

The History and Prehistory of Natural Language Semantics

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Contemporary natural-language semantics began with the assumption that the meaning of a sentence could be modeled by a single truth-condition, or by an entity with a truth-condition. But with the recent explosion of dynamic semantics and pragmatics and of work on non-truth-conditional dimensions of linguistic meaning, we're now in the midst of a shift away from a truth-condition-centric view and toward the idea that a sentence's meaning must be spelled out in terms of its various roles in conversation. This communicative turn in semantics raises a historical question: why was truth-conditional semantics dominant in the first place, and why were the phenomena now driving the communicative turn initially ignored or misunderstood by truth-conditional semanticists? I offer a historical answer to both questions. The history of natural language semantics—springing from the work of Donald Davidson and Richard Montague—began with a methodological toolkit that Frege, Tarski, Carnap, and others had created to better understand artificial languages. For them, the study of linguistic meaning was subservient to other explanatory goals in logic, philosophy, and the foundations of mathematics, and this subservience was reflected in the fact that they idealized away from all aspects of meaning that get in the way of a one-to-one correspondence between sentences and truth-conditions. The truth-conditional beginnings of natural-language semantics are best explained by the fact that, upon turning their attention to the empirical study of natural language, Davidson and Montague adopted the

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methodological toolkit assembled by Frege, Tarski, and Carnap and, along with it, their idealization away from non-truth-conditional semantic phenomena. But this pivot in explanatory priorities toward natural language itself rendered the adoption of the truth-conditional idealization inappropriate. Lifting the truth-conditional idealization has forced semanticists to upend the conception of linguistic meaning that was originally embodied in their methodology.

1. Truth-Conditional Semantics and The Communicative Turn

The most fundamental way of dividing up approaches to linguistic meaning is on the basis of how they answer a question best articulated by David Lewis.

In order to say what a meaning *is*, we may first ask what a meaning *does*, and then find something that does that. (1970: 193)

Meaning is a theoretical posit, and so our theory of it has to be grounded in the explanatory role that we posit it to play. Lewis's question is the one raised by his methodological advice: what is the explanatory role of linguistic meaning? My goal in this section is to document a fundamental shift in how semanticists have answered this question over the last several decades.

Lewis's own answer to his question was that the meaning of a sentence "is something that determines the conditions under which a sentence is true or false" (1970: 193). Versions of this answer dominated natural-language semantics from its contemporary beginnings in the work of Donald Davidson (1965, 1967a, 1970) and Richard Montague (1970a,b, 1973) until recently. If we use 'truth-conditional semantics' as a broad covering term for any theoretical approach that articulates or embodies a truth-condition-centric answer to Lewis's question, then many debates about how to do semantics are disputes between different species of semanticists within the truth-conditional genus. For example: are sentences' semantic values² functions from possible worlds to truth-values (Cresswell 1973; Lewis 1970, 1975; von Stechow & Heim 2011), functions from more elaborate indices to truth-values (e.g., Montague 1974; Brogaard 2012; Egan, Hawthorne, & Weather-

² Following Lewis (1980) I use 'semantic value' as a theory-neutral term for the property of an expression or the entity associated with an expression that (a) combines with other expressions' semantic values via semantic composition rules and (b) is the output of the semantic composition of the semantic values of the expression's parts (if the expression is complex). This is the most central notion of linguistic meaning for the purposes of compositional semantics.

son 2005; Lasarsohn 2005; MacFarlane 2014; Richard 2004), sets of centered worlds (Lewis 1979b), sets of situations (Barwise & Perry 1983), structured complexes made up of objects and properties (Russell 1903, 1918; Soames 1987), structured complexes made up of abstract modes of presentation (Frege 1892a,b; Evans 1986; Zalta 1988), or structured entities of other kinds (King 2007; Soames 2010)? These debates have all taken place *within* truth-conditional semantics as I conceive of it. The defenders of each of these views agree that the role of a sentence's meaning is to determine its truth condition; what they disagree about is what sorts of posits best play the role of truth-conditional meanings.

A similar point can be made about the debates between Davidson and his followers, on one hand, and semanticists working in Montague's model-theoretic tradition, on the other. Davidson's work represents both the beginning of the contemporary era of natural-language semantics and the beginning of its truth-conditional paradigm (1965, 1967a, 1970). In order to answer Lewis's Question, however, Davidson would have had to interpret it somewhat differently than Lewis did, because Davidson explicitly rejected the idea that a sentence's meaning is an entity to which it bears a semantic relation. This makes it somewhat difficult to generalize across Davidsonian and non-Davidsonian versions of truth-conditional semantics. But we can translate Lewis's question into Davidsonian idiom as follows: "what aspect of linguistic expression should a theory of meaning explain?" And Davidson's answer is clear: a theory of meaning should explain how expressions contribute to the truth-conditions of sentences of which they are parts. So although it wouldn't make sense for a Davidsonian to talk of the composition of semantic values—Davidsonians would prefer "the canonical derivations of T-theorems"—it does make sense to apply the covering term 'truth-conditional semanticists' to both Davidsonians and the others I've mentioned insofar as they all take the task of a theory of meaning to be the systematic prediction of sentences' truth conditions.

Truth-conditional semantics is an active research program, and most introductory semantics textbooks still embody truth-conditional assumptions.³ But natural-language semantics is now experiencing a major shift away from the foundational assumption that defines its truth-conditional strain. The best-known moniker for this shift is 'the dynamic turn', which picks up on the rise of dynamic

³ A possible exception is Pauline Jacobson's recent textbook on variable-free semantics (2014); I will say more about her views later in this section.

semantics and the dynamic-pragmatic environment that is increasingly presupposed by non-dynamic approaches to semantics. (I'll say more about both of these options below.) The shift with which I am concerned is broader than the dynamic turn, and subsumes it, in that it includes several other moves away from truth-conditional semantics and toward various versions of the idea that the meaning of an expression is its role in communication or conversation. For this reason, I will call the shift *the communicative turn*.

The communicative turn, as I understand it, contains multitudes; it includes revisionary proposals that are not all mutually compatible, and some of which are pitched in terms of mutually inconsistent theoretical frameworks. But these heterogeneous proposals have been driven by a consistent collection of data arising from five kinds of linguistic phenomena: non-declarative clauses, context-sensitivity, presupposition, conventional implicature, and expressive meaning. Sentences that exhibit these phenomena have been found to require revisionary semantic treatments either because they cannot be understood in terms of truth-conditional meaning (but are still meaningful), or because understanding them requires positing supplemental dimensions of meaning beyond truth-conditional content.

A paradigmatic example involves non-declarative clauses, including interrogatives (e.g. (1)) and imperatives (e.g. (2)).

- (1) Did Frege discover any important dance steps?
- (2) Give my dog a bath!

It seems to be a category mistake to call sentences like these true or false, and so to ascribe truth-conditions to them.⁴ If this intuition is correct, then the meanings of non-declaratives will have to be cashed out in non-truth-conditional terms. The obvious next step in this line of reasoning is to point out that clauses of different types differ principally in terms of what they are used to do in conversation: interrogatives are for asking questions and imperatives are for issuing directives. This pre-theoretic idea has been cashed out semantically by a variety of suggestions to the effect that clauses' semantic values be identified with the types of speech acts for which they can be directly and literally used (Searle 1969; Alston 2000; Barker 2004; Harris 2014). These proposals vary depending on the underlying theory of speech acts they incorporate.

⁴ Some have denied this premise (e.g. Lewis 1970; Davidson 1979); I will discuss them in §3.

By far the most influential approaches to non-declaratives, and to non-truth-conditional aspects of meaning in general, have been built around dynamic models of conversation of the kind first proposed by Robert Stalnaker (1976, 2014). Conversations, on this model, take place against the background of a shared common ground made up of the propositions presupposed by all of the participants in a conversation. Taking propositions to be sets of possible worlds, Stalnaker defines the *context set* of a conversation as the intersection of the propositions in the common ground—the set of worlds compatible the participants’ presuppositions. Assertion is understood as the act of adding the semantic value of the declarative sentence one utters to the common ground (or, equivalently, as intersecting its propositional content with the context set). The semantic value of a declarative sentence is thus cast as the raw material for assertion. A conversation consisting solely of utterances of declarative sentences can then be understood as a “joint inquiry” whose goal is to zero in on the way the world actually is by adding more information to the common ground through a series of assertions, thus shrinking the number of possibilities in the context set.

These ideas—conversational context as a body of shared representations, speech acts as ways of updating these representations, and sentence meanings as the raw material for these updates—have been generalized in a wide variety of ways. David Lewis (1976) conceives of conversational context as a scoreboard that keeps track of various facts about what’s happening in the conversation in much the same way that a baseball scoreboard keeps track of numerous facts about the current state of a game. Just as different events in a baseball game affect the score in different ways—adding strikes, balls, runs, outs, etc.—different speech acts, performed with different kinds of sentences, update the conversational score in different ways. The context is thus a multidimensional representation, with different speech acts understood in terms of the different dimensions of the score they characteristically update. It is a short jump from this conception of conversation to the idea that sentences possess multiple dimensions of meaning, each serving as the raw material for updating some particular dimension of the context. Semanticians have now made this jump in many different ways. The resulting theories are classified as versions of either dynamic semantics or dynamic pragmatics, depending on whether they posit semantic or pragmatic mechanisms by which context is updated (K. Lewis 2011, 2014).

The most influential current approaches to the meanings of non-declarative clauses are a case in point. It is now widely thought that the context of a conversation tracks not only the common ground, but also the collection of *questions under discussion*, which model the issues that speakers want to resolve and which determine which speech acts are relevant (Roberts 1996/2012), as well as the *to-do list*, which tracks speakers' practical commitments (Portner 2004).⁵ Just as asserting a proposition is adding it to the common ground, asking a question is adding it to the context's questions under discussion, and commanding or requesting that someone do something is adding an item to the context's to-do list. Moreover, just as the semantic values of declaratives are modeled as the raw material for assertions, the semantic values of non-declaratives are modeled as the raw material for speech acts of the appropriate types. This is accomplished in either of two ways: in dynamic-semantic frameworks, the semantic value of a clause is its *context-change potential*—a function that maps possible states of the context to other possible states (e.g. Ciardelli, Groenendijk, & Roelofsen 2013; Starr *ms*). The semantic value of an interrogative clause, on this view, is a function that takes some context as an input and outputs a context that differs only in that it contains a new question under discussion. In dynamic-pragmatic frameworks, clauses' semantic values do not contain instructions for updating the context, but are instead model-theoretic objects of types that fit into different dimensions of the context, so that it is easy to offer a pragmatic explanation of how uttering a sentence with such a semantic value updates the context in the appropriate way (Portner 2004). In either framework, what unites the semantic values of all three clause-types—what makes them all kinds of meaning—is that they are the properties of sentences that allow speakers who utter them to move a conversation forward in predictable ways.

Dynamic-semantic and dynamic-pragmatic frameworks have represented the end-points of a variety of other moves away from truth-conditional semantics over the last three decades. Many examples have recently gone under the heading of 'expressivism'—a label which was originally used to describe approaches to ethical non-cognitivism that construe the use of normative language ('ought', 'good', 'right', etc.) as non-descriptive, the speech acts performed with such language as non-as-

⁵ I cite Roberts and Portner as two of the most influential contributors to a growing movement. For another influential approach that is relevantly similar to Roberts' questions-under-discussion framework, see Ciardelli, Groenendijk, & Roelofsen (2013); for relevantly similar alternatives to Portner's proposal, see Charlow (2013), Kaufmann (2012), D. Lewis (1975b), and Starr (*ms*).

sertoric, and the mental states those speech acts express or bring about as non-cognitive. Versions of expressivism have been defended by philosophers for decades, but the view has recently made its way into mainstream semantic theory via the marriage of Alan Gibbard's (1990, 2003) model of expressive content with dynamic models of conversation. On views of this kind, conversational contexts contain, in addition to an informational dimension, a practical dimension, which represent agents' normative or practical commitments. The function of normative speech is to update this practical dimension of context in the same way that descriptive speech is used to update the context's informational dimension. By characterizing expressivism in dynamic terms—as the position that some expressions have the function of updating the conversational context in non-assertoric ways—this work has set the stage for dynamic and expressivist treatments of normative vocabulary (Pérez-Carballo 2012; Pérez-Carballo & Santorio 2016; Yalcin 2012), epistemic modals (Veltman 1996; Yalcin 2007), indicative conditionals (Gillies 2010; Starr 2010), and deontic modals (Charlow 2015, 2016).

Not all defenses of expressive meaning include commitment to dynamic semantics or dynamic pragmatics, though all versions point to a multidimensional and communication-centric conceptions of linguistic meaning. Potts (2005, 2006, 2012) singles out a category of expressions he calls 'expressives'—examples include 'please', along with various expletives and pejoratives—and argues that their semantic values must consist of something other than regular truth-conditional content on the grounds that the expressive components of their meanings don't compose normally with the semantic values of other expressions into which they're embedded. Although Potts does not defend a positive theory of expressives' semantic values, he argues that any such position would have to situate their meanings in some theory of conversation (2005: ch.2).

Another class of arguments has pushed the idea that many sentences can be used to express propositional contents in more than one way at once. According to most contemporary semanticists, a speaker who utters (3) *presupposes* that someone ate the pancakes and *asserts* that Fido did it, for example. And, following Potts (2005), many semanticists now think that a speaker who utters (4) *conventionally implicates* that Shaq is huge and agile and *asserts* that Shaq plays for the Lakers.

(3) It was Fido that ate the pancakes.

(4) Shaq, who is huge and agile, played for the Lakers.

Along with factive verbs, definite noun phrases, aspectual verbs, and other expressions, *it*-clefts like the one with which (3) begins are commonly taken to be presupposition triggers—expressions whose utterance signals the speaker’s presuppositions (Beaver & Geurts 2011: §1). Similarly, non-restrictive relative clauses, such as the one in (4), are understood to be conventional-implicature triggers.

Although the contents of presuppositions and conventional implicatures can be modeled as truth-conditions or truth-condition-bearing entities, there are excellent reasons to distinguish both from the primary truth-conditional content a speaker asserts or expresses in uttering a sentence. The latter is now often described as *at-issue content* to distinguish it from presuppositions, conventional implicatures, and other kinds of *not-at-issue* content (Murray 2014; Potts 2005; Tonhauser 2012). Unlike *at-issue* contents, *not-at-issue* contents *project*, which is to say that they are expressed even if their triggers are embedded under negation, in the consequents of conditionals, and in various other environments that block speakers’ commitment to *at-issue* content. For example: a speaker signals their presupposition that someone ate the pancakes even if they say, ‘It wasn’t Fido who ate the pancakes’, or ‘If it was Fido who ate the pancakes, then he should be punished’. The prediction and explanation of this projection behavior is now widely held to be among the tasks of semantic theory (Beaver & Geurts 2011; Potts 2005: §2.4.3; Simons et. al. 2010; Soames 1989). A full characterization of the *at-issue*/*not-at-issue* distinction requires characterizing the different conversational roles of the two kinds of content. This is reflected in the standard terminology: it is most natural to distinguish the *at-issue*, presuppositional, and conventional-implicative dimensions of linguistic meaning by distinguishing the act of asserting, the act of presupposing (or of signaling one’s presuppositions), and the act of conventionally implicating, respectively. The ‘*at-issue*’/‘*not-at-issue*’ labels themselves are used to distinguish two ways in which speakers can signal their commitments through speech. Uttering a sentence commits the speaker to the *at-issue* content she expresses in a way that can be directly challenged, whereas the *not-at-issue* contents enter the conversation surreptitiously, and require more (and more conversationally disruptive) effort to reject (von Stechow 2004; Potts §2.4.3). As in the case of recent work on non-declaratives and expressivism, these ideas have been worked out in detail within dynamic-semantic and dynamic-pragmatic theories of *not-at-issue* content, and many linguists now believe that satisfactory semantic theories of *not-at-issue* meaning must be spelled out in the context of theories of conversational

dynamics (Beaver 2001; Chierchia 1995; Heim 1983b; Murray 2014; Simons et al 2010; Stalnaker 1974; for an overview, see Beaver & Geurts §4.2–3).

The last source of the communicative turn that I will discuss is linguistic context-sensitivity. The sentence ‘I am here now’ doesn’t have a truth condition, or has one only relative to some assignment of semantic values to ‘I’, ‘here’, ‘now’, and the sentence’s tense morphology. This alone necessitates revising the original targets of truth-conditional semantics, shifting the focus away from sentences to utterances (Davidson 1967a) or sentences indexed to formally-modeled contexts (Lewis 1980; Kaplan 1989a). The most influential attempt to make sense of context-sensitivity within truth-conditional semantics is Kaplan’s (1989a) logic of demonstratives, in which expressions are assigned semantic values relative to a set of coordinates modeling aspects of the context in which an expression is uttered. But the ubiquity of context-sensitivity in natural language and the impossibility of explaining much of it in Kaplanian terms have motivated a variety of moves away from truth-conditional approaches. Although the Kaplanian approach seems to work well for so-called “automatic indexicals”, such as ‘I’, which always refers to the speaker, it has long been clear that something less algorithmic is going on with many other expressions. To take just two particularly puzzling examples, we can use demonstratives (‘this’, ‘that’) to refer to just about any intended object (Bach 1987, 1992; Kaplan 1989b; King 2012; Kripke 1977), and we can use incomplete determiner phrases (‘every beer’, ‘the table’) in seemingly arbitrarily restricted ways (Neale 1991, 2004). Kaplanians have struggled to accommodate the semantics of expressions like these because what speakers say with them seems not to boil down to the kind of stable and predictable aspects of context that can be built into a formal model ahead of time. Other examples of seemingly open-ended context-sensitivity have piled up in the literature, suggesting that the underdetermination of truth conditions by linguistic meaning is a deep and pervasive fact about how natural language works.⁶ One kind of response to this problem, which is inspired by the intentionalist program of Paul Grice (1957, 1968) and Stephen Schiffer (1972, 1981), has been to abandon the idea that sentence meanings are truth conditions or entities with truth conditions, and to instead understand them as constraints of various strengths on the propositions that speakers can express, on the intentions

⁶ For extensive discussions of cases of open-ended semantic underspecification, see Bach (1987), Carston (2002), Neale (2004), and Sperber & Wilson (1986/94).

they can have, or on the speech acts they can perform in uttering a sentence (Bach 1987, 2004; Devitt *ms*; Harris 2004; Neale 2004; Schiffer 1993, 2003).

A similar view has been reached from a different direction by Pauline Jacobson and other variable-free semanticists who have taken her lead. Although Jacobson begins her recent semantics textbook with truth-conditional rhetoric (2014: §2.2), she identifies the semantic values of context-sensitive sentences (such as ‘he left’, where ‘he’ is deictic) with properties (in this case, the property of being a male who left), and says that “the propositional information is supplied by the listener applying this [property] to some contextually salient individual” (2014: p.294). Jacobson thus justifies a non-truth-conditional account of some sentences’ semantics by appealing to a foundational theory of meaning that locates its explanatory role within a theory of conversation (if, admittedly, an impressionistic one).

A different sort of approach to some kinds of context-sensitivity has grown out of work on anaphoric connections that cross clausal boundaries, such as the connections marked by the subscripted indices in (5)–(7):⁷

- (5) [A dog]_i has been rummaging in the garbage can.
It_i has torn open all the plastic bags.
- (6) Every farmer who owns [a donkey]_i beats it_i.
- (7) I dropped ten marbles and found all of them, except for one_i.
It_i is probably under the sofa.

The anaphoric dependency of the pronouns in (5)–(7) can’t be explained by saying that they refer to the same things as their antecedents, because there are perfectly good indefinite readings of their antecedents on which they cannot be understood as referring to anything—for example, when (5) is uttered on the basis of an inference that some dog or other has gotten into the garbage. In some respects, these anaphoric pronouns work like variables bound by quantificational antecedents, but in these cases the antecedents are in different clauses, and there is no systematic way of translating pairs of sentences like these into first-order logic. All of this had begun to puzzle semanticists by the late 1970s, and gave rise to early dynamic approaches to semantics variously called ‘discourse representation theory’ (Kamp

⁷ These examples and my discussion of them are a highly-compressed summary of some of the arguments found in Heim (1982: ch.1).

1981) and ‘file-change semantics’ (Heim 1982, 1983a), later variants of which have become a focus of intensive research.⁸

I can give a sense of how these theories work by focusing on one of Heim’s (1982, 1983a) formulations of her view. She proposes that part of the semantic function of indefinite noun phrases is to add new *discourse referents* to the conversational context. The terminology of discourse reference, which is due to Karttunen (1976), can be somewhat misleading. As Heim puts it, “discourse referents are not referents”; they “are not individuals and...to establish a discourse referent does not necessarily mean to refer to anything” (1982: 166). Heim treats discourse referents as referential indices—mere formal devices whose function is to keep track of anaphoric relations throughout a conversation (which she calls a “text”). In effect, they allow for something like variable-binding across clausal boundaries. At any point in a conversation, the context includes a collection of discourse referents, and the semantic values of anaphoric pronouns, definite descriptions, and other “definites” are fixed in terms of them. Variations on this idea have become highly influential, and discourse reference is now commonly appealed to in theories of a wide variety of context-sensitive expressions that aren’t, on their face, anaphoric, including demonstratives (Roberts 2002, 2003; Stojnic 2016), modals (Roberts 1989, 1996; Stojnic 2016), propositional anaphora and the at-issue/not-at-issue distinction (Murray 2014), proper names (Cumming 2007, 2008), and indirect speech acts (Asher & Lascarides 2001, 2003; Lepore & Stone 2015). According to these theories, manipulating discourse referents is a part of what certain expressions do in virtue of their linguistic meanings. And this is to say that the role of linguistic meaning is (at least in part) to contribute to the ongoing conversational context, rather than (merely) to encode truth conditions.

2. The Truth-Conditional Idealization

If you ask a present-day semanticist Lewis’s question—what does meaning do?—the answer will increasingly be that it does many things, and that what unites all of the things meaning does is that they must be spelled out as part of a broader theory of conversation. If we accept, with growing ranks of semanticists, that the communicative turn in at least some of its manifestations constitutes progress, then a

⁸ Influential dynamic approaches to anaphora include Chierchia (1995), Geurts (1999), Groenendijk & Stokhof (1991a,b), Kamp & Reyle (1993), and Roberts (1989, 1996).

historical question becomes puzzling: why was truth-conditional semantics such a dominant research program in the first place? And given that the communicative turn has resulted from increased attention to certain ubiquitous linguistic phenomena—non-declarative clauses, expressives, presupposition, conventional implicature, and context-sensitivity—why weren't these phenomena attended to during the heyday of truth-conditional semantics?

To answer these questions, we should look to the early-20th-Century work on logic, mathematics, and philosophy in the context of which the methodological toolkit of truth-conditional semantics took shape. If the contemporary *history* of semantics begins with a focus on natural language initiated by Davidson and Montague, its *prehistory* played out in the work of logicians, mathematicians, and philosophers who focused on formal languages and heavily idealized fragments of natural language. I will focus on the three figures from the prehistory of contemporary semantics who have had the greatest influence on it: Frege, Tarski, and Carnap. To be sure, many other early-20th-Century philosophers and mathematicians laid important components of the foundation of truth-conditional semantics.⁹ But no early-20th-Century figure matches the influence of the three I'll discuss.

By the methodological toolkit of truth-conditional semantics, I mean a collection of concepts and theoretical tools that are presupposed or deployed by mainstream versions of truth-conditional semantics, and that developed during the prehistoric period. Frege's contributions are perhaps most influential. In particular, his thesis that semantic composition is functional application is the most central notion of most mainstream work on the syntax-semantics interface—a legacy that is epitomized by the fact Heim & Kratzer refer to the methodology of their influential semantics textbook as 'the Fregean Program' (1998: chs.1–2).¹⁰ Along with

⁹ Bertrand Russell's ideas about descriptions, logical form, and structured propositions (1903, 1905, 1918) have been influential, for example, as were Saul Kripke's (1963) work on modal logic, Alonzo Church's work on the lambda calculus (1941), Arthur Prior's work on temporal logic (1957, 1967, 1968), and Andrzej Mostowski's work on quantifiers (1957). Moreover, there is a sense in which the prehistory of semantics continued after the history of semantics began, as work on formal languages has continued to influence natural-language semantics throughout the latter's development.

¹⁰ Although Frege took referents (*Bedeutungen*) to compose by functional application, it is controversial whether he thought the same about senses, and many commentators argue that he took the sense of a word and the sense of a complex expression of which the word is a part to stand in a part-whole relation (e.g., Dummett 1991: 176, 1996: 192; see also Levine 2002 and Mendelsohn 2005: §5.1).

Russell, Frege is the source of the idea that quantifiers are second-order predicates (1893: §22–23). Frege’s sense–reference distinction is the basis, via its influence on Carnap’s (1947), Kripke’s (1963), and Montague’s (1973) intension–extension distinctions, for contemporary work on the semantics of intensional and hyperintensional expressions. Most importantly for our purposes, Frege is normally credited with the idea that the semantic value of a sentence (which Frege identifies with its sense, and the thought it expresses) is an entity that can be individuated by its truth condition (1893: §32). Tarski’s most influential contributions to the toolkit are (a) his method for constructing axiomatic truth theories for formal languages (1933, 1944), which was the primary inspiration for Davidson’s truth-theoretic semantics, (b) his idea that logical consequence is preservation of truth across all uniform reinterpretations of non-logical vocabulary (1936), which is the central notion of Montague’s model-theoretic semantics, and (c) his treatment of variables and binding in terms of sequences (or equivalently, assignment functions) (1933). Carnap put many of Frege’s and Tarski’s ideas together, brought them into the philosophical mainstream, generalized them with his *Introduction to Semantics* (1941), and later laid the mathematical foundations for studying the kind of intensional languages that Montague would place at the center of his methodology (1947).

My aim in this section is to make the case that Frege, Tarski, and Carnap worked with heavily idealized notions of language and meaning, and that this idealization was deliberate. I will call the idealization in question the ‘truth-conditional idealization’ because it is, in effect, an idealization away from all aspects of language and linguistic meaning that present an obstacle to a one-to-one correspondence between sentences and truth conditions. These are the same features of language and linguistic meaning that are currently driving the communicative turn: non-declarative clauses, expressive meaning, presupposition, conventional implicature, and context-sensitivity.¹¹ Frege, Tarski, and Carnap idealized away from these phenomena by limiting their attention to formalized languages made up of declarative, context-insensitive sentences that possess a single, truth-conditional dimension of significance. Their reason for doing this was that none of them was aiming primarily at understanding linguistic meaning as it presents itself in

¹¹ I do not mean to suggest that these are the only features of natural language away from which Frege, Tarski, and Carnap idealized in their investigations of language; we could also add vagueness, ambiguity, non-referring singular terms, many complex syntactic structures, and so on.

natural language; instead, they had mathematical and philosophical goals that required focusing on the bearers of truth conditions.

In saying that Frege, Tarski, and Carnap idealized away from certain features of language and linguistic meaning, I do not mean to suggest that they studied idealized versions of natural languages; on the contrary, the languages they studied were stipulated constructions. But they were languages in the sense that they were constructed in such a way as to share some of their central properties—including semantic properties—with natural languages, and they were idealized in the sense that they were constructed so as to share only a carefully selected subset of the properties of natural languages. Although it doesn't make sense to say that Frege, Tarski, or Carnap developed idealized models of particular languages, it does make sense to say that they constructed idealized models of *language* in the abstract.

The truth-conditional idealization is most explicit in Frege's work. Following a long period of Frege scholarship in which Frege's work on language was taken as central to his project (notably in Dummett 1973, 1994), recent Frege scholars have come to interpret his thought about language in terms of his broader aim of understanding the metaphysics and epistemology of mathematics.¹² For Frege, the truth-conditional idealization is a reflection of his mainly instrumental interest in language and meaning, and this can be seen from the combination of two facts. First, his concept-script (*Begriffsschrift*)—the formal language in which his contributions to logic and the foundations of mathematics are framed—contains no non-declarative clauses, no context-sensitivity, and no mechanisms for capturing presupposition, conventional implicature, or expressive aspects of meaning. But second, Frege theorized about all of these phenomena in detailed but informal asides about natural language.

The most discussed example of this juxtaposition stems from the fact that Frege's concept-script contains no context sensitivity, together with the fact that his writings include several well-known and influential passages about tense, indexicality, and other forms of context-sensitivity in natural language. In the course of these passages, he makes it clear that natural-language sentences do not express thoughts in a context-independent way.

If a time indication is needed by the present tense one must know when the sentence was uttered to apprehend the thought correctly. Therefore the time of utterance is part of the expres-

¹² Important contributors to this reassessment of Frege include Burge (1979, 1984, 1986, 1992), Gabriel (1996), Ricketts (1986), Simons (1992), Taschek (1992), Weiner (1990, 1997a,b)

sion of the thought. If someone wants to say the same today as he expressed yesterday using the word “today”, he must replace this word with “yesterday”. Although the thought is the same its verbal expression must be different so that the sense, which would otherwise be affected by the differing times of utterance, is readjusted. The case is the same with words like “here” and “there”. In all such cases the mere wording, as it is given in writing, is not the complete expression of the thought, but the knowledge of certain accompanying conditions of utterance, which are used as means of expressing the thought, are needed for its correct apprehension. The pointing of fingers, hand movements, glances may belong here too. The same utterance containing the word “I” will express different thoughts in the mouths of different men, of which some may be true, others false. (1956 [1918]: 296)

Whether these remarks are compatible with the rest of Frege’s theory of sense is a matter of debate.¹³ Frege’s thoughtfulness about context-sensitivity in natural language is interesting for our purposes because it shows that he was well aware of this difference between his concept-script and natural language. The most lucid explanation of why he abstracted away from these distinctions in building his concept-script has been offered by Tyler Burge (1979, 1984), who argues that it is a mistake to conflate Frege’s notion of sense with linguistic meaning; whereas meaning is a property of words, sentences, and other expression-types, the same expression-type can be used to express different senses on different occasions. Burge uses this observation to situate Frege’s semantic investigations within his broader theoretical goals.

The basic misunderstanding is the identification of Frege’s notion of *Sinn* (sense) with the notion of linguistic meaning. The misunderstanding is an easy one to fall into for two reasons. For one, the term “meaning” has always been vague, multi-purposed, and to some extent adaptive to the viewpoint of different theories. Pressing the term into service to characterize Frege’s notion has seemed harmless enough, as long as it is made clear that the notion is restricted to an aspect of meaning relevant to fixing the truth value of sentences. A second reason for the misunderstanding has been that Frege did not lavish any considerable attention on the area in which the differences between sense and the ordinary notion of meaning are clearest—context-dependent reference.

Although the differences between meaning and sense are easiest to notice with indexicals (including proper names), the distinction issues from the fundamental cast of Frege’s work, a cast discernible throughout his career independently of issues about indexicals. Baldly put, Frege was primarily interested in the eternal structure of thought, of cognitive contents, not in conventional linguistic meaning. He pursued this interest by investigating the structure of language, and much of his work may be seen as directly relevant to theories of linguistic meaning. But the epistemic orientation of his theorizing leads to a notion of sense with a different theoretical function from modern notions of meaning. (Burge 1979: 213)

¹³ See, e.g., Evans (1982) for an attempt to construct a Fregean (or neo-Fregean) theory of context-sensitivity, and Kaplan (1989a) and Perry (1977) for influential criticisms

As Burge says elsewhere, none of the explanatory roles that Frege assigns to his notion of sense “is logically equivalent to, or even extensionally coincident with, conventional significance (or with linguistic meaning, unless the relevant language were, unlike actual natural languages, ideal for expressing thought)” (1984: 455). But Frege’s goal in designing his concept-script was precisely to create a language “ideal for expressing thought”—a transparent medium for examining the bearers of truth and falsity by placing them in one-to-one correspondence with sentences. And so the conflation of linguistic meaning with sense as those notions apply to Frege’s own work is an easy mistake to make.¹⁴

I agree with the spirit of Burge’s reading, but his view that “context-dependent reference” is “the area in which the differences between sense and the ordinary notion of meaning are clearest” undersells a broader point. In fact, Frege recognized and discussed but deliberately idealized away from several other dimensions of linguistic meaning that were irrelevant to his broader explanatory goals. In ‘Über Sinn und Bedeutung’, for example, Frege explicitly restricts many of his claims about linguistic meaning to declarative sentences (*Behauptungssätze*), but he also includes two paragraphs on clauses of other types:¹⁵

A subordinate clause with ‘that’ after ‘command’, ‘ask’, ‘forbid’, would appear in direct speech as an imperative. Such a clause has no reference but only a sense. A command, a request, are indeed not thoughts, yet they stand on the same level as thoughts. Hence in subordinate clauses depending upon ‘command’, ‘ask’, etc., words have their indirect reference. The reference of such a clause is therefore not a truth value but a command, a request, and so forth.

The case is similar for the dependent question in phrases such as ‘doubt whether’, ‘not to know what’. It is easy to see that here also the words are to be taken to have their indirect reference. Dependent clauses expressing questions and beginning with ‘who’, ‘what’, ‘where’, ‘when’, ‘how’, ‘by what means’, etc., seem at times to approximate very closely to adverbial clauses in which words have their customary references. These cases are distinguished linguistically [in German] by the mood of the verb. With the subjunctive, we have a dependent question and indirect reference of the words, so that a proper name cannot in general be replaced by another name of the same object. (1948 [1892]: 33–34)

¹⁴ Although Burge’s point is couched in his Platonist reading of Frege’s metaphysics (see Burge 1992), my point would be equally safe in the hands of those who read Frege as an anti-Platonist. Joan Weiner has consistently pointed out that Frege’s primary aims were epistemological, for example, and that this is why his *Begriffsschrift* does not deal in any “features of language that are [not] exhausted by logical laws” (1997a: 249; see also 1997b).

¹⁵ In ‘The Thought’ (1956 [1918]: 293–4), Frege’s views on interrogatives shifts somewhat. There he argues that “word questions” (i.e. wh-questions), like predicates, express unsaturated senses, whereas “sentence questions” (i.e. polar questions) express the senses as their indicative counterparts, but that their function is “to express a thought without laying it down as true”.

I am not optimistic that Frege's ideas about non-declaratives could be incorporated into an adequate semantic theory, but they demonstrate that the absence of non-declaratives in the concept-script was no oversight, and they give us good evidence about Frege's reasons for restricting his language to declaratives. Frege was not merely interested in the thoughts expressed by sentences; he wished his concept-script to be a language whose sentences all expressed thoughts with truth values, even going so far as to construct a proof that each sentence of the concept-script has a *Bedeutung* (1893: §10). Elsewhere, Frege remarks that logic "has much the same relation to truth as physics has to weight or heat" and that "it falls to logic to discern the laws of truth" (1956 [1918]: 289). Frege's concept-script was the medium he devised for this discernment, and the truth-conditional idealization was a means to this end. Including non-declaratives, which he took to have sense but no reference (and so no truth-values), would have been pointless given his logical aims.

Although he idealizes away non-declaratives, Frege is unusual among early 20th-Century logicians in that he does reserve a place for what we might call the illocutionary dimension of linguistic meaning—the dimension encoded in natural language, at least in part, by clause-type—in his concept-script. He does so in the form of the vertical judgment stroke that begins each well-formed statement. Quoting Frege (1891), Burge explains the function of the judgment-stroke as follows.

The result of attaching the judgment stroke to a sentential expression, begun by the horizontal, asserts something, but is not a term: 'The judgment stroke cannot be used to construct a functional expression; for it does not serve, in conjunction with other signs, to designate an object: "⊢ $2+3 = 5$ " does not designate anything; it asserts something.' (Burge 1986: 113)

The judgment stroke is interesting for present purposes because it demonstrates that Frege took the illocutionary dimension of meaning represented by it (whatever that dimension is) to be irreducible to both sense and reference—a point made famous by Geach (1965). Although this illocutionary dimension of meaning does make its way into Frege's concept-script, there are at least two respects in which its treatment is idealized. First, as I have already shown, Frege's views about non-declaratives are confined to his informal remarks about natural language; the only symbol carrying illocutionary meaning in his concept-script corresponds to assertion. Second, in moving the features of his sentences that carry illocutionary meaning all the way over to the left, outside their sense-bearing clause, what Frege

leaves in their place is a kind of proto-sentence from which all illocutionary meaning has been stripped—what contemporary semanticists sometimes call a ‘sentence radical’.¹⁶ This makes it possible to isolate a clausal component of every sentence of the concept-script that has all of the semantic hallmarks of the sentences studied by truth-conditional semanticists in two significant respects: (i) the sentence-radical’s sense is coincident with its truth-conditional content, and (ii) its sense composes solely from the sense of its parts.

Frege is also typically cited as the originator of the idea of presupposition (Beaver & Geurts 2011: §4.1; Soames 1989: 75). Frege argues that every singular term triggers the presupposition that its referent exists (1891, 1892a, 1892b)—an idea that has continued to exert a major influence, particularly in discussions of definite descriptions (Strawson 1950; Heim & Kratzer 1998; Elbourne 2013). In addition to this presuppositional dimension of meaning, Frege also discusses a dimension he calls ‘coloring’ (*Färbung*), which, he makes clear, is a dimension that is independent of both sense and reference (1892, 1918). Some of his examples, such as the distinction he draws between the coloring of ‘and’, ‘although’, ‘but’, and ‘yet’ prefigure later discussions of conventional implicature by Grice and others, and have been explicitly cited by some as the origin of that notion (Bach 1999a: 329–30; Neale 1999). Other examples, such as Frege’s claim that ‘dog’ (*Hund*) and ‘cur’ (*Köter*) differ only in coloring, prefigure applications of the notion of expressive meaning to slurs and other pejorative expressions (Jeshion 2013; Potts 2005; Williamson 2009), and have been cited as an explicit precursor to some notions of expressive meaning (e.g., Potts 2006: §2.2). Like context-sensitivity and non-declaratives, presupposition and coloring show up only in Frege’s brief discussions of natural language (1891, 1892a,b, 1918); the notions play no role in the concept-script. The explanation for their absence is clear, and parallels Frege’s reasons for leaving out context-sensitivity and non-declaratives: including presupposition or coloring in his formal language would pollute the transparent medium for truth-valued thoughts that Frege sought to create. Thus, whereas uttering an expression in natural language involves presupposing that the expression has a *Bedeutung*, according to Frege, he offers a proof that each expression of the concept-script possesses a *Bedeutung* (1893: §10; see also Heck 2012: ch.4), thus

¹⁶ The practice of factoring clauses into mood-markers and sentence-radicals is quite common in contemporary work on the semantics of non-declaratives; see, e.g., Charlow (2014), Davidson (1979), Grice (1968), Lewis (1970), Starr (ms).

ensuring the transparency of his medium for thoughts. It follows, as Joan Weiner puts it, that “a logically perfect language requires no presuppositions” (2007a: 262). Similar points obviously go for conventional implicature and expressive meaning: those aspects of linguistic meaning do nothing to ensure the intimate, bijective relation between sentences and truth-valued thoughts that Frege wished to ensure—and they could potentially get in the way—and so he left them out of the picture.

Frege's idealization away from all aspects of language and linguistic meaning that weren't relevant to studying thoughts *qua* the bearers of truth is the most fully-articulated and clearly self-conscious instance of the truth-conditional idealization. Neither Tarski nor Carnap was as explicit in their adoption of the idealization, as explicit about their reasons for adopting it, or as precise about the various aspects of language and meaning away from which they were idealizing. We nonetheless find evidence of the same idealization peppered throughout their writings, in the overall picture of their semantic theorizing, and in one of the covering terms that has often been used to group them together—‘the ideal language tradition’.¹⁷

In a slogan, those in the ideal language tradition shared an ambition to design languages that were better suited to their mathematical, logical, and scientific pursuits. They took natural languages to be defective for these purposes for a variety of reasons: natural languages' sentence structures and vocabulary don't adequately reflect the structure of reality (Russell 1918), “the words of everyday life are not sufficiently abstract” for expressing scientific claims without saying too much (Russell 1931: 82), and so on. But at least one of their reasons for focusing on artificial languages was to avoid the complications raised by the aspects of meaning that later came to fuel the communicative turn.

In outlining his theory of truth, Tarski restricts its applicability to formal languages only (1933: §7). He makes it explicit, moreover, that truth can be defined only for object languages whose sentences are all declarative, and he takes sentences themselves to be the bearers of truth and falsity (Tarski 1944: §2). Tarski was famously pessimistic about the possibility of defining truth in natural languages.

¹⁷ This label extends to other figures, including Russell, early Wittgenstein, the logical positivists, and to some extent also Quine. If I had more space, I would devote some of it to saying how versions of the truth-conditional idealization play out in these figures' work, and how they influenced the early history of natural-language semantics—issues that are quite subtle. I leave them out because they had less of a direct impact on truth-conditional semantics than Frege, Tarski, and Carnap.

...the very possibility of a consistent use of the expression 'true sentence' which is in harmony with the laws of logic and the spirit of everyday language seems to be very questionable, and consequently the same doubt attaches to the possibility of constructing a correct definition of this expression. (Tarski 1933: 165)

Tarski's pessimism was due, at least in part, to the ease and frequency with which semantic paradoxes crop up in natural language. His solution was to restrict his method for defining truth to formal languages with restricted expressive power. The most crucial such restriction is the exclusion of each language's sentences from the extension of its own truth predicate, so that truth can be defined for each language only by positing a hierarchy of object languages and metalanguages. But it is also noteworthy in this connection that Tarski's formal languages lack context-sensitive expressions. The semantic paradoxes are often formulated in natural language using indexicals, and Tarski formulates the liar paradox using demonstratives in both his 1933 essay (158: '...the sentence printed on this page...') and his 1944 essay (347: 'The sentence printed in this paper on p. 347, l. 31, is not true'). Moreover, Tarski initially characterizes formalized languages as "artificially constructed languages in which the sense of every expression is unambiguously determined by its form" (1933: 165–66), thus ruling out the possibility of formalized languages containing context-sensitive expressions.¹⁸

Like Frege, Tarski's aim was not primarily to understand linguistic meaning—and particularly not in natural language. He constructed and studied artificial languages and developed semantic tools to better understand those languages, but these pursuits were in the service of broader mathematical goals, including accounts of truth, definition, and logical consequence that were rigorous enough for mathematical use. As John Burgess puts it, "it was not linguistic understanding but mathematical fruitfulness that Tarski sought with his definition [of truth], and in this he was very successful" (2008: 154–5). This point even applies to Tarski's use of the word 'semantic' to describe his theory of truth. He used this label not because he thought that his theory of truth could constitute or lay the foundation for a theory of meaning (much less a theory of meaning in natural language), but because it involves defining truth in semantic terms.

¹⁸ Patterson locates Tarski's idealization away from indexicality within a tradition among earlier Polish logicians of treating indexicals as defects of natural language because they violated the principle that "two sentences which have the same form always mean the same" (Kotarbiński 1966: 22, quoted by Patterson 2012: 59).

...it turns out that the simplest way of obtaining an exact definition of truth is one which involves the use of other semantic notions, e.g., the notion of satisfaction. It is for this reason that we count the concept of truth which is discussed here among the concepts of semantics, and the problem of defining truth proves to be closely related to the more general problem of setting up the foundations of theoretical semantics. (Tarski 1944: §5)

But although some semantic notions are needed to define truth in Tarski's way, these notions are rather limited. Tarski was interested in sentences qua bearers of truth and falsity and relata of the consequence relation, and so all sentences and semantic features of sentences not relevant to these pursuits were irrelevant to his aims.

When Carnap came to embrace semantics under Tarski's influence, he adopted many the same idealizations. In §5 of his *Introduction to Semantics*, Carnap makes it clear that he is interested only in "pure semantics", which he describes as the stipulative "construction and analysis of a semantical system"—an inquiry he contrasts with "descriptive semantics", which he characterizes as "the description and analysis of the semantical features either of some particular historically given language, e.g. French, or of all historically given languages in general" (1941: 11–12). "Our discussions apply only to declarative sentences", Carnap continues, "leaving aside all sentences of other kinds, e.g. questions, imperatives, etc.; and hence only to language systems (semantical systems) consisting of declarative sentences" (1941: 14–5). Though he goes on to admit that "not much work has been done so far in the logical analysis of other than declarative sentences", he cites a range of work of which he is aware (1941: 15). Carnap does not discuss context-sensitivity or the other features I've discussed, but the formal languages he constructs lack these features.

What are Carnap's reasons for idealizing? Helpfully, he includes a list of applications of semantics in §38, arguing that its study results in a better understanding the propositional calculus (§38b), of the distinction between logical and non-logical vocabulary (§38c), of the distinction between extensional and non-extensional languages (§38d; see also Carnap 1947), of the diagnoses and potential solutions to the semantic paradoxes (§38e), of proof theory (§38f), of various philosophically and mathematically useful notions that had previously been regarded with suspicion, including truth, probability, and confirmation (§38g), and of a variety of problems (and pseudo-problems) in epistemology, the philosophy of science, and the empirical sciences (§38h–i, §39). What these applications have in common is that—at least according to Carnap—they are all best pursued via pure

semantics in his sense. Although it is clear from his discussion of descriptive semantics in §5 that Carnap takes the empirical study of semantic features of natural languages to be worthwhile, its pursuit not included among his own explicitly-stated aims. Since Carnap takes pure semantics to be a wholly analytic pursuit and descriptive semantics to be an empirical one (1941: §5), it is unclear what, if any bearing he would have taken the results of the former to have on the latter.

3. The Pivot

The event that demarcates the history of contemporary semantics from its prehistory was a pivot from one diverse collection of explanatory goals to a very different one. What went under the name ‘semantics’ prior to this pivot was a set of tools used to pursue logical, mathematical, and philosophical projects. The contemporary history of semantics began with a shift to the goal of empirically investigating natural language by showing how the semantic properties of sentences systematically depend on their structures and the semantic properties of their component expressions. The key to my narrative is that this discontinuity in explanatory goals was masked by a continuity in methodological assumptions.

The historical moment at which I am locating this pivot was not, of course, the first time anyone took an interest in the empirical study of meaning in natural language. My focus is aimed at the beginnings of a relatively coherent research program that established itself among philosophers and linguists in the 1970s, and that continues as going concern in most philosophy and linguistics departments today.¹⁹ Davidson and Montague are the founders of this research program.

Among the central aims of Davidson’s influential early papers on semantics were (a) to overcome Tarski’s skepticism about the possibility of applying his tools to the study of natural language, and (b) to argue that such an application of Tarski’s tools could “do duty” as a theory of meaning for natural language (1967a, 1970, 1973). Davidson recognized that his proposals differed from Tarski’s in several key ways; since his goal was not to define truth in a formal language, but rather to use a primitive notion of truth to construct an axiomatic theory that could stand in as a theory of meaning, Davidson couldn’t take semantic notions such as the synonymy of object-language and metalanguage expressions for grant-

¹⁹ A brief history of this research program is told by Partee (2004: ch.1), who played a central role in establishing it, particularly among linguists.

ed, as Tarski had. He marked this distinction subtly, by describing his project as that of giving “truth theories” as opposed to Tarski’s “truth definitions”. Still, Davidson made free use of the adjective ‘Tarski-style’ to describe his project (e.g., 1984: xv), and the details of his methodology are borrowed directly from Tarski’s playbook: construct an axiomatic theory that assigns satisfaction conditions to predicates (and, in Davidson’s case, referents to singular terms), and that deductively generates a T-sentence for every sentence of the object-language. But as John Burgess has masterfully argued in his essay, ‘Tarski’s Tort’, the analogy drawn by Davidson and others between his project and Tarski’s is misleading; even the idea that Davidson’s and Tarski’s projects can be described as ‘semantics’ in anything like the same sense rests on a serious equivocation, given their fundamentally opposite explanatory goals.

...the invocation of Tarski’s name was not entirely appropriate, since as Davidson, if not every one of his disciples, was aware, those conjectures amount to an inversion of Tarski. For they make what for Tarski were clauses in a definition of truth in terms of already understood notions like negation and conjunction and disjunction, into definitions of a kind of those operators, in terms of a notion of truth taken as primitive. We constantly find in the writings of Davidson and disciples mentions of a “Tarskian” theory of truth, where “counter-Tarskian” or “anti-Tarskian” would have been more accurate, if less likely to confer borrowed prestige on bold (which is to say doubtful) new conjectures. And Tarski, of course, is not responsible for this usage. (Burgess 2008: 166)

Although Davidson adopted the details of Tarski’s methodology, he employed it for “counter-Tarskian” ends: his goal was the empirical investigation of natural language rather than the mathematical investigation of formal languages, and each project took as primitives the concepts that the other aimed to elucidate. In Carnap’s terminology, Davidson’s aim was to pursue descriptive semantics using the tools of pure semantics.

A similar story can be told about Montague, who was Tarski’s former PhD student and Carnap’s colleague at the time when he began developing his proposals about natural-language semantics. Montague began his 1970 manifesto, ‘English as a Formal Language’, by boldly stating that he proposes to pursue natural-language semantics in exactly the same model-theoretic way that way that Tarski (1936) had pursued the project of defining logical truth, as extended by Carnap (1947) and Kripke (1963) for intensional languages.

I reject the contention that an important theoretical difference exists between formal and natural languages. ... Like Donald Davidson, I regard the construction of a theory of truth—or

rather, of the more general notion of truth under an arbitrary interpretation—as the basic goal of serious syntax and semantics... (1970a: 222)

This famous claim amounts to a denial of Carnap's distinction between pure and descriptive semantics, and has the corollary that pure semantics is equally appropriate for the empirical study of meaning in natural language.

Truth-conditional semantics was thus conceived around the idea that natural-language semantics should be pursued using the same methodological toolkit that Frege, Tarski, and Carnap developed for better understanding formal languages, but with the key difference that now that toolkit was being wielded with the radically different goal of empirically investigating natural language. A crucial aspect of Davidson's and Montague's adoption of this methodological toolkit, for my purposes, is that they took up the truth-conditional idealization along with it. According to both Davidson and Montague, as well as the truth-conditional semanticists who followed them, the task of a semantic theory was to assign each meaningful sentence of the object language a single truth-condition. This could be made to look like a good idea only because all non-truth-conditional aspects of linguistic meaning were initially idealized away, and because the fragments of English they began with were maximally similar to the formal language previously studied. This is my explanation of why contemporary natural-language semantics began as truth-conditional semantics. With this historical background in place, we can recognize the communicative turn as a slow attempt to lift the truth-conditional idealization.

A short digression on the nature of idealization will be helpful here; I will adopt Michael Weisberg's (2007) taxonomy of kinds of idealization in what follows. Weisberg defines idealization as "the intentional introduction of distortion into scientific theories" (2007: 639). This is a practice that may be more or less legitimate, depending in part on the explanatory purpose to which idealization is put. In the hands of Frege, Tarski, and Carnap, the truth-conditional idealization distorted the notion of linguistic meaning in a way that was legitimate because linguistic meaning was not the object of their inquiries, and because idealizing helped them to achieve their other goals. But once Davidson and Montague took up the goal of empirically investigating meaning in natural language, the truth-conditional idealization constituted a distortion in the very subject-matter they sought to understand. With the transition from prehistorical to historical con-

cerns, the truth-conditional idealization became a fundamentally different sort of thing.

In Weisberg's helpful terminology, Frege, Tarski, and Carnap can best be construed as aiming at *minimalist* idealizations of the semantic properties they studied.

Minimalist idealization is the practice of constructing and studying theoretical models that include only the core causal factors which give rise to a phenomenon. Such a representation is often called a minimal model of the phenomenon. Put more explicitly, a minimalist model contains only those factors that make a difference to the occurrence and essential character of the phenomenon in question. (2007: 642)

Weisberg illustrates the notion of a minimal model with the example of Boyle's Law, which he borrows from Strevens (2004):

In explaining Boyle's law...theorists often introduce the assumption that gas molecules do not collide with each other. This assumption is false; collisions do occur in low-pressure gases. However, low-pressure gases behave as if there were no collisions. This means that collisions make no difference to the phenomenon and are not included in the canonical explanation. Theorists' explicit introduction of the no-collision assumption is a way of asserting that collisions are actually irrelevant and make no difference. (Weisberg 2007: 643)

Frege, Tarski, and Carnap constructed minimal models of language that "contained only those factors that make a difference to the occurrence and essential character of the" logical, mathematical, and philosophical phenomena that were in question for them. Of course, the factors of the phenomena in which they were interested weren't *causal*—they were abstract and mathematical—but I think it makes sense to say that their idealized models of language were minimal in a sense that is closely related to Weisberg's definition. Moreover, since their models did not distort the things they were trying to study, and since the distorted ideas about the nature of linguistic meaning that arose from—or were inspired by—their investigations were "false but nondifference-making" given their purposes (Weisberg 2007: 643), their uses of the truth-conditional idealization were legitimate.

This was no longer true once "semantics" became the study of meaning in natural language. It then became imperative that the truth-conditional idealization could eventually be lifted—that detailed compositional accounts of non-declaratives, context-sensitivity, expressives, presupposition, and conventional implicature could be given—lest the idealization turn out to be a *mere* distortion. The only charitable interpretation of the truth-conditional idealization in this context would identify it, again using Weisberg's terminology, as a *Galilean* idealization—a dis-

tortion introduced into a theory in order to make its subject-matter tractable (2007: 640). The idea of a Galilean idealization is to begin one's model of a phenomenon by including only some central features that one has the theoretical or computational resources to understand at present, and to reintroduce other features and the complexities they raise later, when new resources become available. A physical model of projectile motion might begin by idealizing away from air resistance, for example, because factoring it in would complicate things in initially difficult-to-calculate ways. But air resistance would eventually have to be reintroduced into the model in order for it to yield useful empirical predictions. In the history of natural-language semantics, the initial focus on a single, truth-conditional dimension of linguistic meaning might be defended as the initial stage of this process—focusing on the fragments of natural language and the dimension of linguistic meaning that were understandable in terms of the theoretical tools then available.

If the truth-conditional idealization is best thought of as a Galilean idealization in the early history of contemporary semantics, then the subsequent history suggests that it was a misguided starting place. We saw one reason for thinking so in §1: the central foundational assumption with which contemporary semantics began—that the role of sentence meaning is to determine a truth condition—has gradually been abandoned in favor of pluralistic, communication-focused conceptions of linguistic meaning. In other words: lifting the idealization has required radically rethinking the nature of the thing being studied.

The truth-conditional idealization has also played a role in delaying the progress of semantics, in part because it has sometimes been treated as an unshakable methodological tenet rather than as a temporary, Galilean idealization that must eventually be lifted. A common stance on non-truth-conditional dimensions of meaning among truth-conditional semanticists who have resisted the communicative turn has been a mixture of silence and dismissiveness. This dismissiveness has often taken the form of the slogan that if it's not part of a sentence's truth condition, it must be pragmatic rather than semantic.²⁰ This slogan begs the question against the very possibility of non-truth-conditional dimensions of meaning. The dismissive approach is also often paired with a vague and unsystematic idea of pragmatics, making it a sort of waste bin for whatever doesn't fit into truth-conditional semantic explanation (Bach 1999b).

²⁰ Variations on this slogan can be found in Blackburn (1987: 52); Cappelen & Lepore (2005)

The truth-conditional idealization has also had a deleterious effect on semantics by leading to an overly thorough exploration of blind alleys. The history of semantics is littered with ill-fated attempts to shoehorn non-truth-conditional aspects of meaning into truth-conditional frameworks. Perhaps the most blatant examples of this were the various attempts by truth-conditional semanticists to reduce non-declarative clauses or their semantic values to their declarative counterparts. Davidson argued that uttering a non-declarative is tantamount to making two assertions (1979), for example, and Lewis argued that each non-declarative is semantically equivalent to an explicit performative sentence (1970). This kind of declarative-reductionism is no longer popular among semanticists—see Starr (2014) for some of the reasons—but it is easy to see the view’s pull for someone who has mistaken the truth-conditional idealization for ideology.

Montague’s own brief remarks about non-declaratives are more puzzling, in part because they seem to be mutually inconsistent, and in part because his views seemed to be evolving at the time of his early death. In ‘Universal Grammar’, which was presented in December 1969 and February 1970 and published in 1970, Montague makes one puzzling remark that alludes to the existence of non-declarative clauses:

The basic aim of semantics is to characterize the notions of a true sentence (under a given interpretation) and of entailment, while that of syntax is to characterize the various syntactical categories, especially the set of declarative sentences. ... I fail to see any great interest in syntax except as a preliminary to semantics. (1970b: 223, *fn.2*)

It is very difficult to make sense of Montague’s claim that semantics should be “especially” concerned with declarative sentences, since it presupposes (a) that semantics shouldn’t be totally unconcerned with non-declaratives, but (b) that it should pay less attention to them. One possible interpretation of this passage would take Montague to be suggesting that all sentences, including those which seem on the surface to be non-declarative, to be syntactically declarative at an underlying level of logical form (cf. Sadock 1974). But this reading is difficult to square with Montague’s claim that semantics is concerned “especially” (rather than

exclusively) with declaratives.²¹ We might instead read Montague as saying that we should be especially concerned with declaratives *for now*—that we should worry about non-declaratives later. On this reading, he is proposing a Galilean idealization. Given Montague’s claim that the “basic aim of semantics” is to assign model-theoretic truth conditions to sentences, this reading requires assuming that Montague took non-declaratives to have semantic values of the same, truth-condition-bearing type as declaratives. But again, it is difficult to square this assumption with his use of ‘especially’, since if non-declaratives possess semantic values of the same type as declaratives, it is unclear why they would be any less interesting from the point of view of Montague’s version of semantics. It is tempting to think that this passage reveals a deep tension in Montague’s original assumptions, and that his commitment to the truth-conditional idealization was not entirely deliberate and reflective.

Another possible understanding of Montague’s place in the history of natural-language semantics is suggested by a brief remark in ‘The Proper Treatment of Quantification in Ordinary English’, (PTQ) which he presented in September, 1970 and which was published posthumously in 1973. There Montague seems to explicitly recognize the Galilean nature of the truth-conditional idealization and briefly anticipates later ideas about non-declaratives that would fuel the communicative turn:

...when only declarative sentences come into consideration, it is the construction of [truth and entailment conditions] that...should count as the central concern of syntax and semantics. [footnote: In connection with imperatives and interrogatives truth and entailment conditions are of course inappropriate, and would be replaced by fulfilment conditions and a characterization of the semantic content of a correct answer.] (Montague 1973: 18)

This was Montague’s last chance to develop his ideas on the matter; he died six months after first presenting the paper, in March 1971. Most mainstream work in semantics during the 1970’s would fail to take heed of his anticipatory footnote, and the truth-conditional idealization, which Montague had seemingly begun to recognize as such, hardened into ideology until it was shaken loose in the following decades. The best evidence of this hardening comes from early introductions

²¹ It is also worth noting that syntactically-loaded versions of declarative reductionism require positing transformations between surface syntax and the whichever level of representation is relevant to semantic interpretation. This doesn’t sit well with Montague’s directly compositional approach to the syntax-semantics interface, according to which semantic interpretation is not “‘postponed’ until a later stage in the grammatical computation” (Barker & Jacobson 2007: 2).

to Montague semantics, in which no attention is given to non-declarative clauses or non-truth-conditional dimensions of meaning, and in which the Montagovian project is presented as essentially truth-conditional (e.g., Dowty, Wall, and Peters 1981; Partee 1975; Thomason 1974).²² All of this makes it tempting to think of Montague not simply as one of the two founders of natural-language semantics, but as someone who straddled the boundary between its prehistory and its history. He began studying natural language with something like the same explanatory goals as his forebears—to define truth-in-an-interpretation and entailment—only now in formal systems that mirrored much more of the complexity of natural language. At this stage, the truth-conditional idealization was, for Montague, still a minimal idealization. But the footnote in PTQ suggests that he may have begun, in his last months, to reconceive of the truth-conditional idealization as a Galilean one, and of his project as the empirical investigation of meaning in natural language. And although semanticists of the 1970's took up Montague's work in an empirically-oriented spirit, thus committing themselves to a Galilean version of the truth-conditional idealization, they did not, in general, seem to have appreciated that the need to lift the idealization would falsify some of their most basic foundational claims.

Although the communicative turn constitutes a revolutionary rethinking of the nature of linguistic meaning, it is important to recognize that it has been a gradual and bloodless revolution, and one that has been embodied by many small adjustments in the methodology of semantics. Moreover, this methodology has exhibited enough continuity that some semanticists who have participated in the revolution still think of themselves as doing Montague-style semantics. Thus, Martin Stokhof, whose work on dynamic semantics makes him a key revolutionary, places

²² A caveat: several papers on non-truth-conditional phenomena that would later influence the communicative turn were published in the 1970s. But citation data suggest that they did not become influential at the time. A clear example is C. L. Hamblin's 'Questions in Montague English' (1973, anthologized in Partee 1976), which is now regarded as a modern classic, with 1240 citations, but which had received only 31, 70, and 275 citations by the end of its first three decades, respectively, the rest coming in the last thirteen years. (Data accessed from Google Scholar on 14 Sept. 2015.) It seems safe to say that interest in Hamblin's work on questions was reignited by the communicative turn, beginning in the late 1990s as theorists of conversational dynamics rediscovered the work (e.g., Roberts 1996/2012), and building to a recent highpoint as that work has, in turn, gained influence. In the context of the communicative turn, Hamblin's proposals about questions have found a broader framework within which to flourish. The same could be said of the effect that the recent upturn in dynamic work on imperatives has had on the citation patterns of earlier treatments.

his own work within a Montagovian tradition by ignoring its truth-conditional aspects—one of its crucial ingredients according to its early practitioners (e.g., Dowty, Wall, & Peters 1981: ch.1)—and emphasizing instead its model-theoretic formulation and its conception of the syntax–semantics interface (Stokhof 2006; see also Partee 2014). We might even hypothesize that since Lewis’s immediate goal in linking sentence meanings with truth conditions was to debunk the structuralist approach to semantics, which had been proposed by Katz & Postal (1964) and initially endorsed by Chomsky (1965), we should take Lewis’s broader point to have been that semantics involves the kind of word–world connections that are still embodied in its post-communicative-turn forms. Given these continuities, we might wonder, wherein lies the revolution?²³

The answer, I think, is that although the recent history of semantics may look from within like a series of gradual adjustments to a single, continuous model-theoretic framework driven by an expanding collection of data, the framework that has resulted from these adjustments embodies a very different answer to one of the central foundational questions that semantics was originally designed to answer. *What is linguistic meaning?* The semantics of the 1970’s embodied and espoused a truth-condition-centric answer to this question; today’s semantics has turned to communication-centric answers. Moreover: the earlier answer to this question shaped semantic practice in ways that led to delayed progress and wrong turns on the ground, and so the issue is not of merely philosophical interest.

I am therefore led to believe that the role of the truth-conditional idealization in the early history of natural-language semantics embodied a confusion—one that resulted from an insufficiently critical adoption of the methodology of prehistoric figures, including Frege, Tarski, and Carnap. What fascinates me about this confusion is that Frege, Tarski, and Carnap themselves did not suffer from it, and this is because they understood the nature of the truth-conditional idealization, its purposes, and its limitations.

Bibliography

Almog, Joseph, John Perry, and Howard Wettstein (1989). *Themes from Kaplan* (Oxford University Press).

²³ Thanks to Brian Rabern for pressing me on these points.

- Alston, William P. (2000). *Illocutionary Acts and Sentence Meaning*. Cornell University Press.
- Asher, Nicholas, and Alex Lascarides. 2001. Indirect Speech Acts. *Synthese*, 128(1–2): 183–228.
- . (2003): *Logics of Conversation*. Cambridge: Cambridge University Press.
- Bach, Kent (1987): *Thought and Reference* (Oxford University Press).
- . (1992). ‘Intentions and Demonstrations’, *Analysis* 52: 140–6.
- . (1994): ‘Conversational Implicature’, *Mind & Language* 9.
- (1999a). ‘The Myth of Conventional Implicature’. *Linguistics and Philosophy* 22. 327–66.
- (1999b): ‘The Semantics-Pragmatics Distinction: What It Is and Why It Matters’, in *The Semantics-Pragmatics Interface from Different Points of View* (Current Research in the Semantics/Pragmatics Interface, vol. 1), ed. K. Turner. Elsevier: 65–84.
- . (2005): ‘Context ex Machina’ in Zoltán Gendler Szabó (ed.): *Semantics versus Pragmatics*. Clarendon Press. 15–44.
- Barker, Chris & Pauline Jacobson (2007): *Direct Compositionality* (Oxford University Press).
- Barker, Stephen J. (2004): *Renewing Meaning: A Speech-Act Theoretic Approach*. (Oxford University Press).
- Barwise, Jon and John Perry (1983). *Situations and Attitudes*. MIT Press
- Beaver, David (2001). *Presupposition and Assertion in Dynamic Semantics*. CSLI Publications.
- Beaver, David and Bart Geurts (2011). ‘Presupposition’. *The Stanford Encyclopedia of Philosophy* (Winter 2014 Edition), Edward N. Zalta (ed.). <http://plato.stanford.edu/archives/win2014/entries/presupposition/>.
- Blackburn, Simon (1987) ‘Morals and Modals’, in *Fact, Science and Value, Essays in Honour of A.J. Ayer’s Language, Truth and Logic*, edited by C. Wright and G. Macdonald (Blackwell). Reprinted in Blackburn’s *Essays on Quasi-Realism* (Oxford University Press, 1993): 52–74.

- Burge, Tyler (1979). 'Sinning Against Frege' *The Philosophical Review* 88. 398–432.
Reprinted as Chapter 5 of Burge 2005: 213–39.
- (1984). 'Review of Michael Dummett's *The Interpretation of Frege's Philosophy*'. *The Philosophical Review* 93 (3): 454–8.
- (1986). 'Frege on Truth'. In L. Haaparanta and J. Hintikka (eds.), *Frege Synthesized*. Reidel. 97–154. Reprinted as ch.3 of (Burge 2005). 83–132.
- (1992). 'Frege on Knowing the Third Realm'. *Mind* 101 (1992): 633–49.
Reprinted as Chapter 8 of Burge 2005: 299–316.
- (2005). *Truth, Thought, Reason: Essays on Frege*. Oxford University Press.
- Burgess, John P (2008): 'Tarski's Tort' in *Mathematics, Models, and Modality: Selected Philosophical Essays*. Cambridge University Press: 149–68.
- Cappelen, Herman & Ernie Lepore (2005): *Insensitive Semantics: A Defense of Semantic Minimalism and Speech Act Pluralism* (Blackwell).
- Carnap, Rudolf (1941). *Introduction to Semantics*. Harvard University Press.
- (1947). *Meaning and Necessity*. University of Chicago Press.
- Carston, Robyn (2002). *Thoughts and Utterances: The Pragmatics of Explicit Communication*. Blackwell.
- Charlow, Nate (2013). 'Logic and Semantics for Imperatives', *Journal of Philosophical Logic* (online first). DOI: 0.1007/s10992-013-9284-4.
- (2015). 'Prospects for an Expressivist Theory of Meaning', *Philosophers Imprint* 15: 1–43.
- (2016). 'Decision Theory: Yes! Truth Conditions: No!'. Forthcoming in Nate Charlow and Matthew Chrisman (eds.): *Deontic Modals*. Oxford University Press.
- Chierchia, Gennaro (1995). *Dynamics of Meaning*. University of Chicago Press.
- Church, Alonzo (1941). *The Calculi of Lambda Conversion*. Princeton University Press.
- Ciardelli, Ivano, Jeroen Groenendijk, & Floris Roelofsen (2013). 'Inquisitive Semantics: A New Theory of Meaning'. *Language and Linguistics Compass* 7 (9): 459–76.

- Cumming, Sam (2007). *Proper Nouns*. PhD Dissertation, Philosophy. Rutgers University.
- (2008). ‘Variabilism.’ *Philosophical Review* 117 (4). 525–54.
- Davidson, Donald (1965). ‘Theories of Meaning and Learnable Languages’ in (Davidson 1984): 3–16.
- . (1967a). ‘Truth and Meaning’ in (Davidson 1984): 17–36.
- (1967b). ‘The Logical Form of Action Sentences.’ In *Essays on Actions and Events*. Oxford University Press.
- (1970). ‘Semantics for Natural Languages’ in (Davidson 1984): 55–64.
- (1973). ‘In Defense of Convention T.’ In (Davidson 1984): 65–78.
- (1979). ‘Moods and Performances’, in A. Margalit (ed.): *Meaning and Use* (Dordrech Reidel). Reprinted in (Davidson 1984): 109–22.
- (1984). *Inquiries into Truth and Interpretation* (Oxford University Press).
- Devitt, Michael (ms). ‘What Makes a Property “Semantic”’, unpublished manuscript.
- Dowty, David R., Robert E. Wall, and Stanley Peters (1981): *Introduction to Montague Semantics* (D. Reidel Publishing Company).
- Dummett, Michael (1973): *Frege: Philosophy of Language* (Duckworth).
- (1991). *Frege: Philosophy of Mathematics* (Harvard University Press).
- (1994): *Origins of Analytic Philosophy* (Duckworth).
- (1996). *Frege and other Philosophers* (Oxford University Press).
- Elbourne, Paul (2013). *Definite Descriptions*. Oxford University Press.
- Evans, Gareth (1982). *The Varieties of Reference*. Oxford University Press.
- von Fintel, Kai. (2004). ‘Would you Believe it? The King of France is Back! Presuppositions and Truth Value Intuitions.’ In A. Bezuidenhout and M. Reimer (eds.), *Descriptions and Beyond*. Oxford University Press. 315–41
- Frege, Gottlob (1891). ‘Funktion und Begriff’. , *Vortrag, gehalten in der Sitzung vom 9. Januar 1891 der Jenaischen Gesellschaft für Medizin und Naturwissenschaft*. Jena: Hermann Pohle. Translated as ‘Function and Concept’ by P. Geach in (Frege 1980).

- (1892a). ‘Über Sinn und Bedeutung’, *Zeitschrift für Philosophie und Philosophisches Kritik* 100: 25–50.
- (1892b). ‘Über Begriff und Gegenstand’. ‘Über Begriff und Gegenstand’, in *Vierteljahresschrift für wissenschaftliche Philosophie*, 16: 192–205. Translated as ‘Concept and Object’ by P. Geach in (Frege 1980).
- (1893). *Grundgesetze der Arithmetik*, Band I. Jena: Verlag Hermann Pohle.
- (1918). ‘Der Gedanke. Eine Logische Untersuchung’. In *Beiträge zur Philosophie des deutschen Idealismus*, I (1918–1919). 58–77.
- (1956 [1918]). ‘The Thought: A Logical Inquiry’. Translation by Max Black of Frege 1918. *Mind* 65 (259): 289–311.
- . (1980). *Translations from the Philosophical Writings of Gottlob Frege*, edited by P. Geach and M. Black (Oxford University Press).
- (2013). *The Basic Laws of Arithmetic*. Translation of (Frege 1893) by Philip A. Ebert and Marcus Rossberg with Crispin Wright. Oxford University Press.
- Gabriel, Gottfried (1996): ‘Frege’s Epistemology in Disguise’, in *Frege: Importance and Legacy*, edited by Matthias Schirn, vol 13 in *Perspectives in Analytic Philosophy*, edited by Georg Meggle and Julian Nida-Rümelin (Walter de Gruyter).
- Geach, P. T. (1965): ‘Assertion’, *The Philosophical Review* 74 (4): 449–65.
- Geurts, Bart (1999). *Presuppositions and Pronouns*. Elsevier.
- Gibbard, Alan (1990): *Wise Choices, Apt Feelings*. Harvard University Press.
- . (2003): *Thinking How to Live*. Harvard University Press.
- Gillies, Anthony (2010). ‘Iffiness’. *Semantics and Pragmatics* 3.
- Grice, H.P. (1957). ‘Meaning’, *Philosophical Review* 66. Reprinted as Chapter 14 of (Grice 1989): 213–224.
- (1968). ‘Utterer’s Meaning, Sentence Meaning, and Word Meaning’, *Foundations of Language* 4. Reprinted as Chapter 6 of (Grice 1989): 117–37.
- (1989). *Studies in the Way of Words*. Harvard University Press.

- Groenendijk, Jeroen & Martin Stokhof (1991a). ‘Two Theories of Dynamic Semantics’. In *Logics in AI, volume 478 of Lectures Notes in Computer Science*. Springer. 55–64. doi: 10.1007/BFb0018433.
- (1991b). ‘Dynamic Predicate Logic’. *Linguistics and Philosophy* 14: 39–100.
- Hamblin, C. L. (1973): ‘Questions in Montague English’, *Foundations of Language* 10 (1): 41–53.
- Harris, Daniel (2014). *Speech Act Theoretic Semantics*. PhD Dissertation, CUNY Graduate Center.
- Heck, Richard (2012). *Reading Frege’s Grundgesetze*. Oxford University Press.
- Heim, Irene (1982). *The Semantics of Definite and Indefinite Noun Phrases*. PhD thesis, University of Massachusetts, 1982.
- (1983a). ‘File Change Semantics and the Familiarity Theory of Definiteness’. In R. Bauerle, C. Schwarze, and A. Von Stechow, editors, *Meaning, Use and Interpretation of Language*. De Gruyter. 164–90.
- (1983b). ‘On the Projection Problem for Presuppositions’. In M. Barlow, D. Flickinger, and M. Wescoat, editors, *WCCFL 2: Second Annual West Coast Conference on Formal Linguistics*. Stanford University. 114–25.
- Heim, Irene and Angelika Kratzer (1998). *Semantics in Generative Grammar*. Blackwell.
- Jacobson, Pauline (2014): *Compositional Semantics: An Introduction to the Syntax/Semantics Interface* (Oxford University Press).
- Jeshion, Robin (2013). ‘Slurs and Stereotypes’. *Analytic Philosophy* 54 (3): 314–329.
- Kaplan, David (1989a). ‘Demonstratives’ in (Almog et al. 1989): 481–563.
- . (1989b): ‘Afterthoughts’ in (Almog et al. 1989): 565–614.
- (2005). ‘The Meaning of ‘Ouch’ and ‘Oops’: Explorations in the Theory of Meaning as Use,’ Unpublished ms, presented on numerous occasions.
- Kamp, Hans (1981). ‘A Theory of Truth and Semantic Representation’. In J. Groenendijk, T. Janssen, and M. Stokhof, editors, *Formal Methods in the Study*

- of Language*. Mathematisch Centrum, University of Amsterdam, Amsterdam.
- Kamp, Hans and Uwe Reyle (1993). *From Discourse to Logic*. Springer.
- Karttunen, Lauri (1976). 'Discourse Referents'. In J. McCawley, editor, *Syntax and Semantics* 7. Academic Press. 363–85.
- Karttunen, Lauri and Stanley Peters (1979). 'Conventional Implicature', in C. Oh and D. A. Dinneen (eds.), *Syntax and Semantics, Vol. 11: Presupposition*. New York: Academic Press, 1–56.
- Kaufmann, Magdalena (2012). *Interpreting Imperatives*. Springer.
- King, Jeffrey C. (2007). *The Nature and Structure of Content*. Oxford University Press.
- (2012). 'Speaker Intentions in Context', *Noûs* (online first, June 2012).
- Kotarbiński, T. (1966). *Gosiology: The Scientific Approach to the Theory of Knowledge*. Pergamon Press.
- Kripke, Saul (1963). 'Semantical Considerations on Modal Logic'. *Acta Philosophica Fennica* 16: 83–94.
- (1977): 'Speaker's Reference and Semantic Reference'. in Peter French, Thomas Uehling & Howard Wettstein (eds.): *Midwest Studies in Philosophy*, vol. 2 (University of Minnesota Press). Reprinted in *Philosophical Troubles* (Oxford University Press, 2011): 99–124.
- Lepore, Ernie and Matthew Stone (2015): *Imagination and Convention: Distinguishing Grammar and Inference in Language* (Oxford University Press).
- Levine, James (2002). 'Analysis and Decomposition in Frege and Russell'. *The Philosophical Quarterly* 52 (207): 195–216.
- Lewis, David (1970). 'General Semantics' in (Lewis 1983).
- . (1975a): 'Languages and Language' in (Lewis 1983).
- . (1975b): 'A Problem about Permission', in E. Saarinen et al., eds., *Essays in Honour of Jaakko Hintikka* (Dordrecht, Reidel, 1979). Reprinted in (Lewis 2000): 20–33.

- . (1979a): ‘Scorekeeping in a Language Game’, *Journal of Philosophical Logic* 8. Reprinted in (Lewis 1983): 233–49.
- . (1979b): ‘Attitudes De Dicto and De Se’, *The Philosophical Review* 88. Reprinted in (Lewis 1983): 133–55.
- . (1980): ‘Index, Context, and Content’ in Kanger and Öhman (eds.), *Philosophy and Grammar* (Reidel).
- . (1983): *Philosophical Papers, Volume I* (Oxford University Press).
- Lewis, Karen (2011): *Understanding Dynamic Discourse* (Dissertation, Rutgers University).
- . (2014): ‘Do We Need Dynamic Semantics.’ In Alexis Burgess and Brett Sherman (eds.): *Metasemantics*. Oxford University Press.
- Mendelsohn, Richard (2005). *The Philosophy of Gottlob Frege*. Cambridge University Press.
- Montague, Richard (1970a). ‘English as a Formal Language.’ In Bruno Visentini et al., *Linguaggi nella Società e nella Tecnica*. Milan, Edizioni di Comunità. 189–224. Reprinted in (Montague 1974): 188–221.
- (1970b). ‘Universal Grammar’, *Theoria* 36: 373–98. Reprinted in (Montague 1974): 222–246.
- (1973). ‘The Proper Treatment of Quantification in Ordinary English’, in J. Hintikka, J. Moravcsik, and P. Suppes (eds.): *Approaches to Natural Language* (Dordrecht). Reprinted in (Montague 1974): 247–70.
- (1974). *Formal Philosophy* (Yale University Press).
- Mostowski, Andrej (1957). ‘On a Generalization of Quantifiers’. *Fundamenta Mathematicae* 44: 12–36.
- Murray, Sarah (2014). ‘Varieties of Update’. *Semantics and Pragmatics* 7 (2). <http://dx.doi.org/10.3765/sp.7.2>
- Neale, Stephen (1990): *Descriptions*. MIT Press.
- (1999). ‘Colouring and Composition’, in Rob Stainton (ed.): *Philosophy and Linguistics*. Westview Press. 35–82.

- (2004). ‘This, That, and the Other’ in Marga Reimer and Anne Bezuidenhout (eds.): *Descriptions and Beyond* (Oxford University Press): 68–182.
- Partee, Barbara (1975): ‘Montague Grammar and Transformational Grammar’, *Linguistic Inquiry* 6: 203–300
- (1976): *Montague Grammar* (Academic Press).
- (2004). *Compositionality in Formal Semantics: Selected Papers by Barbara H. Partee*. Blackwell.
- Patterson, Douglas (2012). Alfred Tarski: Philosophy of Language and Logic. Palgrave Macmillan.
- Perry, John (1977). ‘Frege on Demonstratives’. *The Philosophical Review* 86 (4). 474-97.
- Pérez Carballo, Alejandro (2014): ‘Semantic Hermeneutics’, in Alexis Burgess & Brett Sherman (eds.): *Metasemantics* (Oxford University Press): 119–146
- Pérez Carballo, Alejandro and Paolo Santorio (2016): ‘Communication for Expressivists’, *Ethics* 126 (3): 607–635.
- Portner, Paul (2004). ‘The Semantics of Imperatives within a Theory of Clause-Types’, in K. Watanabe R. Young (eds.): *Proceedings of SALT 14* (CLC Publications). <http://semanticsarchive.net/Archive/mJlZGQ4N/>
- Potts, Christopher (2005). *The Logic of Conventional Implicature*. Oxford University Press.
- (2007). ‘The Expressive Dimension’. *Theoretical Linguistics* 33(2):165-197.
- Potts, Christopher (2012). ‘Conventional Implicature and Expressive Content’. In Claudia Maienborn, Klaus von Stechow, and Paul Portner (eds.): *Semantics: An International Handbook of Natural Language Meaning, Volume 3*. Mouton de Gruyter: 2516-36.
- Prior, A. N. (1957). *Time and Modality*. Oxford University Press.
- (1967). *Past, Present and Future*. Oxford University Press.
- (1968). *Papers on Time and Tense*. Oxford University Press.
- Ricketts, Thomas (1986): ‘Generality, Meaning and Sense in Frege’, *Pacific Philosophical Quarterly*, 67: 172-95.

- Roberts, Craige (1989). 'Modal Subordination and Pronominal Anaphora in Discourse'. *Linguistics and Philosophy* 12 (6): 683–721.
- (1996). 'Anaphora in Intensional Contexts'. In S. Lappin, editor, *Handbook of Contemporary Semantic Theory*. Blackwell.
- (1996/2012). 'Information Structure in Discourse: Toward an Integrated Formal Theory of Pragmatics', in Jae-Hak Yoon & Andreas Kathol (eds.), *Papers in Semantics* (Working Papers in Linguistics 49) (The Ohio State University, 1996). Revised and reprinted in *Semantics and Pragmatics* 5: 1–69. DOI: <http://dx.doi.org/10.3765/sp.5.6>.
- (2002). 'Demonstratives as Definites'. In Kees van Deemter & Roger Kibble (eds.): *Information Sharing: Reference and Presupposition in Language Generation and Interpretation* (CSLI). 89–196.
- (2003). 'Uniqueness in Definite Noun Phrases'. *Linguistics and Philosophy* 26 (3). 287–350.
- Russell, Bertrand (1903). *The Principles of Mathematics*. London: W.W. Norton, 1937. (First edition 1903.)
- (1914). *Our Knowledge of the External World*. Open Court. Reprinted with an introduction by John Slater, 2009. Routledge Classics.
- (1918). *The Philosophy of Logical Atomism*. Edited with an introduction by David Pears, 1985. Open Court.
- (1931). *The Scientific Outlook*. London: George Allen and Unwin; New York: W.W. Norton.
- Sadock, Jerrold M. (1974). *Toward a Linguistic Theory of Speech Acts*. Academic Press.
- Schiffer, Stephen (1972). *Meaning*. Oxford University Press.
- (1981). 'Indexicals and the Theory of Reference'. *Synthese* 49 (1): 43–100.
- (1982). 'Intention-Based Semantics'. *Notre Dame Journal of Formal Logic* 23 (2): 119–56.
- (1993). 'Actual Language Relations' in *Philosophical Perspectives* 7: 231–58.
- (2003). *The Things We Mean*. Oxford University Press.

- Searle, John (1969): *Speech Acts*. Cambridge University Press.
- Simons, Mandy, Judith Tonhauser, David Beaver, & Craige Roberts (2010). ‘What Projects and Why’. In *Semantics and Linguistic Theory (SALT)* 21, 309–327. CLC Publications.
- Simons, Peter (1992): ‘Why is There so Little Sense in Grundgesetze?’, *Mind* 101: 752–66.
- Soames, Scott (1987). ‘Direct Reference, Propositional Attitudes and Semantic Content’, *Philosophical Topics* 15: 47–87.
- (1989). ‘Presupposition’, in D. Gabbay and F. Guenther, eds. *Handbook of Philosophical Logic, vol. 4: Topics in the Philosophy of Language*. Dordrecht: Reidel, 1989. 553–616.
- (2002). *Beyond Rigidity*. Oxford University Press.
- (2010). *What is Meaning?*. Princeton University Press.
- Sperber, Dan & Deirdre Wilson (1986/94). *Relevance: Communication and Cognition*. Blackwell.
- Stalnaker, Robert (1974). ‘Pragmatic Presuppositions’. In Munitz, M. and Unger, P. (eds.), *Semantics and Philosophy*. New York University Press. 197–214.
- (1978). ‘Assertion’, in P. Cole (ed.): *Syntax and Semantics* 9. Academic Press. Reprinted in (Stalnaker 1999): 78–95.
- (1999). *Context and Content*. Oxford University Press.
- (2014). *Context*. Oxford University Press.
- Starr, Will (2010): *Conditionals, Meaning, and Mood*. PhD Dissertation, Philosophy, Rutgers University.
- . (2014). ‘Mood, Force, and Truth’. *Protosociology* 31. 160–81.
- (ms): *Imperative Dynamics*. Unpublished Manuscript.
- Stojnic, Una (2016): [title]. PhD Dissertation, Philosophy, Rutgers.
- Strawson, P.F. (1950). ‘On Referring’. *Mind* 59: 320–44.
- Tarski, Alfred (1933). ‘Pojęcie prawdy w językach nauk dedukcyjnych’. Warsaw: Nakładem Towarzystwa Naukowego Warszawskiego. Translated by J.H.

- Woodger as 'The Concept of Truth in Formalized Languages', ch.8 of Tarski 1956: 152–278.
- (1936). 'Über den Begriff der logischen Folgerung', in *Actes du Congrès International de Philosophie Scientifique*, fasc. 7 (Actualités Scientifiques et Industrielles, vol. 394), Paris: Hermann et Cie, pp. 1–11. Translated by J.H. Woodger as 'On the Concept of Logical Consequence', ch.16 of Tarski 1956: 409–420.
- (1944). 'The Semantic Conception of Truth and the Foundations of Semantics'. *Philosophy and Phenomenological Research* 4: 341–76.
- (1956). *Logic, Semantics, Metamathematics: Papers from 1923–1938*. Oxford University Press.
- Taschek, William (1992): 'Frege's Puzzle, Sense and Information Content', *Mind* 101: 767–91
- Tonhauser, Judith (2012). 'Diagnosing (Not-)at-Issue Content'. *Proceedings of Semantics of Under-represented Languages of the Americas (SULA)* 6. UMass, Amherst: GLSA. 239–54.
- Thomason, Richmond (1974): 'Introduction', in (Montague 1974): 1–71.
- Veltman, Frank (1996): 'Defaults in Update Semantics', *Journal of Philosophical Logic* 25 (3): 221–61.
- Weiner, Joan (1990): *Frege in Perspective* (Cornell University Press.)
- (1997a). 'Has Frege a Philosophy of Language?', in W. W. Tait (ed), *Early Analytic Philosophy: Essays in Honor of Leonard Linski*. Open Court Press, 1997. Reprinted in M. Beaney and E. Reck (eds), *Gottlob Frege: Critical Assessments of Leading Philosophers*. Vol IV. Routledge, 2006.
- (1997b). 'Frege and the Linguistic Turn'. *Philosophical Topics*, Volume 25, No 2, 1997 pp. 265–289
- Weisberg, Michael (2007). 'Three Kinds of Idealization', *Journal of Philosophy* 104 (12): 639–59.
- Williamson, Timothy (2009). 'Reference, Inference and the Semantics of Pejoratives', in J. Almog and P. Leonardi (eds.), *The Philosophy of David Kaplan*. Oxford: Oxford University Press, 137–58.

- Wiggins, David (1997): 'Meaning and Truth Conditions: From Frege's Grand Design to Davidson's', in *A Companion to the philosophy of Language*, edited by Bob Hale & Crispin Wright (Blackwell): 3–28.
- Yalcin, Seth (2007). 'Epistemic Modals.' *Mind* 116 (464): 983–1026.
- (2012): 'Bayesian Expressivism', *Proceedings of the Aristotelian Society* CXII (2): 123–60.
- Zalta, Edward N. (1988). *Intensional Logic and the Metaphysics of Intentionality*. MIT Press.