactic proposals. If a movement operation is needed to derive a certain interpretation, the C–I system is said to require it, yet the only evidence that it requires it is the syntactic proposal itself.

This is the substance of one of the most pointed criticisms of the program. Freidin (2021) argues that reliance on interface conditions as the explanatory basis for syntactic principles has met serious and long-standing difficulties, and he suggests that a careful formulation of Merge may subsume many of the effects attributed to such conditions. Whatever one makes of the specific proposal, the general point is well taken. A legibility condition that is not supported by evidence from outside syntax cannot explain syntax.

A Triangulation Requirement

The circularity can be reduced, if not eliminated, by a simple methodological requirement, which this paper adopts as its working principle: a claim about the C–I system should count as credible to the extent that it is supported by at least one line of evidence that is independent of the syntactic analysis it is invoked to support. Four sources of such evidence are available. Developmental and comparative research on core knowledge systems characterizes the conceptual primitives that exist before and apart from language (Carey, 2009; Spelke & Kinzler, 2007). Neuroimaging and neuropsychology reveal the extent to which reasoning and conceptual processing can be dissociated from the language network (Fedorenko & Varley, 2016). Formal semantics and the philosophy of language supply independent motivation for particular kinds of semantic structure, such as the event arguments proposed by Davidson (1967) and elaborated in the neo-Davidsonian tradition (Parsons, 1990). And psycholinguistic work on comprehension and acquisition tests whether the structures posited are in fact the ones that language users build. In what follows, claims about concepts and thought are weighed against this requirement.

Implications for the Structure of Human Concepts

Concepts as Atoms or as Assembly Instructions

A first question is whether the concepts that words express are structureless atoms or complexes assembled in the course of understanding. Fodor (1998) defended the atomist view: lexical concepts such as DOG or TREE are primitive, unstructured, and related to the world by causal or nomological relations rather than by definitions. The atomist position fits comfortably with the systematicity argument of Fodor and Pylyshyn (1988, pp. 33–41), according to which the productivity and systematicity of thought require representations with a combinatorial syntax and semantics, while the content of the primitives is left to a separate theory of reference.

Minimalist legibility pushes in a different direction, though without forcing the issue. If the C–I system must read objects built by Merge from lexical items, then lexical items must supply something the C–I system can use. Pietroski (2018) argues that what they supply is better understood as an instruction to fetch or assemble a concept than as a concept that is already complete. On his account, lexical items are flexible access points to bodies of conceptual information, and the concepts they yield are overwhelmingly monadic, that is, predicates of a single argument, with phrasal combination interpreted by a restricted operation resembling predicate conjunction. Hornstein and Pietroski (2009) press the idea that the syntax of Merge and the semantics of conjunction are closely matched, so that the interface between them can be very simple.

The significance for a theory of concepts is that the legibility requirement acts as a filter on

what a concept can be. If the C–I system interprets Merge-built structures through a small repertoire of composition operations, then the concepts that figure in language-based thought must be of a type that those operations can combine. This is a substantive constraint and not a truism, because it excludes the idea that human concepts are arbitrary relational structures with an unbounded range of adicities, each requiring its own combinatorial rule.

Event Structure and the Decomposition of Predicates

The most developed evidence for this constraint comes from the way verbal meaning is decomposed in syntax. Davidson (1967) argued that sentences about actions are best analyzed as quantifying over events, and Parsons (1990) extended the proposal into a neo-Davidsonian framework in which the participants in an event are related to it by separate thematic predicates. Kratzer (1996) argued that the agent argument is introduced by a separate functional head and not by the verb itself, and Pylkkänen (2008) generalized the point to other argument-introducing heads. Lohndal (2014) shows how these ideas can be integrated with a Merge-based syntax in which each argument contributes one conjunct to the meaning of the whole.

For present purposes the interest of this literature lies in its convergence. A line of philosophical argument about the logic of action sentences, a line of semantic argument about thematic relations, and a line of syntactic argument about the architecture of the verb phrase point to the same conclusion: those the conceptual representations to which syntax maps are event-structured and built from simple predicates that are conjoined. This is the sort of independent convergence that the triangulation requirement asks for. It supports the claim that part of what the C–I system is, is a system that deals in events and their participants, in a format that composes cheaply with Merge.

Human Concepts as Perspectives

A second constraint concerns the character of lexical concepts themselves. Chomsky (1995a, 2000b) has argued that the concepts expressed by human words differ from the representations used in animal communication in being open-textured and sensitive to human interests and ways of viewing things. A word like London can be used to talk about a place, a population, a set of institutions, or a pattern of weather, sometimes within a single sentence, and the same holds for book, house, and river. The properties that matter for individuating what such words denote are not those of mind-independent physical objects. They reflect the perspectives from which speakers approach the world. Words, on this view, are not labels attached to pre-existing things but packages of conceptual perspectives.

This has a direct consequence for theories of meaning, taken up below. For the theory of concepts, it means that the C–I system must be capable of working with representations that are flexible, multiply faceted, and not tied one-to-one to external objects. Accounts that model concepts as grounded in perceptual and motor simulation (Barsalou, 1999, 2008) or as regions in geometrically structured quality spaces (Gärdenfors, 2000) can capture much of the experiential basis for such flexibility, but they need to be supplemented by an account of how such representations are made available to a combinatorial system that treats them as units. Minimalism supplies one part of that account in the form of the edge property of lexical items, their capacity to enter into Merge (Chomsky, 2008), but it does not say what makes a concept the kind of thing that can bear that property.

Integration across Conceptual Domains

A third implication concerns the unity of the conceptual system. Research on core knowledge indicates that infants and other animals possess a small number of domain-specific systems for representing objects, agents, number, and spatial layout, each with its own signature limits (Spelke & Kinzler, 2007). Carey (2009) argues that human concepts go beyond these systems through processes of conceptual bootstrapping, in which language and other symbol systems play a role. Spelke (2003) suggests that the combinatorial properties of natural language allow the outputs of the core systems to be combined, which would explain why human thought is unusually flexible across domains.

The legibility requirement offers a way of making this suggestion more precise. If Merge-built expressions are to be read by the C–I system, then concepts drawn from different core systems must be available to it in a common format, since a single expression can combine a term from the

object system, a term from the number system, and a term from the agent system, as in three men carried the piano upstairs. The requirement thus yields a hypothesis about the C–I system: it contains, or has access to, a format that is domain-general enough for the products of different modules to be combined by one operation. This is an inference from the syntax–thought fit, and it is consistent with the developmental evidence, which is why it is worth stating. But the evidence is not decisive. The developmental work shows that integration occurs; it does not show that the common format is provided by syntax and not by some other cognitive system.

Implications for the Nature of Thought

Productivity, Systematicity, and the Language of Thought

Fodor's (1975) language of thought hypothesis holds that thinking takes place in a representational medium with a combinatorial syntax and a compositional semantics, and Fodor and Pylyshyn (1988) argued that only such a medium can explain why a creature that can think that John loves Mary can also think that Mary loves John. The minimalist architecture invites an identification that Fodor himself resisted. If Merge is a simple operation that yields unbounded hierarchical structure, and if the C–I system reads its outputs, then the generative engine behind language may also be the engine behind the thoughts that language expresses. Berwick and Chomsky (2016) suggest something close to this: the structures built by Merge constitute an internal language of thought, and externalization is a later and secondary matter. Chomsky (2021) restates the general orientation in a recent review of the program.

It is important to see what the Strong Minimalist Thesis itself does and does not entail here. The thesis says that syntactic objects must be legible to the C–I system. It does not say that the C–I system is itself generated by Merge, nor that thought is possible only for creatures with Merge. Three positions can be distinguished. On the first, defended by Fodor, thought has its own combinatorial medium that is independent of, and prior to, natural language. On the second, language is constitutive of at least some kinds of thought. Carruthers (2002) develops a version in which inner speech is the vehicle through which cross-modular conceptual integration takes place, and Hinzen (2006) argues that grammatical organization is itself the form that human propositional thought takes. On the third, language is mainly an instrument of communication and plays little role in thinking (Fedorenko et al., 2024). The Strong Minimalist Thesis is formally compatible with all three. The stronger claim that Merge is the only generative engine in the mind goes beyond it and requires separate defense.

Evidence from Dissociation

The empirical question is how much thought depends on language. Fedorenko and Varley (2016) review neuroimaging and neuropsychological evidence that the brain regions supporting language processing are distinct from those supporting a range of reasoning tasks, and that individuals with severe impairments of language can nevertheless perform tasks involving arithmetic, causal reasoning, and reasoning about other minds. Fedorenko et al. (2024) extend the argument in a recent synthesis in Nature, concluding that the language network is not recruited in most forms of thinking and that the structure of language bears the marks of efficient communication.

Such results place a real constraint on theories of the C–I system. They show that a great deal of conceptual processing does not depend on the language network, which fits the FLB picture in which the C–I system is a neighboring system and not a part of language (Hauser et al., 2002). They do not, however, settle whether the distinctive thoughts that language makes possible, thoughts involving embedded attitudes, displaced reference, and unbounded recursion, rely on syntactic structure for their format. The dissociation evidence concerns tasks that can plausibly be solved without such thoughts.

A Restricted Claim about Thought

What, then, can be responsibly said about thought on the basis of minimalist legibility? The weakest defensible conclusion is a conditional about a class of thoughts. To the extent that language-based thought is read from Merge-built structures, such thought has the following properties. It is hierarchically structured, since Merge yields hierarchy and not linear order. It is compositional, in the sense that the interpretation of a complex expression is determined by its parts and the way they are combined. It is predicate-based and event-structured, with arguments related to predicates through a

small number of thematic relations. It can embed propositions within propositions without a principled bound, which makes attitude reports and recursive mental-state attribution possible. And it admits two modes of organization, one concerning argument structure and the other concerning discourse-related and scopal properties, corresponding to the duality of semantics.

These properties amount to a profile of the kind of thought that language is designed to express, not to a theory of all thought. A creature might have rich thoughts about navigation, social relations, or causal structure without any of them being organized in this way, and the dissociation evidence suggests that humans, too, do much of their thinking in non-propositional formats. The more interesting claim, which the minimalist architecture makes available but does not establish, is that the combination of these properties is what gives human thought its characteristic open-endedness. Hinzen (2006) pursues this line, arguing that grammatical organization is the engine of distinctively human thought and reference. Its testability rests, in my view, on whether the tasks that differentiate human from non-human cognition, such as counterfactual reasoning, recursive mindreading, and the construction of abstract concepts, depend on language in the way the claim predicts.

Meaning, Relativity, and the Language–Thought Relation

Minimalism and the Old Relativity Debate

The language–thought question has a long history in anthropology and psychology. Whorf (1956) argued that the grammatical categories of a language shape habitual patterns of thought, a claim that has been defended in strong and weak forms ever since. Experimental work has produced mixed results. Boroditsky (2001) reported that Mandarin and English speakers differ in their conceptions of time because of differences in the spatial metaphors their languages favour, but Chen (2007) failed to replicate the effect, and the status of the original finding remains disputed. Winawer et al. (2007) found that Russian speakers, whose language obliges them to distinguish lighter and darker blues, discriminate blue shades faster across that boundary, an effect that appears to depend on verbal processing. Gleitman and Papafragou (2013) review the field and conclude, with some caution, that the evidence for deep language-driven restructuring of thought is limited, while allowing that language can influence attention and memory in more modest ways.

Where Minimalism Locates Variation

Minimalist assumptions bear on this debate through a simple structural point. If the core computational system and the mapping to the C–I interface are invariant across human languages, then the places at which languages can differ are limited. Since Borer's (1984) proposal that parametric variation is confined to the properties of lexical items, and in the minimalist formulation of Chomsky (1995b), the main locus of variation has been taken to be the lexicon, together with the processes of externalization. This yields a prediction that is more specific than either strong relativism or strong universalism. Effects of language on thought should be expected primarily at the level of lexical concepts and the categories that the lexicon makes available, such as color terms or spatial frames of reference, and not at the level of the combinatorial operations that assemble concepts into thoughts. The core design for composing thoughts should be shared.

This prediction is contested. Evans and Levinson (2009) argue that the diversity of the world's languages is much greater than the Universalist tradition has allowed and that the cognitive science of language should treat that diversity as primary. Everett (2005) claimed that Pirahã lacks recursive embedding and that its grammar is shaped by a cultural constraint on communication to immediate experience, a claim that, if correct, would bear directly on the minimalist assumption that Merge-built recursion is universal. Nevins et al. (2009) reanalyzed the data and concluded that the claimed exceptional properties are not supported as presented. It is not the purpose of this paper to adjudicate the Pirahã question. The relevant point is that the minimalist reading of the C–I interface gives the debate a clear target: whether languages vary in the combinatorial repertoire that is legible to thought or only in the lexical and phonological material to which that repertoire applies.

Internalist Semantics and the Meaning of Meaning

The most far-reaching consequences of C–I legibility may concern the theory of meaning itself. A dominant tradition in formal semantics holds that the meaning of a sentence is its truth condition, specified relative to a model of the world (Heim & Kratzer, 1998). Chomsky (1995a,

2000b) has argued that the relation between words and things in the world is not the right target for a scientific theory of language, since reference is something that people do, using words for their purposes, and not something that words do. What the language faculty provides, on this internalist view, is a structured set of instructions to the conceptual system. The study of those instructions is a branch of syntax in a broad sense and not a study of the relation between mind and world.

Pietroski (2018) develops this position in detail, arguing that natural language semantics should be understood as a theory of the concepts that expressions let us build and not as a theory of truth conditions, and that this approach better fits the facts of polysemy and the absence of a one-to-one correspondence between lexical items and entities. Collins (2011) likewise defends an internalist approach to linguistic meaning. Legibility at the C–I interface supports the internalist turn in the following way. If the objects the C–I system reads are expressions of an I-language, then what they supply to the C–I system is mental structure. Whatever relation to the world arises, arises through the C–I system's uses of that structure, and the theory of meaning has to be stated at the interface, not beyond it.

This does not make truth-conditional semantics useless. Formal semanticists have developed powerful tools for describing entailment and scope, and nothing in the minimalist picture forbids their use as models of interpretive structure. What the picture does imply is a caution: a model of the C–I system that treats it as a mirror of the world presupposes more than legibility requires. The interface is a point of contact between syntax and a mental system, and the nature of that contact does not by itself determine how the mental system relates to anything outside the head.

Objections and Limits

Rival Architectures

The most serious alternatives to the minimalist picture deny that syntax is the sole generative system. Jackendoff (2002) proposes a parallel architecture in which phonological, syntactic, and conceptual structures are each independently generative and are linked by interface rules. On this view, conceptual structure has its own combinatorial principles, including principles governing spatial cognition, social cognition, and event structure that are not derived from syntax at all. Culicover and Jackendoff (2005) argue that syntax can be correspondingly simpler, because much of what minimalist derivations achieve through abstract movement and functional structure can be handled by direct correspondences with conceptual structure. If this is right, the C–I system is rich and independently structured, and syntax is shaped by it much less tightly than the SMT proposes.

Usage-based accounts present a different challenge. Tomasello (2003) argues that children acquire language by learning constructions, pairings of form and meaning, using general cognitive capacities for intention-reading and pattern-finding, so that the meaning of a construction is learned and is not given by a universal interface. If this is right, the C–I system need not impose the uniform legibility conditions that the SMT presupposes, and the apparent fit between syntax and semantics may be the product of learning and use.

The minimalist reply is, in outline, one of parsimony and explanatory depth. A single combinatorial operation that interfaces with a modest conceptual system explains why syntax and semantics are so closely matched, whereas a parallel architecture must stipulate the matching in a set of interface rules (Hornstein & Pietroski, 2009). The reply has force only to the extent that the minimalist derivations of the phenomena succeed, and critics of the program, including Freidin (2021), doubt that they always do. The honest summary is that the choice between architectures is not settled by the considerations discussed here, and that legibility conditions constrain theories of meaning and thought only conditionally on the minimalist architecture.

Falsifiability and the Meaning of "Optimal"

A further difficulty concerns the notion of optimality. To say that language is an optimal solution to legibility conditions is to make a claim that can be tested only if both the conditions and the standard of optimality are specified. If several interface conditions pull in different directions, as seems likely when two distinct mental systems are involved, then conflicting demands can be balanced in many ways, and almost any design can be described as an optimal compromise. A thesis that can accommodate almost any outcome cannot be refuted by one. The minimalist response is to

treat the thesis as a guide to research and not as a finished theory. That response can be accepted while insisting that the program earns its keep only when it produces specific, checkable predictions, such as the predictions about conceptual structure, event decomposition, and the locus of linguistic variation that this paper has traced.

The C–I Interface as a Window into the Conceptual Mind

Syntax as a System for Expressing Thought

The humanistic significance of the minimalist program lies in what it implies about the point of syntax. An autonomous-syntax view treats grammar as a self-contained formal system, a game of symbols with its own rules. Minimalism, by making interface legibility central, treats grammar as a system whose design reflects what it is for. In this respect it recovers something of the older view found in Humboldt (1836/1999), for whom language was the means by which the mind gives articulate form to thought. Chomsky (1966) found in the Cartesian tradition a related emphasis on the creative aspect of language use, its freedom from stimulus control and its fitness to ever-new situations, and Chomsky (2016) returned to these themes in asking what kind of creatures we are. Because the C–I interface is where syntax meets thought, it is the place at which the formal and the humanistic study of language come into contact.

The Limits of the Window Metaphor

The window metaphor has to be handled with care. A window transmits what lies behind it, but a syntactic representation does not transmit thought in any simple sense. It is a structure that the C–I system interprets, and the interpretation may add, discard, or reshape information. What the C–I interface reveals is therefore not thought as such but the format in which thought is made available to language and returned from it. Windows also have frames, and the frames in the present case include the lexical stock of a given language, the pragmatic use of expressions in context, and the many forms of thought that never pass through the interface at all. The picture that emerges from the dissociation evidence is of a conceptual mind that is larger than language and a language faculty that is built to give a distinctive subset of thought a public, shareable form.

Conceptual Schemes and African Philosophical Inquiry

The humanistic reading also connects the technical discussion with a tradition of inquiry into conceptual schemes embedded in particular languages. In African philosophy, Gyekye (1987) analyzed the conceptual scheme of the Akan, using the resources of the language to examine notions such as person, destiny, and community, and Wiredu (1996) drew on comparison with Akan to question whether philosophical problems associated with the English verb to be are universal or are products of features of English and related languages. These studies exemplify an approach that the minimalist architecture makes it possible to reconsider. If the combinatorial design that maps syntax to thought is shared across languages, then the cultural distinctiveness of a conceptual scheme must lie primarily in its lexical concepts, its categorization, and its patterns of use. The distinction is useful because it allows universal design and cultural particularity to be discussed together without reducing either to the other.

II. Conclusion

The central claim of the minimalist program is that language is an optimal solution to the conditions imposed by the systems it serves, and the most consequential of those conditions is legibility at the conceptual–intentional interface. This paper has argued that the claim has consequences for theories of meaning and thought, but that the consequences are more limited, and more conditional, than the rhetoric of the program sometimes suggests.

Five conclusions have emerged. Firstly, legibility is a relational notion, and the SMT is informative about thought only to the extent that the C–I system is characterized independently of the syntax it is invoked to explain. The triangulation requirement offers a practical test: claims about the C–I system should be supported by evidence from development, neuroscience, semantics, or psycholinguistics. Secondly, with respect to concepts, legibility favors a view on which lexical items provide flexible access to concepts that are combined by a small repertoire of operations, on which verbal meanings are decomposed into events and participants, and on which a domain-general format

allows concepts from different core systems to be joined. Thirdly, with respect to thought, the minimalist architecture yields a profile of language-based thought as hierarchical, compositional, event-structured, and open-ended, but the dissociation evidence shows that much thought proceeds independently of the language network, and the stronger claim that Merge is the only generative engine in the mind is not entailed by the SMT.

Next, with respect to linguistic relativity, minimalism predicts that variation should be concentrated in the lexicon and in externalization and not in the combinatorics of thought, a prediction that remains under active empirical dispute. Fifth, with respect to meaning, legibility favors an internalist conception on which the semantics of natural language concerns the instructions that expressions provide to the conceptual system, while leaving truth-conditional models available as tools for describing interpretive structure.

Several problems remain open. The most pressing is an independent characterization of the C–I system that is rich enough to constrain syntax and does not depend on it. Other priorities include an account of non-propositional meaning, such as that carried by prosody and gesture; cross-linguistic evidence from under-described languages, including the many languages of Africa; developmental studies of how children map syntactic structure onto event representations; and neuroscientific work on how non-linguistic systems read structures built by the language network. Syntax, on the view developed here, is neither an autonomous formalism nor a mirror of thought. It is a system shaped by the demands of the mind that reads it, and for that reason a disciplined way of learning what those demands are.

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