Chomsky on Semantics*

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March 3, 2020

Semanticists will often casually remark that Chomsky—notoriously—rejects semantics. As a casual remark, there is something to this. Chomsky has explicitly argued against some central components of truth-conditional semantics. Chomsky has also frequently noted how poorly understood some aspects of semantics are, and has shown little inclination to grant the status of reasonably well-developed science to many parts of semantics. Where he is more optimistic, he has suggested that what we find is 'basically syntax' anyway. Skepticism about semantics is certainly among Chomsky's views, and so the casual remark semanticists often make is fair enough.

But the casual remark is also certainly too casual. Chomsky has discussed semantics frequently, from the very beginning of his work, and in many ways, semantics has played a central role in a number of key Chomskian arguments. From early on, what meanings sentences can have has been central data for Chomsky. Chomsky has also dedicated a great deal of attention to how the interface between syntax and semantics is structured. For all Chomsky's skepticism about many aspects of truth-conditional semantics, he has never really dismissed the importance of semantics for understanding language.

1 Skepticism and Autonomy

Early and late, Chomsky has expressed some degree of skepticism about semantics. Here are some representative samples:

*My understanding of Chomsky has benefited from many discussions with John Collins, Jeff King, Terje Lohndal, Paul Pietroski, and Alexis Wellwood. Thanks to them for all the help, and especially to John and Terje for comments on an earlier draft of this paper.

> There is, however, little evidence that "intuition about meaning" is at all useful in the actual investigation of linguistic form. (Chomsky, 1957, p. 94)
>
> On the contrary, the problem of delineation [of syntax and semantics] will clearly remain open until these fields are much better understood than they are today. (Chomsky, 1965, p. 159)
>
> [Of Semantics:] No area of linguistic theory is more veiled in obscurity and confusion, and it may be that fundamentally new ideas and insights will be needed for substantial progress to be made in bringing some order to this domain.(Chomsky, 1972, p. 75–76)
>
> [Of the syntax-semantics interface:] Important obscure questions still lie beyond: in what respects, for example, do these properties belong to the language faculty as distinct from other faculties of mind to which it is linked? (Chomsky, 2000, p. 129)

It is easy to see the skeptical tone of these and other remarks. At the very least, semantics remains in a very underdeveloped state compared to, say syntax or phonology.

As we will discuss more below, Chomsky does reject a particular, well-developed program in semantics. Leaving that aside, Chomsky finds the subject of semantics in a poorly developed state. He often describes semantics as 'obscure', and not up to the standards of good science.

But it also should be noted that the quotes above are almost all from discussions of something other than semantics in general. He is often really talking about the nature of syntax, or the language faculty, or the syntax-semantics interface. It is hard to find any place where Chomsky discusses semantics in isolation.

Moreover, Chomsky's skepticism about semantics as a science or its place in grammar does not mean he suggests there is 'no such thing as semantics'. Of course there is. Chomsky frequently refers to a traditional idea of a language as a pairing of sound *and meaning* (e.g. Chomsky, 1972, p. 62):

> A grammar of a language, in the sense in which I will use this term, can be loosely described as a system of rules that express the correspondence between sound and maning in this language.

Even less skeptically, we find (Chomsky, 1975a, p. 21):

> I will merely emphasize again that the "legitimacy of semantics" (whatever that might mean) has never, to my knowledge, been challenged, nor has there ever been any question of the importance of incorporating a study of reference, meaning, language use, and related topics within a full theory of language that will deal, in particular, with the highly significant relations between formal structure and semantic interpretation.

Chomsky, as we will discuss more below, is very concerned about how much of meaning is part of the language faculty proper. But he never says there is no such thing as meaning, or that it is not central to language.

One specific reason Chomsky has often voiced skepticism about semantics is that he saw the wrong kinds of appeals to semantics in the wrong places. This involves the complex issue of the autonomy of syntax. In loose terms, this is the idea that syntax is not derivative on semantics. The autonomy thesis includes more specific claims; for instance, that grammatical sentences are not those that have semantic significance, and grammatical relations are not to be understood as semantic relations (Chomsky, 1957, p. 94). Many of Chomsky's well-known examples, including *Colorless green ideas sleep furiously*, come from his discussion of the autonomy of syntax (e.g. Chomsky, 1957, 1965).

The autonomy of syntax is also a kind of methodological point. It requires formulating syntactic principles in syntactic terms, not semantic ones; and it requires separating out semantic evidence about what a sentence means from evidence about its structure. So, to illustrate, we must not be mislead by the semantic oddness of an idea being colorless and green to claims about the structure of this famous sentence. This is a difficult idea to state properly. One reason is that the autonomy of syntax as Chomsky sees it by no means precludes any appeals to meaning. The fact that *I almost had a book stolen* has *three* distinct meanings is an important piece of evidence. It helps us to discover that our grammar can generate at least three syntactic structures for this string. But this fact about English syntax is not to be reduced to some facts about meaning. Rather, once the syntactic facts are identified, they help explain the observation about meaning. Nor are we to reduce our appeals to what sentences can mean to observations about how easily we can identify meanings. The third reading of our sentence—that I nearly succeeded in stealing a book—is often not recognized by speakers without some prompting. We can explain all this better once we identify the three

distinct syntactic strutures the sentence can have; and perhaps, note the pragmatic oddness of one of them.[1]

The arguments for the autonomy of syntax in Chomsky's early writing (Chomsky, 1957, 1965) have been described as part of an extended argument for the 'existence of syntax' (Adger, 2018). His discussions of semantics there, both more skeptical and less, often relate to where and how semantic evidence can be correctly used in the study of syntax, or more generally, linguistic competence. His skepticism often reminds us that on Chomsky's view, assumptions that phenomena are semantic can be unjustified, or obscure, and hinder progress.[2]

2 Syntax-Semantics Interface

We have already seen that among the issues that brings Chomsky to discuss semantics is the way that syntax and semantics relate. In a very abstract way, Chomsky's views on this matter have been consistent. A typical early statement is the very last paragraph of *Syntactic Structures* (Chomsky, 1957, pp. 107–108):

> In other words, one result of the formal study of grammatical structure is that a syntactic framework is brought to light which can support semantic analysis. Description of meaning can profitably refer to this underlying syntactic framework, although systematic semantic considerations are apparently not helpful in determining it in the first place ... Nevertheless, we do find many important correlations, quite naturally, between syntactic structure and meaning; or, to put it differently, we find that grammatical devices are used quite systematically. These correlations could form part of the subject matter for a more general theory of language concerned with syntax and semantics and their points of connection.

Syntax generates grammatically well-formed structures—sentences if you like. These support semantic interpretation. As it is often put, they are in the

[1] Discussions of examples like these appear frequently in Chomsky's writing, from Chomsky (1965) to Chomsky (1986) and beyond. For more discussion, see Pietroski.

[2] Chomsky's views on the autonomy of syntax relate to a wide range of empirical and methodological issues. For more discussion, see Adger (2018), Newmeyer (1998), and Pietroski.

inputs of semantic interpretation. As such, they must be suitable for interpretation. As Chomsky later puts it, they must be "legible" to the right systems of semantic interpretation (Chomsky, 2000, p. 9).

As is well-known, syntax in the Chomskian tradition has often appealed to a number of distinct syntactic levels, sometimes (though not wholly helpfully) called levels of syntactic representation. An important technical question that has been central to Chomsky's discussion of semantics is just what is the level at which semantic interpretation happens. To explain these issues and Chomsky's views on them, it will helpful to take an historical perspective, and document some interesting developments over the past years.

Chomsky's most extensive discussion of the syntax-semantics interface takes place in the period from around 1965 to 1980.[3] Those familiar will recognize this as the period in which the so-called Standard Theory emerged with the publication of *Aspects of the Theory of Syntax* (Chomsky, 1965), and developed into the so-called Extended Standard Theory and then into Government and Binding Theory by the time of Chomsky (1981). This was a particularly interesting time for thinking about how syntax and semantics relate. The years just after *Aspects* were filled with optimism about the state of generative linguistics. It was what Partee (2015) calls the 'Garden of Eden period'.

The model of syntax in *Aspects* is rich in many ways, and it is impossible in this essay to do it full justice. But briefly, phrase structure rules build deep structures. A transformational component then builds surface structures from deep structures. Most importantly for our purposes, deep structure is the level of semantic interpretation, and surface structure of phonetic interpretation. Chomsky specifically says "The deep structure of a sentence is submitted to the semantic component for semantic interpretation" (Chomsky, 1965, p. 135).

This is deceptively simple claim. It is complex syntactically, as the idea that the syntactic process goes first through phrase structure to form a distinct level of deep structure, and then through transformations to form surface structure, is a very substantial claim, not made explicitly in Chomsky (1957, 1975a).[4] More striking for our interests is that *Aspects* includes an

[3]For a more extensive historical overview, see Lasnik & Lohndal (2013). For some discussion of more recent issues, see Alexiadou & Lohndal (2017).

[4]Specialists will note that implicit in Chomsky (1957) are some ideas that play a similar role; especially, the distinction between kernel sentences and T-markers. Also, the need for these levels is questioned in later work.

ambitious semantic component. Chomsky explicitly endorses work of Fodor, Postal, and Katz on semantics (Katz & Fodor, 1963; Katz & Postal, 1964; Katz, 1972), and includes it in the *Aspects* model. Again, we cannot explore their theory in depth, but it is built around the idea of a structure of 'semantic markers' like 'human', 'animal', etc., and further semantic distinguishers that refine contents. Semantics for larger phrases is generated compositionally by so-called 'projection rules'. Philosophers have asked, often, whether such markers can really provide meanings for sentences (e.g. Lewis, 1970). Regardless, the theory here is semantics in at least two senses: It compositionally projects meanings, and it is answerable to a range of semantic data, including ambiguity, entailment, and so on.[5]

For the moment, we will focus, as Chomsky does, on the syntax-semantics interface. The kind of compositional semantics developed by Fodor, Postal, and Katz did not only involve marker representations of meaning; it also involved compositional ways to project them. Along the way, it included the idea of adding some semantically relevant morphemes to deep structure that had not been placed there before, including negation and question morphemes. This allows, for instance, question-formation transformations to not change meanings. We thus reach the Katz-Postal Hypotheses, that transformations do not change meanings. As transformations do not change meanings, the deep structures they apply to must express the meanings of sentences. Thus, deep structure is the level of semantic interpretation, or as we now say, provides the syntax-semantics interface. With this hypothesis in place, we get the elegant view of the relation between syntax and semantics of *Aspects*.

Chomsky makes some of his most positive-sounding remarks about semantics in *Aspects*. Among many (Chomsky, 1965, p. 144):

> To the extent that grammatical categories and relations can be described in language-independent terms, one may hope to find universal projection rules, which need not, therefore, be stated as part of a specific grammar.

Chomsky is here optimistic that some of semantics could be a full-fledged part of universal grammar.

The Katz-Postal Hypothesis became a focus of much attention in the years after *Aspects*. Chomsky had already mentioned some potential complications

[5]For an overview of the start of the art at the time, see Fodor (1977).

in Chomsky (1965). But over the years a number of challenges appeared. As highlighted by Jackendoff (1972), passive transformations appear to have more effect on meaning than originally thought. Among the many challenges to the Katz-Postal Hypothesis, Partee (2015) highlights issues with quantifiers, which are of special importance to truth-conditional semantics. These issues where uncovered by a number of authors (Karttunen, 1969; Lakoff, 1968; McCawley, 1971). One typical observation is that passivization more dramatically affects meaning when quantifiers are involved:

(1) a. i. John sank the boat.
ii. The boat was sunk by John.
b. i. Everyone in the room knows two languages.
ii. Two languages are known by everyone in the room.

For the first pair,we might be tempted to say they are synonymous (at least, before we pay close attention to focus). But the second pair seems to rearrange quantifier scope, and so the claim of synonymy is much harder to sustain.[6]

There are two ways one can respond to this. One is to continue to hold on to the Katz-Postal hypothesis, and change what we think deep structure is like to explain the apparent puzzles. This is, we might observe, extending one idea that lead to the *Aspects* model: including some extra morphemes in deep structure. The other is, of course, to give up on the Katz-Postal hypothesis and see more than deep structure as input to semantics.

Hence began what some have called the 'linguistics wars'.[7] A view, known as 'generative semantics', opted for the first response.[8] Generative semantics had a number of important ideas, and as it is not Chomsky's view, I shall not go into it in any depth. Suffice to say that to sustain the Katz-Postal

[6]As Partee notes, Chomsky (1965) does note potential issues with quantifiers in footnote.

[7]See Harris (1993), though in my personal experience, people who lived through those days disagree on whether there was a 'war', and what it was about. Though many now reject the Katz-Postal Hypothesis, with the luxury of hindsight we can see how much of what was then seen as part of the 'losing side' of the 'war' has become important to much current linguistic thinking.

[8]This view—a 'movement' by some lights— is associated with Lakoff, McCawley, Ross, some early work of Dowty, some work of Bach, some work of Horn, and others. Some representative publications in generative semantics include Lakoff (1971, 1972), McCawley (1968, 1971, 1972), and Ross (1970, 1972).

hypothesis, generative semantics made deep structure increasingly more abstract, and had it contain increasingly more specifically semantic elements. Deep structure in generative semantics began to look more like logic, and less like the phrase structure of a natural language; and, it began to look more like the semantic representation of a sentence, rather than the input to semantics.

In the period from the late 60s to the late 70s, especially in the essays in Chomsky (1972, 1977), Chomsky along with Jackendoff (1972) developed a response to generative semantics. Their view, sometimes called 'Interpretive Semantics' or the 'Extended Standard Theory' (in contrast to the 'Standard Theory' of *Aspects*) holds that both deep and surface structure feed semantic interpretation. Deep structure, specifically, provides grammatical relations to semantic interpretation. As thematic role theory is developed (e.g. Fillmore, 1968; Gruber, 1965), this is increasingly seen as representing thematic structure. But suface structure is at this point also a component of semantic interpretation, as quantifiers, focus, and so on are interpreted there.

Further developments from Chomsky (1977) lead to the idea that the semantic information encoded in deep structure is preserved in transformations, and that post-surface structure semantic organization is needed. This leads to the idea that there is a level of Logical Form (LF) that is the distinctive level of semantic interpretation May (1977, 1985). This becomes a part of both the Government and Binding Theory (Chomsky, 1981), and the subsequent minimalist developments (e.g. Chomsky, 1995, 2000). Ultimately, the view that emerges with the Minimalist Program is that syntactic processes generrate legible representations PHON and SEM, which are the interfaces with phonetic and semantic interpretation.

So far, we have been talking about a fairly technical issue, as much in syntax as semantics: what level of syntactic representation is the right one to input into semantic interpretation. But in resisting generative semantics, Chomsky is not only addressing this narrow question. He is also insisting that syntactic structure feeds semantic interpretation, but is not itself semantic in nature (as he said in earlier work as well). Syntax is not semantics. In fact, in the period where he is responding to generative semantics, Chomsky voices more skepticism about semantics than he did in *Aspects*. The quote above from Chomsky (1972) is illustrative. Another example is from Chomsky (1977, p. 31):

> But it seems plain that the syntactic structures are not a projec-

> tion of the semantics, and that the relation between the "world of ideas" and the syntactic system is fairly intricate.

Part of Chomsky's skepticism about semantics is skepticism about an overly semantic approach to underlying syntactic structures. The dispute with generative semantics highlights this.

3 Chomskian Semantics?

We have now seen some of the sources of Chomsky's skepticism about semantics in grammar, but also that he is not dismissive of the idea that there is some form of semantics. Clearly he thinks it is a poorly understood subject, but we can still ask what semantics along Chomskian lines would look like.

The main hint about what a Chomskian semantics could be is that in Chomsky (1965) he endorses the Fodor, Katz, and Postal idea of semantic markers. These, as we noted, provide a range of semantic elements like 'human' or 'animal', that can be combined by composition rules. He continues to talk about various plausible features that might be part of a grammar. Chomsky (2000) mentions 'animacy', 'artifact', and 'substance'.[9] So, we can assume a Chomskian semantics will include a range of appropriate semantic features, though just what they are is yet to be accurately determined.

To understand this idea for Chomsky, it is important to remember that when talking about language, Chomsky's main interest is in the *Language Faculty* (sometimes called the *Faculty of Human Language*). The way Chomsky thinks about the Langauge Faculty is itself a complicated issue, and I shall not try to delve into it too deeply. But to quickly note some crucial features: it is a distinct human cognitive system, that is substantially innate, and one whose principles and parameters make up Universal Grammar. For us, the most important point is that the Language Faculty is an aspect of cognition. It is part of psychology (cf. Chomsky, 1986, p. 25). In works around this period, Chomsky introduces the tem 'I-language'. An I-language is state of the Langauge Faculty as it develops. It is thus an internal (and intensional!) part of an individual's psychology.[10]

[9] For interesting recent work on the semantics and cognition of objects, substances, and events, see Wellwood et al. (2018). See also reference therein for the rich literature on these issues.

[10] Chomsky (1986) is perhaps the canonical statement of this idea, but it is consistent

When Chomsky talks about semantics, he is mostly talking about something that can be part of the Langauge Faculty—part of I-language. This is not the whole story, of course. Chomsky frequently describes the syntax-semantics interface as the point where the Language Faculty will hand off legible structures to a *Conceptual-Intentional* system, where much of what we might think of as fixing meaning takes place (Chomsky, 1995, 2000). But within I-language itself, what we find are *semantic features*. What features are in I-language is an empirical question, but a good guide is that they are the semantic components of a sentence that are encoded in the grammar. Chomsky's example of substance illustrates this. Conceptually, we can distinguish substance from particular objects, even at a very young age. So, there is an important aspect of our ability to think about the world represented by this feature. But equally, languages grammaticalize a mass-count distinction that roughly encodes the substance-object distinction. So, we have good reason to think this feature is part of I-language.[11]

Semantics for Chomsky must be part of I-language: the part that provides useful information from the Language Faculty to the Conceptual-Intentional system. Clearly, on this view, semantics proper is a constraint on the full contents we attribute to what we say. How strong a constraint, Chomsky would say, is unknown, but likely to be fairly weak.

Indeed, I think Chomsky's view is that there is not really a separate study of semantics within I-language. One hint is that, as we already saw, where we are confident there are features, they have syntactic effects. More generally, it has been a consistent idea of Chomsky's that the mechanisms of grammar are autonomous. I-language is its own system. We see this, for instance, in Chomsky's response to generative semantics. Chomsky resists reading semantics back into what was then deep structure, and insists on purely syntactic processes generating an interface level for semantic interpretation.

In more recent work, this idea has been further clarified. Starting with the strong lexicalist view of syntax that emerges with Chomsky (1972), and through further development into the Minimalist Program (Chomsky, 1995), a clear picture of the abstract architecture of the Language Faculty emerges. Lexical items are essentially bundles of features: semantic and phonological. The Language Faculty is a computational system that generates legible

across a range of Chomsky's writings including Chomsky (1965, 1977, 2000). For a good discussion of the complex issues surrounding the Langauge Faculty, see Collins (2004).

[11]The literature of cognition of objects and substance is huge, as is the literature on mass versus count terms. See references in Wellwood et al. (2018).

structures of features from these, that are then fed to the interface systems (Conceptual-Intentional and Articulatory-Perceptual). Chomsky often stresses that it is an open question just what goes into this system, and the Minimalist Program is one that seeks to find the most optimum system, with the least apparatus. But it is clear that there is not really a separate semantics module in this picture. We are not expecting to find, for instance, modes of semantic composition distinct from syntactic ones. Among features will presumably be some that are especially important for the Conceptual-Intentional system, some that are especially important for the Articulatory-Perceptual system, and some for computational engine itself. But still, grammar—syntax if you like—operates of features that include semantic ones.[12]

The Minimalist Program seeks to identify the optimal mechanisms for I-language (as an organizing principle for a research program, but also for reasons of understanding the evolution of language, as discussed in e.g. Hauser et al. (2002)). The very austere picture of the Language Faculty *Narrow* that Hauser et al. (2002) describe, reducing it essentially to a recursion mechanism, may make us wonder how much semantic will be left in the final results. But more concretely, there has been a tendency among generative linguists, even though working squarely in semantics, to shift burdens of explanation from semantics to syntax. One good example is quantifier scope, which may seem like a semantic phenomenon, and can be treated as such. But work in the tradition of May (1977, 1985) offers an account of quantifier scope based on otherwise well-recognized syntactic processes. Logical Forms, on this view, syntactically encode scope. This approach has been integrated into many works in semantics (e.g. Heim & Kratzer, 1998).[13] Similar points can be made in a number of ares, including binding theory and constraints on co-reference.

This tendency leads some in the Chomskian tradition to hold that within linguistics, understanding semantic phenomena means making them syntactic. Chomsky himself says something like this. He mentions work on semantics by Larson & Segal (1995) and Pustejovsky (1995), and says (Chomsky, 2000, p. 174):

[12]Pietroski (2018) argues that we need to find modes of composition in the Conceptual System that track minimal syntactic operations. He argues forms of concept conjunction do just that.

[13]But see Jacobson (2014) for a different view, which we might call more 'semantic'?

> This work could be considered syntax in the technical sense; it deals with the properties and arrangements of the symbolic objects ... The same practice would be appropriate, I think, with regard to the work often called "natural-language semantics" and "lexical semantics." It can be regarded as part of syntax, but oriented to a different interface and different aspects of language use.

There is a strict Chomskian view that at least what we understand of I-language semantics is really syntax anyway. Of course, many semanticists working in the Chomskian tradition disagree (e.g. Heim & Kratzer, 1998; Partee, 2015). The most strictly Chomskian approach to semantics would investigate syntax and its relation to the Conceptual-Intentional system. Work along these lines has been pursued by Pietroski (2010, 2012, 2018). Wellwood's work (e.g. Wellwood et al., 2018; Wellwood, 2019) is in a related vein, if not strictly Chomskian.

4 Reference and Truth Conditions

So far, we have described some sources of Chomskian skepticism about semantics, but also seen what semantics for Chomsky is. What has been missing, strikingly, is engagement with one of the most well-developed research programs in semantics, including semantics within the broad project of generative ('Chomskian') linguistics.

There are many traditions in semantics, and many current research programs in sematics are embedded in firmly anti-Chomskian views of language in general.[14] But since pioneering work of Partee (Partee, 1973, 1975), many linguists have seen the project of truth-conditional semantics as part of generative linguistics, and as part of a broadly 'Chomskian' approach to language. It is no surprise that the much-cited textbook of Heim & Kratzer (1998) is called *Semantics in Generative Grammar*.[15] But Chomsky is skeptical of

[14]So-called Usage-Based Theories (e.g. Tomasello, 2005) and construction grammars (e.g. Goldberg, 1995) have semantic components that are explicitly anti-Chomskian. Cognitive Semantics and Frame Semantics (e.g. Fillmore, 1982; Talmy, 2000) are equally anti-Chomskian. There are many approaches to semantics. For a good overview, see the chapters in Maienborn et al. (2011).

[15]The same can be said for other textbooks, notably Chierchia & McConnell-Ginet (1990) and Larson & Segal (1995). Though she disagrees with many Chomskians about

this sort of semantics, and is so for foundational reasons. Whereas many of Chomsky's remarks on semantics are cautious and guarded, it is clear that he really rejects some of the core ideas of this program.

Truth-conditional semantics, of couse, had its start in philosophy, especially in logic, and migrated to linguistics over the years. As is very familiar, it has two fundamental ideas. First, the meaning of a sentence is (or at least determines) its truth conditions. Take a simple sentence:

(2) Max smokes.

In virtue of its meaning, this sentence is true in a range of conditions: those in which a certain individual, Max, has a certain property, smoking. This determines a set of conditions. If you like the apparatus of possible worlds, it determines a set $\{w\text{: Max smokes in } w\}$. But we do not need to worry about worlds: for our purposes, any way of representing truth conditions is fine. We can just as well (for our purposes) say:

(3) 'Max smokes' is true if and only if Max smokes.

Truth-conditional semantics, of course, works with appropriate representations of truth conditions.[16]

The main project of truth-conditional semantics within linguistics is to explain how truth conditions are determined compositionally, from the meanings of the parts of sentence and the ways they combine. But what then are the meanings of the parts of a sentence? According to this approach, their contributions to truth conditions. Central to that is *reference*. We assume that certain terms refer to certain things. Proper names like *Max* refer to their bearers, for instance. In the tradition from Frege, we can then work out what many other terms must mean to determine truth conditions. Predicates must have meanings that when combined with the meanings of names in simple sentences give truth conditions. These are in effect properties.

As this idea has been developed both in philosophy and linguistics, it often (though not always) looks to assign semantic values to constituents of

the syntax-semantics interface, Jacobson (2014) is also within the broad enterprise of generative linguistics.

[16]Of course, I am talking about the project started with Frege (1892) and Tarski (1935), developed by Carnap (1947), Cresswell (1973), Davidson (1967), Lewis (1970), and Montague (1973), and then many others. For some discussion of the different flavors of truth-conditional semantics, see my (2014). For more on how different flavors of semantics and the syntax-semantics interace relate, see Lohndal (2014).

sentences, and present modes of composition to show how those values combine. It is useful to simplify, in the manner of many standard presentations of truth-conditional semantics, and look at the purely extensional fragment. In such a simplified setting, we can assign terms their referents, sentences a truth value (proxy for truth conditions), and predicates their extensions, often in functional form. We have something like: [17]

(4) a. $[\![\text{smokes}]\!] = \lambda x.x$ smokes
    b. $[\![\text{Max}]\!] = \text{Max}$

(5) $[\![\text{Max Smokes}]\!] = [\![\text{smokes}]\!]([\![\text{Max}]\!])$

The mode of composition here is function application, which generalizes to a large number of cases. As part of this approach, different types of semantic values are assigned to different constituents. Composition can be by function application, but given the range of semantic values, there are substantial questions to be asked about how semantic composition works. Obviously, the empirical richness of this sort of approach to semantics goes way beyond such a simple example, as any good textbook in semantics makes clear. But this is the motivating idea behind the project, and much of what Chomsky takes issue with is already present in such simple cases.

Chomsky has voiced concerns about this sort of semantics over many years. Generally, Chomsky rejects the idea that natural languages are like the formal languges studied by logicians. Early on, he responded to a paper by Bar Hillel (1954) that suggested the formal syntax of logic, and the notion of consequence from logic, could be usefully combined with linguistics. Chomsky (1955) strongly disagrees, and rather claims that formal languages from logic have so little relation to natural language that such combinations would be fruitless. Montague (e.g. Montague, 1970, 1973) took the opposite position, that natural languages are just like formal languages. There is little explicit discussion of Montague in Chomsky's work, but his rejection of Montague semantics may well come down to his reservations expressed in 1955.[18]

[17] Here I mostly follow the influential presentation of Heim & Kratzer (1998), though up to some notational details, you find something similar in many many works in semantics. Semantic values are indicated by double brackets $[\![\cdot]\!]$. In displays and formulas, I let context disambiguate use and mention, but where it is helpful, I put linguistic items in *italics*. Thus, $[\![\text{Max}]\!]$ is the semantic value of *Max*.

[18] But see remarks in Chomsky (1980).

Chomsky's most extensive discussion of truth-conditional semantics is in Chomsky (2000). There, he rejects the project, on foundational grounds. Here is a much-quoted passage (Chomsky, 2000, p. 132):

> As for semantics, insofar as we understand language use, the argument for a reference-based semantics (apart from an internalist syntactic version) seems to me weak. It is possible that natural language has only syntax and pragmatics; it has a "semantics" only in the sense of "the study of how this instrument, whose formal structure and potentialities of expression are the subject of syntactic investigation, is actually put to use in a speech community," to quote the earliest formulation in generative grammar 40 years ago ...

Chomsky presents a battery of arguments for this claim, especially in Chomsky (2000). Not surprisingly, they have proved controversial. I shall review them quickly, as they have already been discussed at length (cf. Pietroski).

Chomsky's arguments center around terms that lack plausible referents, or underdetermine reference. Here is a typical passage (Chomsky, 2000, p. 172):

> Suppose Peter says that Joe Sixpack voted for a living wage because he's worried about his child's health. Are we entitled to conclude that Peter believes the world to be constituted of such entities as Joe Sixpack, living wages, and health, and relations like voting-for and worrying-about that hold among them?

Similar points are made in Chomsky (1981), using the term *flaws*, and a related one in Chomsky (1975b) using the term *cattle*. Ludlow (2011) calls the 'implausible committments' argument, as it seems implausible that we are committed to entities such as 'Joe Sixpack' to which the term refers.

Chomsky takes polysemy to show us similar problems (pp. 15–16 Chomsky, 2000, e.g.):

> Suppose the library has two copies of Tolstoy's War and Peace, Peter takes out one, and John the other. Did Peter and John take out the same book, or different books? If we attend to the material factor of the lexical item, they took out different books; if we focus on its abstract component, they took out the same book. We can attend to both material and abstract factors

> simultaneously, as when we say that "the book that he is planning will weigh at least five pounds if he ever writes it," or "his book is in every store in the country."

Even when we can find referents for expressions that seem plausible, we cannot always systematically assign a coherent referent to a term, and the mechanisms of language do not seem to care.[19]

Any number of specific responses have been given to these sorts of arguments. One response, that terms like *Joe Sixpack* or *the average man* are not really referring expressions to begin with, has been offered by Higginbotham (1985) and Kennedy & Stanley (2009). Whether polysemy really poses such a serious problem has been challenged by King (2018) and relatedly Kennedy & McNally (2010). Collins (2017b) replies. To say the least, whether arguments from difficulty in identifying semantic referents succeed has proved controversial.

Chomsky (2000, pp. 129–133, 177-181) also argues that there is no theoretical benefit to positing semantic values. He compares the idea with positing 'phonetic values'. So, he considers the idea that for an element a of a phonological form, we posit a 'phonetic value' $^\star a$. Nothing would be gained from doing so, he claims. Would we explain how speakers communicate with such a theory? They would recognize common 'phonetic values' for expressions of their languages? This is a weak theory, as it really tells us little if anything about what happens when a hearer hears speech in ways that facilitate communication. Such a theory is just "spinning wheels" (p. 129) and there are "no proposals along these lines" (p. 178). Semantic values, and reference to them, is not better, according to Chomsky. It does not explain how speakers and hearers communicate, and it introduces a theoretically demanding notion of reference. The arguments from implausible committments and polysemy are taken to show that reference, as needed for such a theory, is just such a theoretically obscure and not well understood relation. Chomsky concludes there is little value to truth-conditional semantics (except, as we saw above, when it turns out to look like syntax).

There are relatively few explicit responses to this line of argument from practitioners of truth-conditional semantics. King (2018) takes up the issue most explicitly. Ludlow (2011) and Partee (1975) take up substantial alternatives, which we will explore in a moment. I think that much of the

[19]For an extensive discussion of this argument, see Collins (2017a). Related points are discussed at length in Pietroski (2003, 2018).

literature on truth-conditional semantics takes itself to be showing its utility. It is capturing aspects of the meanings we recognize words to have and how they compose, and is responsible to a wide range of data. Perhaps the most common response from the literature is to show how Chomsky's worry that there is no substantial theory may be incorrect.[20]

The discussion in Chomsky (2000) is primarily an explanation and defense of internalist view of language (along with forms of naturalism, anti-behaviorism, etc.). The status of truth-conditional semantics is one of many ideas in philosophy that Chomsky takes issue with as part of this defense. But as a number of commentators, notably King (2018) and Ludlow (2011) point out, rejecting truth-conditional semantics is part of that defense. Generally, Chomsky is rejecting the idea that external relations between speakers and things in the world is part of the scientific study of language (which is the study of I-language). Truth-conditional semantics is based on reference and other assignments of semantic values, so rejecting such external relations requires rejecting truth-conditional semantics on foundational grounds (as is made clear by King (2018)).

The most systematic reply to this line of argument I know is from Ludlow (2003, 2011). Ludlow grants that referential semantics may not be part of the *Narrow* Faculty of Language (e.g. Hauser et al., 2002). But he argues an internalist, psychologically based I-language approach still makes room for relational explanations in semantics, including reference. Ludlow notes instances where explanations of individualistic properties of organisms are best given in terms of relations to their environments. Ludlow (2011) also explores other ways we can think of the standard type-based apparatus of truth-conditional semantics in more interernalist ways. Not surprisingly, the foundational status of truth-conditional semantics within an I-language approach remains contentious. Chomsky (2003) found Ludlow's response to the arguments we reviewed above unpersuasive. Ludlow (2011) replies to Chomsky that they have more force than Chomsky granted.

[20]For the data in semantics, see Chierchia & McConnell-Ginet (1990) and Krifka (2011). The textbooks mentions above all illustrate many of the theories and solutions to problems offered by truth-conditional semantics. Within philosophy there has been more discussion of arguments like Chomsky's about reference, with an eye towards the issue of *contextualism*. Chomsky's arguments echo those of Travis (e.g. Travis, 2008), who argues for a form of radical contextualism according to which pragmatics rather than semantics is the key to meaning. Among many responses is Cappelen & Lepore (2005) as well as Kennedy & McNally (2010). For a recent, empirically informed discussion see Hansen (2018).

Chomsky's responses to more technical developments of truth-conditional semantics within linguistics have been limited. We already noted his approval of Larson & Segal (1995), but so long is it is viewed as syntax. Chomsky (1977, pp. 47–52) does discuss an analysis of the structure of noun phrases from Partee (1975). There Partee made the now classic proposal that semantic considerations show us that complex noun phrases have the structure [D NP], as in [$_{\text{D}}$ the [$_{\text{NP}}$ man who saw Mary]] (cf. Heim & Kratzer, 1998). Chomsky objects, partly on on technical grounds. He complains that Partee's analysis will fail on plural noun phrases. (Though more recent work on plurals leaves this claim contentious.) But much of his discussion is a defense of a strong autonomy of syntax, where such semantic considerations as Partee presented for syntactic structure have no place.[21]

Chomsky's skepticism about truth-conditional semantics has been, and remains strong. It is part of his defense of internalism and the autonomy of syntax, but remains among his more contentious views.

5 Conclusion

Generally, we have seen that Chomsky has had a great deal to say about semantics. Some of it is negative. He rejects truth-conditional semantics, generative semantics, and views that challenge a strong autonomy of syntax. He is doubtful that we know that much about semantics, and doubts it has much of a place in the Narrow Language Faculty. But all the same, Chomsky recognizes that meaning is one of the central aspects of language, and the correctly formulated scientific study of meaning has to be part of the broad project of understanding us as agents and language users.

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[21]Partee (2015) describes herself as 'surprised' by the strength of Chomsky's negative reaction, given the optimistic things he said about semantics in *Aspects*.

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