

# Introduction

Here is the idea, shorn of all the qualifications and supplementations: each complex expression of natural language is the concatenation of two simpler expressions; these two constituents, together with the meaning of concatenation, determine the meaning of the complex expression; constituents are understood as monadic *predicates*, and concatenation signifies *conjunction*. So, from a semantic perspective, every complex expression is a conjunction of predicates.

If this is correct, then core aspects of linguistic meaning are quite simple, though quite different from how they are standardly depicted. Defending the idea requires qualification, supplementation, and more than one book. But the guiding thought is that phrases like ‘red ball’ provide semantic paradigms: a red ball is something that satisfies the condition imposed by ‘red’ *and* the condition imposed by ‘ball’. In light of Davidson’s (1967*b*, 1985) proposals and subsequent developments, it is also plausible that the meaning of (1) is given roughly by (2).

- (1) Pat hugged Chris quickly
- (2) there was something such that  
it was done by Pat, *and* it was a hugging, *and* it happened  
to Chris, *and* it was quick.

On this view, the subsentential expressions in (1) indicate conjuncts of a complex monadic predicate; where a conjunct may be logically complex, and a sentence reflects existential closure of a predicate.

I argue that many constructions—involving quantification, plurality, ‘that’-clauses, and causal verbs—can and should be analyzed in this fashion. This does not yet establish the general thesis, according

to which (2) reveals fundamental principles of semantic composition in natural language, since the meaning of concatenation may not be uniform across *all* complex expressions. Though as we shall see, there are reasons for assuming uniformity, absent evidence to the contrary. Some of the arguments provided here are new. But in defending the proposed conception of how natural language syntax contributes to meaning, I draw on work by many theorists.<sup>1</sup>

## 1. Overview

According to many linguists and philosophers, sentence (1) means roughly that something had the following properties: Pat did it, it was an event of hugging, Chris underwent it, and it was quick. Using formal notation, and ignoring tense, the suggestion is that the meaning of (1) is given by (1M),

$$(1M) \quad \exists x[\text{Agent}(x, \text{Pat}) \ \& \ \text{Hugging}(x) \ \& \ \text{Theme}(x, \text{Chris}) \\ \& \ \text{Quick}(x)]$$

where ‘Agent’ and ‘Theme’ express relations between events and *participants* in those events. From this perspective, each word in (1) corresponds to a predicate of events, but the syntactic arguments of the verb—the subject ‘Pat’ and direct object ‘Chris’—are also associated with “thematic roles”. I’ll argue that (1M) is indeed the right way to specify the meaning of (1), that the conjunctive aspects of (1M) reflect the *combinatorial structure* of (1), and that this is an instance of a far more general pattern.

### 1.1. *Concatenation Signifies Conjunction*

As a first approximation, we can regard (1) as the result of concatenating ‘hugged’ with ‘Chris’, adding ‘quickly’, and then

<sup>1</sup> Especially important and discussed below are Davidson (1967*b*, 1985), Castañeda (1967), Higginbotham (1983, 1985, 1986), Taylor (1985), Parsons (1990), Schein (1993), Larson and Segal (1995). There are also points of contact with Chomsky’s (1995, 2000*b*) minimalist program in syntax.

combining that phrase with ‘Pat’. The result can be represented in many ways.

$$\begin{array}{rcl} & / \ \backslash & \\ \text{Pat} & / \ \backslash & \text{Pat}^{\wedge}((\text{hugged}^{\wedge}\text{Chris})^{\wedge}\text{quickly}) \\ & / \ \backslash \text{quickly} & [\text{Pat} [[\text{hugged Chris} \text{quickly}]] \\ \text{hugged} & \text{Chris} & \end{array}$$

If each word corresponds to a predicate of events, as suggested by (1M), perhaps the branching structure itself contributes to the meaning of (1). Clearly, the sentence doesn’t mean that something had the following property: Pat did it, *or* it was a hugging, *or* Chris underwent it, *or* it was quick. In my view, this is because the semantic correlate of concatenation is conjunction, as opposed to disjunction or anything else. The ampersands in (1M) reflect a semantic contribution of syntax.

Of course, even if this is correct, one wants to know how thematic notions like ‘Agent’ and ‘Theme’ come to be involved in sentential meanings. But suppose the *grammatical* structure of (1) reflects the fact that ‘Pat’ and ‘Chris’ are arguments of the predicate ‘hugged’, while ‘hugged Chris’ and ‘hugged Chris quickly’ are complex predicates that take one argument, as shown in (1G);

$$(1G) \quad [\text{Pat}_{\alpha} [[\text{hugged}_{\Pi^*} \text{Chris}_{\alpha}]_{\Pi} \text{quickly}]_{\Pi}]$$

where the subscripts ‘ $\alpha$ ’ and ‘ $\Pi$ ’ indicate grammatical arguments and predicates, respectively, and ‘ $\Pi^*$ ’ indicates a (two-place) predicate that combines with an argument to form a (one-place) predicate.<sup>2</sup> Then a natural thought is that subjects of “action verbs” represent things *as* Agents, while objects of such verbs represent things *as* Themes. Perhaps when speakers hear (1), ‘Pat’ is understood as the eventish predicate ‘Agent(x, Pat)’ because ‘Pat’ is the subject of ‘hugged’, and

<sup>2</sup> One can interpret the subscripts in (1G) as follows: ‘Pat’ is an  $\alpha$  (an argument), ‘hugged’ is a  $\Pi^*$  (a predicate that combines with an  $\alpha$  to form a  $\Pi$ , which is a unary predicate), and so on; see Chomsky (1957, 1965) on the theoretical role and interpretation of labels. One can, if one likes, replace ‘ $\alpha$ ’ and ‘ $\Pi$ ’ with ‘NP’ (or ‘DP’) and ‘V’. But I want to be as neutral as possible with regard to which syntactic labels (if any) are semantically important; cf. Collins (2001). For now, I am also

'Chris' is understood as the eventish predicate 'Theme(x, Chris)' because 'Chris' is the object of 'hugged'. If so, then appeal to thematic roles provides a way of describing a certain relation between grammatical structure and meaning: at least for purposes of semantic combination, verbs and their syntactic arguments are interpreted as monadic predicates, which may have thematic structure.

Precisely because appeals to thematic roles figure prominently on this view, I am *not* denying that natural language meanings involve relations. But if the arguments of action verbs are interpreted as monadic predicates, this invites the thought that many other expressions are interpreted similarly. Since (1) can be paraphrased with 'There was a hugging of Chris by Pat', an obvious thought is that the prepositions 'of' and 'by' indicate thematic roles, with 'of Chris' and 'by Pat' understood like the subject and object of (1); see Gruber (1965, 1976), Fillmore (1968), Jackendoff (1972, 1987), Chomsky (1981). Maybe semantic relationality in natural language is due to a relatively small stock of relations, largely associated with certain grammatical configurations or "functional" expressions (like prepositions).

Still, *sentences* are not merely predicates. Declarative sentences, at least when they are used, can typically be evaluated for truth or falsity. So one wants to hear more about the source of the existential quantification in (1M). Why does (1) mean that *there was something* of a certain sort? One might also wonder how concatenation could possibly correspond to conjunction in sentences like (3–4)

- (3) Chris sang or Pat did not dance
- (4) No dancer hugged every linguist

These issues will be addressed in due course. But as we'll see, one can maintain that concatenation signifies conjunction of (monadic)

abstracting from various issues concerning the label (if any) of 'quickly', how to label sentences, the meaning of thematic predicates, and the possibility that  $\text{hugged}_{\Pi^*}$  is a complex expression formed by combining a  $\Pi$  with a covert element. More on all this below. But whatever the details, the proposal is that a structure like (1G)—in current terminology, an LF—is mapped to a semantic structure or "logical form" like (1M).

predicates, even in sentences like (3–4). And this hypothesis about natural language turns out to be better than a standard alternative.

It is widely held that if concatenation signifies anything, it signifies *function-application*. On this view, a complex expression like ‘Chris sang’ means what it does because: the syntactic predicate (‘sang’) is semantically associated with some function; the syntactic argument (‘Chris’) is associated with some entity in the domain of that function; and concatenating a predicate with an appropriate argument yields an expression associated with *the value of the relevant function as applied to the relevant entity*.<sup>3</sup> The trick is to specify the functions and entities in a plausible way; and this can be done for a significant range of cases, including sentences like (3–4). But I think “Functionism” is ultimately unsatisfactory. The plan is to show that “Conjunctivism” is theoretically viable, and to provide some arguments for adopting it. So of necessity, much of the book is devoted to showing that Conjunctivists can do what Functionists have done. (And in the hope that comparing these approaches may help novices think about the empirical content of each, I have tried to err on the side of explicitness, at the risk of boring specialists.)

One might think that Functionism is truistic: a consequence of the only plausible notational scheme for semantics, as opposed to an empirical hypothesis that might be compared with an alternative. So in Chapter 1, I begin with a general discussion of how the two approaches—and a third “mixed” view—differ, while still sharing some foundational assumptions about how to construct semantic theories that accommodate a certain range of elementary facts. I also review some old arguments for the claim that sentences like (1) involve covert quantification over events. This claim is compatible with several views about the semantic correlate of concatenation. Though by the end of Chapter 2, which is primarily concerned with quantification and its relation to plurality,

<sup>3</sup> If ‘sang’ is associated with function *S*, and ‘Chris’ is associated with entity *c*, then ‘Chris’^‘sang’ is associated with *S(c)*—i.e., the value of *S* given *c* as the (semantic) argument to *S*. See Ch. 1.

we will have an attractive Conjunctivist semantics for sentences like (1–4) and many other textbook cases. Indeed, the resulting account is preferable in several respects to a Functionist account.

In Chapter 3, I extend this positive case, arguing for a Conjunctivist approach to various causal constructions and to verbs (like ‘said’) that take sentential arguments. A running theme will be that Conjunctivism is better than Functionism even with regard to many cases of predicates combining with arguments—in particular, cases involving *plural* arguments, *causal* verbs, speech-act verbs with *sentential* complements, and even *determiners* (like ‘every’) that take predicates (like ‘bottle’ and ‘fell’) as arguments. This is important, since the initial attractions of Functionism lie with its treatment of predicate–argument combinations. Cases of adjunction, like ‘red ball’ and ‘sang loudly’ (in which a noun or verb combines with a modifier) favor Conjunctivism. So if Conjunctivism provides a better account of theoretically interesting predicate–argument combinations, that is bad news for Functionism. It also tells against the mixed view that concatenation of *predicates with arguments* signifies function-application, while concatenation of *predicates with adjuncts* signifies predicate-conjunction.

My plan is to motivate Conjunctivism by showing its virtues across a variety of constructions. But no discussion of any construction type is offered as anything like a full treatment of its topic. (Experts on serial verbs, for example, will note that Chapter 3 describes only the tip of their iceberg.) Along the way, I sketch replies to some potential objections; though unsurprisingly, I do not provide a complete Conjunctivist semantics for English, much less every natural language. And for reasons hinted at in the final chapter, evaluating potential counterexamples quickly leads to large questions about how meaning is related to truth. Nonetheless, I hope to show that Conjunctivism is an attractive thesis that is preferable to more familiar alternatives.

### 1.2. *Form and Meaning*

Let me conclude this overview by locating the main issues in a slightly different context. For any sentence of a natural language, we

can ask the following questions: what is its grammatical structure; what does it mean; and how is its structure related to its meaning? The structure of a sentence clearly bears on how it is understood by speakers of the relevant language. Sentences like (5) and (6)

- (5) Pat hugged Chris
- (6) Chris hugged Pat

differ in meaning, presumably, because the subject–object distinction matters semantically. Similarly, ‘lawyer who needed a doctor’ and ‘doctor who needed a lawyer’ have analogous but different meanings. But even for sentences like (5), we don’t really know *how* grammatical form is related to meaning.

Upon reflection, this is unsurprising. Semantics is difficult, in part because it calls for the solution of an equation with three variables (see Higginbotham, 1985, 1986). Given a linguistic expression, we need theoretically perspicuous representations of its grammatical and semantic properties, in order to ask how these (perhaps overlapping) properties are related. So even given a tentative view about the structure of a given expression, two relevant aspects of linguistic reality remain unknown. One cannot formulate a clear proposal about how form is related to meaning without representing the latter. And while the meanings of expressions may in some sense be “transparent” to competent speakers, *explaining* semantic facts typically requires nontrivial representations of—i.e., substantive hypotheses about—those facts. Specific representations may suggest proposals about how grammatical and semantic properties are related. But any such proposal must be evaluated in light of all the available evidence.

For example, suppose the grammatical structure of (5) is as shown in (5G),

- (5G) [Pat<sub>α</sub> [hugged<sub>Π\*</sub> Chris<sub>α</sub>]<sub>Π</sub>]

on the model of (1G) above. There are many features of (5) that (5G) does not capture, and some of these features may well be semantically relevant. Still, (5G) is presumably correct as far as it goes. It is less clear how we should represent the meaning of (5). As any

speaker of English can tell you, it means that Pat hugged Chris. But the question is how to represent this meaning for purposes of doing semantics. We can—by stipulation, if necessary—denote the meaning of (5) with ‘that Pat hugged Chris’. But this does not yet begin to characterize the theoretically important properties of this sentential meaning. For reasons reviewed below, I assume that sentential meanings are structured. This raises questions about *how* they are structured, and how the meanings of complex expressions are related to natural language grammar.<sup>4</sup>

Jumping ahead a bit, consider three hypotheses about the “semantic structure” of (5).

- (5a)  $H_2(p, c)$
- (5b)  $\exists x[H_3(x, p, c)]$
- (5c)  $\exists x[\text{Agent}(x, p) \ \& \ H_1(x) \ \& \ \text{Theme}(x, c)]$

Here, ‘p’ and ‘c’ are labels for individuals in some domain; ‘ $H_2$ ’ is a binary predicate satisfied by certain ordered pairs of individuals; ‘ $H_3$ ’ is a ternary predicate satisfied by certain ordered triples, with ‘x’ ranging over events; and ‘ $H_1$ ’ is a unary predicate satisfied by events. If (5a–c) reflect importantly different proposals about the meaning of (5), and I argue that they do, we want to know which one figures in the best explanations of the semantic facts. The answer is not obvious.

Correlatively, it is initially unclear *how* the meaning of (5) is related to the meanings of its constituents, if only because there are several available hypotheses about the semantic contribution of verbs. Setting (5b) aside for now, should theorists represent the semantic contribution of a verb like ‘hugged’ with a predicate satisfied by ordered pairs of individuals, or with a predicate satisfied by certain events? As we’ll see, the first suggestion fits naturally with the idea that combining expressions indicates function-application; the second fits naturally with the idea that combining expressions

<sup>4</sup> We also want to know *why* grammatical form is related to meaning in certain ways. I return, in particular, to the question of why being the subject or object of a verb has *thematic* significance.

indicates predicate-conjunction. And *many* considerations are relevant to evaluating these alternative hypotheses.

Interpretations of semantic theories can also be tendentious. Though in my view, claims about our theoretical formalism can and should be guided by relevant empirical facts, just like claims about the semantic significance of concatenation. In Chapter 2, I focus on the need for theories that employ *second-order* quantification. This raises questions about how to interpret such quantification as it appears in our metalanguage, given facts about plural noun-phrases like ‘three linguists’, ‘most philosophers’, and ‘the students’. Indeed, part of my argument for a Conjunctivist account of such expressions relies on a nonstandard but empirically attractive conception of second-order quantification.<sup>5</sup>

The concluding chapter briefly addresses a large question that I discuss elsewhere; see Pietroski (2003*d*, forthcoming, in progress). Do declarative sentences of natural language have *truth*-conditions, perhaps relative to contexts? It is widely held that they do, and that facts about truth-conditions are the primary explananda for semantic theories. For most of the book, I adopt this view as an idealization. Though following Chomsky (1977, 2000*a*), I suspect that semantic theories are really theories about intrinsic features of linguistic expressions; where these features constrain *but do not determine* truth-conditions, not even relative to contexts. This bears indirectly on the main issue, since counterexamples to overly simple views about how meaning is related to truth can look like counterexamples to otherwise plausible views about how syntax contributes to meaning; and Conjunctivism is a thesis about meaning, not a thesis about truth *per se*. But we can delay debates about *how* meaning constrains truth, since at least initially, they are orthogonal to the main issue here.

Let me stress, however, that the difference between Functionism and Conjunctivism is intramural. Both are proposals about how to

<sup>5</sup> Here, I will draw on Boolos (1998) and Schein (1993). It turns out that (5) is an especially simple sentence that does not force us to consider second-order quantification over potentially many events with potentially many participants. Other sentences do.

apply a certain theoretical framework—deriving from Frege, Tarski, and others—to the study of natural language. I take it as given that formal tools can be fruitfully applied to questions about how the meaning of a complex expression, like ‘quickly found the red ball that most philosophers saw’, depends on the relevant word meanings and how the words are combined into phrases. The issue concerns the relative merits of different hypotheses about the semantic role of forming a phrase by combining expressions. Does concatenation signify function-application, or predicate-conjunction, sometimes one and sometimes the other, or none of the above? In posing this question, I assume that (i) complex expressions of natural language have semantic properties determined by their parts and how those parts are arranged, and (ii) theorists can defend specific hypotheses, couched in a formal idiom, about these properties. I cannot here defend these presuppositions in a way that fully responds to skeptics.<sup>6</sup> But the rest of this introduction, which indicates the kinds of facts I think a theory of meaning should account for, may at least motivate the assumptions for newcomers. This is a backdrop against which we can ask more specific questions about the semantic significance of concatenation.

<sup>6</sup> For useful discussion that does not presuppose Functionism, see Higginbotham (1985, 1986), Larson and Segal (1995). For formulations of more standard views, see also Heim and Kratzer (1998), Chierchia and McConnell-Ginet (2000). But for reasons hinted at in the previous paragraph, I am not assuming that there are compositional theories of *truth* for natural languages.