I want to join Gina in welcoming you to this first conference on cognitive science put on by Tufts. As the resident theoretician here, I take my job today to be to lay out the overall scope of the undertaking.

So what is involved in building meaning from language? I take it that the issue is how sentence and discourse meanings are built online in working memory, both in language perception and language production. What are meanings built from? The key here is building: the watchword of linguistic theory for the last 50 years has been combinatoriality. Sentence and discourse meanings can’t be just discerned in the phonological input and/or retrieved whole from long term memory – the brain has to construct them from smaller parts stored in long term memory, using combinatorial processes.

What are the parts stored in long term memory? For a first approximation, it’s word meanings. In turn, a word meaning is a piece of mental representation stored in long term memory in association with a piece of phonology – a pronunciation -- and syntactic features such as part of speech and subcategorization features. Whatever weird metaphysics words might have in their common conceptualization, as explored by Dan Dennett last night – whether you learn words or they invade you – it’s this triplet of phonology, syntax, and semantics that constitutes a word in long term memory. In the course of sentence perception, activation of the word’s phonology leads to activation of the meaning. In the course of sentence production, activation of the meaning leads to activation of the phonology.

Many traditions in semantics, from Frege to semantic network modelers, have assumed that word meanings are all that’s needed from long term memory in order to build sentence meaning. But as we’ll see, both in my talk and in James Pustejovsky’s, there’s a great deal more involved than just word meanings.

To get a better feel for the problem, let’s consider the very simple sentence (1).

(1) This striped cat chased that shaggy dog.

Let’s start with the verb. The action of chasing necessarily involves two characters, a chaser and a “chasee”. The verb itself does not say who these characters are. It specifies them just as variables that have to be filled in (or instantiated) in order to specify a particular event of chasing. These variables are called the semantic arguments or thematic roles of the verb. In turn, principles that map between syntax and semantics specify that these semantic arguments are to be instantiated by the meanings of the subject and object of the sentence, so that the cat is chaser and the dog is chasee.

With many verbs, not all the thematic roles have to be expressed. For example, in an event of buying, there have to be four characters: the buyer, the seller, the thing bought, and the money exchanged. All the sentences in (2) describe events of buying, but different combinations...
of characters are expressed overtly. The unexpressed characters (or implicit arguments) are still part of the meaning.

(2) Amy bought a book from Susan for $5. (all arguments expressed)
    Amy bought a book for $5. (seller implicit)
    Amy bought a book from Susan. (money implicit)
    Amy bought a book. (seller and money implicit)

Actually, back in example (1), there’s also an implicit argument. Part of the meaning of chase is that the chaser and chasee are in motion, and therefore they traverse a trajectory. We can make this piece of meaning explicit with a prepositional phrase, as in (3).

(3) This striped cat chased that shaggy dog across the lawn.

These examples show that there is an important distinction between semantic argument structure – the arguments in the meaning – and syntactic argument structure – the syntactic phrases that express semantic arguments.

These examples also show us that one of the combinatorial principles in building meaning is argument instantiation – satisfying a variable with the meaning of a phrase in the sentence. Verbs are not the only words with arguments. For instance, you can’t be a father without being father of someone, so father and other kinship terms also have arguments, as do many other nouns, adjectives, and prepositions. And noun phrases are not the only phrases that can serve as arguments. In (3), across the lawn is a prepositional phrase serving as an argument, and in (4), that the earth is 6000 years old is a sentence serving as an argument.

(4) Pat thinks that the universe is 6000 years old.

So argument structure is not just about verbs and nouns, as much psycholinguistics implicitly presumes. It involves combinations of all major syntactic categories.

Another principle of combination is illustrated in (1) by the phrases striped cat and shaggy dog. The meanings of the adjectives don’t function as arguments of the meanings of the nouns, but as modifiers. They add additional information to the specification of the character in question. Relative clauses and certain prepositional phrases also function as modifiers, as we see in (5), where the modifiers are underlined:

(5) the cockroach that ate Cincinnati
    the gentleman on my left

And modifiers can also modify the meanings of adjectives, prepositional phrases, and sentences, as we see in (6).

(6) extremely cynical
    high on the hill
    We’ll run out of oil, in all likelihood.
So again, modifications doesn’t just involve adjectives modifying nouns – it appears with many combinations of grammatical categories.

What we’ve seen so far is that there are two essential ways that word meanings can combine – argument instantiation and modification, and that these are to a great extent independent of the part of speech of the words in question.

The subject and object in (1) also contain the deictic determiners this and that, which function as semantic modifiers. This time, though, the modification directs the hearer to some aspect of the current extralinguistic context. Which cat? The cat I’m pointing to or otherwise indicating at the moment. So meaning derived from the words has to be integrated with pieces of meaning derived from extralinguistic context, and in this case the extralinguistic context provides a modifier. Deictics can also function to designate individuals on their own, as in Would you pick that up, please? [pointing], where the visual field provides the argument of the verb pick up.

Continuing to look at example (1), we might notice that chased is not a simple word like cat. It’s composed morphologically of a verb stem chase and the past tense affix –ed. The tense expresses its own piece of meaning, namely as a modifier of the event of chasing, locating it temporally. Semantically this is entirely parallel to the modifier in the gentleman on my left, which locates an object in space, or the concert on Tuesday, which locates an event in time. It just happens to be expressed by a suffix rather than by a phrase. In other words, the suffix and its meaning also have to be stored in longterm memory, available to be freely combined with verbs. (This is a slightly different take on the infamous words vs. rules controversy, but I don’t have time to go into it today.) So this suffix is a stored unit smaller than a word.

There are also stored units that are larger than words. The idioms kick the bucket and bite the dust both mean about the same as die, and they have to be learned as units. Like die, they have one semantic argument, which is expressed in subject position. But the bucket is not a semantic argument of kick – the whole thing serves as a semantic unit. That’s what makes it an idiom. On the other hand, we know these idioms form a syntactic phrase, because the past tense combines morphologically with the verb – we have kicked the bucket, not kick-the-bucketed. We also know that idioms form syntactic phrases because of idioms like take X for granted, where X is a variable to be instantiated by an argument in standard direct object position, and for granted comes after it, which it couldn’t do if take-for-granted were just a long word. There are thousands of idioms in English, so these units larger than words are not a negligible part of the English lexicon or of English sentence processing.

Another aspect of meaning can be conveyed by stress and intonation. Consider the sentences in (7).

(7) This cat chased that DOG. [answer to: What did that cat chase? or What did this cat do?]

This CAT chased that dog. [answer to: What chased that dog?]
This cat CHASED that dog. [answer to: What did this cat do to that dog?]
THIS cat chased that dog. [answer to: Which cat chased that dog?]
These all describe the same event, with the same characters playing the same roles. They vary in which aspect of the event is taken to be distinctive, or which aspect is new information, or which aspect contrasts with some other possible event.

These examples show three things. First, there is an independent aspect of meaning called information structure, which marks constituents as contrastive, old or new, topic or focus. This aspect of meaning is orthogonal to propositional structure, the structure involving arguments and modifiers – nearly anything in propositional structure can serve as topic or focus. Second, something has to be stored in longterm memory that enables us to recognize these distinctions in meaning. This time it isn’t words, but patterns of stress and intonation that can be combined freely with the string of words to convey the meaning. Third, there are other ways to express this aspect of meaning, for instance with constructions like topicalization (8a), cleft (8b), and pseudo-cleft (8c). (Some other languages have special suffixes that produce this effect.) Notice that the stress pattern is retained here as well.

(8) a. That DOG, this cat CHASED.
   b. It was this CAT that chased the dog.
   c. What the cat chased was the DOG.

So there is a many-to-one mapping from overt linguistic expression to information structure.

While I’m mentioning intonation, we might also recall that we can signal yes-no questions just by intonation, as in (9a). And question intonation can be overlaid on focusing intonation, as in (9b), showing that intonation is combinatorial as well as words. Of course, yes-no questions can also be signaled by subject-auxiliary inversion, as in (9c), and by the final word huh, as in (9d).

(9) a. This cat chased that dog?
   b. THIS cat chased that dog?
   c. Did this cat chase that dog?
   d. This cat chased that dog, huh?

So as in other cases we’ve seen, there are multiple linguistic means for expressing the same thing.

In addition to propositional and information structure, there is a third aspect of meaning that has to be built online. Consider the sentences in (10).

(10) a. Kathrin rode that motorcycle to work.
   b. Kathrin rode a motorcycle to work.
   c. Kathrin wants to ride that motorcycle.
   d. Kathrin wants to ride a motorcycle.

Is there a motorcycle that’s a character in the event? The outlier here is the fourth sentence, which talks about Kathrin’s desires about motorcycles but no particular motorcycle. This so-
called *nonspecific* reading can’t be localized in a particular word. Rather, these examples show that it results somehow from the semantic combination of the verb *want* and the indefinite determiner.

The same effect can be produced from the interaction of indefinite noun phrases with lots of other words of different grammatical categories and by the question construction. Here are some examples, where the relevant word is underlined.

(11) a. Kathrin may ride a motorcycle tomorrow (but she doesn’t know which one yet).
    b. If Kathrin rides a motorcycle, I’ll eat my hat.
    c. Kathrin never rode a motorcycle.
    d. Did Kathrin ride a motorcycle?

A slightly different case is illustrated in (12).

(12) a. Kathrin always rides that motorcycle to work. [same motorcycle each time]
    b. Kathrin always rides a motorcycle to work. [may or may not be same one]
    c. Kathrin always eats a salad for lunch. [must be different one each day]

So the issue here is whether the direct object refers to a single thing or to multiple things, one on each occasion. This possibility of multiple objects results from an interaction between *always* and the indefinite determiner.

Actually, (12c) illustrates a further complication. How do we know that it’s a different salad every time? Well, because of what we know about eating: something being eaten ceases to exist after the event is over, so it can’t be the same thing on different occasions. By contrast, you can ride the same motorcycle more than once. So the meaning of the verb interacts with *always* and the indefinite article to produce this aspect of sentence meaning. I don’t care whether you want to call this interaction semantics or real world knowledge in the sense that I think Ken McRae is going to talk about – it’s part of what we understand when we understand the sentence.

The understanding of referential commitments is not confined to noun phrases. In (10a,b) there is an event of Kathrin riding a motorcycle, but in (10c,d) and (11a,b,d), we don’t know if there is or will be. In (11c), we know there wasn’t such an event. In (12), there are multiple events all with the same description.

This aspect of meaning might be called *referential structure*. It includes the information encoded by quantification (in effect an existential quantifier in (10) and (11) and a universal quantifier in (12)). It also includes the means of keeping track of characters through a discourse by means of pronouns. Again, these aspects of meaning are orthogonal to propositional structure, in the sense that (10), (11), and (12) are all talking about acts of riding, where the characters are Kathrin and a motorcycle. They differ in the modality under which this event and the character of the motorcycle are understood. We’ve seen that this modality can’t be determined by any single word, but rather involves the combinatorial properties of two or more words in the sentence.
In order to be able to build referential structure in the course of understanding a sentence, two things have to be stored in longterm memory. First, words and constructions that affect referential structure such as want, always, may, the question construction, and the indefinite article have to be coded for their potential contribution to referential structure. Second, a set of principles must be stored that enables a language user to compute the referential commitments of particular sentences that contain these words and constructions.

So far, I’ve tried to show you that meaning is very rich and multidimensional, and that building the meaning of a sentence involves a great deal more than just pasting word meanings together. Now I want to show you a number of phenomena of a sort that I call enriched composition, where the meaning goes beyond anything directly contained in the word meanings (or the intonation). The first is implicature. For example, as I was going out the door the other day, my wife said to me,

(13) Will you be going near a mailbox?

What she means, of course, is ‘Would you mail some letters for me?’, but she’s saying it politely. Cases like this are often treated as pragmatic inferences made from the literal meaning to the meaning intended in context. But they’re part of understanding utterances, so we can’t just ignore them. A related case involves discourse connection:

(14) Amy: Would you like some lunch?
Tom: There’s a nice Italian place around the corner.

Tom’s reply is understood as implicitly answering ‘yes’ and going on to suggest how to get some lunch. That is, its meaning goes beyond the words and the syntax to finding a meaningful connection to Amy’s question. Within this context, Italian place is understood as meaning ‘Italian restaurant’ – it gets its full meaning not from the meanings of the words alone but also from the discourse context. Gina Kuperberg will be talking tomorrow about some experimental work on such cases.

Another sort of situation where meaning is not in the words of the sentence is ellipsis. Think about (15).

(15) Amy: I don’t want to go to New York.
Tom: But I do.

Tom’s reply is understood as meaning the same as ‘But I want to go to New York.’ How does it get this meaning? Classical transformational grammar says that the fuller version of the sentence is hidden in its Deep Structure or Logical Form, and either deleted or not pronounced. This preserves the idea that meaning is built from the words in the sentence – even if you don’t hear them.

An alternative approach is that Tom’s reply gets its meaning in part from words in the previous sentence and the way they are combined. This approach says there are no hidden
words, only a more complex way of building the meaning. How could we tell which of these alternatives is better? (16) is an example from a Rodgers and Hart song of the 1930s.

(16) It seems we stood and talked like this before. We looked at each other in the same way then. But I can’t remember where or when.

There is no way to fill out the way we understand the last sentence by just copying words from the previous two sentences. A great deal of massaging is necessary. About the best I can do is the very clumsy reconstruction in (17):

(17) ... But I can’t remember where or when we stood and talked like this before and we looked at each other in the same way (as we’re looking at each other now).

What’s really important in understanding (16) is not settling on exact words that are missing: rather it’s picking out the relevant pieces of meaning from the previous sentences, not the words. In fact, there are cases of ellipsis where there are no words in the context at all, and still the speaker’s meaning is perfectly understandable, and it varies with the nonlinguistic context.

(Thanks to Neil Cohn)

Another case of enriched composition where meaning is not just in the words is the phenomenon called reference transfer, where we use the name of one thing to talk about something else.

(18) Plato is on the top shelf, next to Chomsky. [Plato = ‘book by Plato’]
Let’s go to the wax museum and check out the Beatles.
[Beatles = ‘statues of Beatles’]
I’m parked out back. [I = ‘my car’]
[One waitress to another:] The ham sandwich in the corner wants some coffee.
[hamster sandwich = ‘person who ordered/who’s eating a ham sandwich’]
We don’t want to say that *Plato* is listed in people’s heads with the possible meaning ‘book by Plato’, and that *ham sandwich* is listed in people’s heads with the possible meaning ‘person eating a ham sandwich.’ The alternative is to say there’s a fairly general principle for building meaning that allows us to interpret these phrases this way in the proper context, without any words to that effect.

Another type of enriched composition is illustrated by the *sound+motion construction* in (19).

(19) Bullets whistled past my window.
    The trucks groaned up the hill.
    The trolley squealed around the corner.

The subjects of these sentences are understood as being in motion. But there is no verb of motion in the sentences. The actual verbs, *whistle, groan*, and *squeal*, are ways of making noises, not ways of moving. More explicit ways of saying about the same thing are (20).

(20) Bullets went past my window whistling.
    Bullets went whistling past my window.

Where does the motion part of the meaning in (19) come from? I don’t think we want to say that every verb that expresses sound emission is actually ambiguous, and that its second meaning is ‘going while making a sound.’

We could say that the underlying form of these sentences contains the word *go*, and it’s deleted. Or we could say that under certain circumstances, the principles of English allow us to express the meaning of *go* without using the word – enriched composition. The motion is in effect hinted at by the presence of the phrases that express trajectory: *past my window, up the hill*, and *around the corner*.

Here’s a reason that the third alternative is better. We can say (21a), but in this case we can’t leave out the *went* – (21b) is ungrammatical.

(21) a. John went whistling past my window.
    b. *John whistled past my window.

The semantic difference seems to be that the bullets make a whistling noise as a *consequence* of their motion, while John just happens to be whistling while he walks. So the unexpressed piece of meaning is not just ‘go,’ but ‘go in a way that causes sound’ – a string of words that it’s harder to imagine deleting. But in any event, this is a rather complex piece of meaning that is not expressed directly by the words or the syntactic structure. English contains a whole series of constructions of this sort, with different meanings. Interestingly, although they feel altogether natural to us, they are not possible in, for example, Spanish and French, where you have to say the equivalent of *Bullets went past my window whistling*.

A final example of enriched composition (for today anyway) is *aspects of coercion*. Compare these three sentences.
(22) a. Joe jumped until the bell rang.
   b. Joe jumped when the bell rang.
   c. Joe slept until the bell rang.

In (22a), Joe is understood as jumping repeatedly. But if *until* is changed to *when*, as in (22b), Joe jumps only once. On the other hand, if we change *jumped* to *slept*, Joe is not understood as sleeping repeatedly. So where does the sense of repetition – so-called *aspectual coercion* come from?

By now the possible remedies should be familiar. We could say that *jump* is ambiguous – coincidentally, along with all the hundreds of verbs that undergo aspectual coercion. But – again coincidentally, it only happens to mean repeated jumping in the context of *until* and similar temporal expressions. Or we could say that the word *repeatedly* is present in logical form but is deleted. But is the deleted word *repeatedly*, or *over and over*, or *lots of times*? The choice is indeterminate. Or we could say that, just as in the case of nonspecific referentiality that we discussed earlier, an extra piece of meaning must be added in, based on the interaction of the meanings of *jump* and *until* – one that’s not directly part of the meanings of either. There is now some experimental evidence that this third alternative is the right one.

In each of these cases – implicatures, discourse connections, ellipsis, reference transfer, the sound+motion construction, and aspectual coercion – we’ve found pieces of meaning that are not a product of just the individual word meanings plus the syntactic structure. Rather, there is a rich melange of other sources of meaning, including nonlinguistic context.

I want to draw two complementary sets of conclusions from this mass of observations, one concerning the architecture of language and one concerning language processing. First the architecture of language. The classical model of language coming from generative grammar, but in turn derived from formal logic and proof theory, is that the generative capacity of language is invested in its syntactic component, and that the both phonology and the combinatorial structure of meaning are *derived* from syntactic structure, as in the following diagram.

**Classical architecture**

```
                Syntactic principles
              /               /
             /               /
         Phonology ← Overt syntactic structures Covert syntactic structures → Meanings
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This has the consequence that semantic structure can be no richer or more complex than syntactic structure – or put the other way around, that syntactic structure has to be at least as rich as semantic structure. In particular, if some aspect of meaning is not represented on the surface of language, it still has to be present in some covert level of syntactic structure such as Deep Structure or Logical Form. Those who have watched the development of generative grammar over the last 4 or 5 decades will have seen that indeed syntactic structure has become more and more complex and full of covert elements (even while the rule system producing this structure...
has allegedly been simplified). Peter Culicover and I, in our book *Simpler Syntax*, have argued that much of this complexity is a direct result of attempting to derive semantics from syntax.

The quick survey I’ve just given you of all the aspects of meaning suggests a different picture. Meaning is multidimensional, embracing at least (a) propositional structure, which stipulates the arrangement of arguments and modifiers, (b) information structure, which gives us the division into topic, focus, and common ground, and (c) referential structure, which specifies the referential commitments and modalities of reference. The only one of these that bears much resemblance to surface syntax is propositional structure, and even that is not in any sort of one-to-one relation with syntax. In addition, we have seen that many aspects of meaning are not coded as words at all, so there is nothing in syntax to build them from.

All of this suggests that meaning is not derived from syntax – rather, it’s its own component of mental representation, built up by its own generative principles. The function of syntax is not to generate meaning, but rather to arrange word-sized pieces of meaning into linearly ordered constituents so they can be pronounced. The resulting architecture can be sketched like this:

**Parallel architecture**

<table>
<thead>
<tr>
<th>Phonological principles</th>
<th>Syntactic principles</th>
<th>Semantic principles</th>
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<tr>
<td>Phonology</td>
<td>Syntactic structures</td>
<td>Meanings</td>
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The double arrows in this diagram represent an *interface components*, sets of principles that establish a relation between two disparate structures. Words can now be seen as part of the interface component: they establish a relation between small pieces of phonology, syntax, and meaning.

The general form of the parallel architecture can be augmented to show how meaning incorporates information coming from visual and other nonlinguistic context. All that’s needed is another interface component that converges on meaning.

**Parallel architecture (augmented)**

<table>
<thead>
<tr>
<th>Phonological principles</th>
<th>Syntactic principles</th>
<th>Semantic principles</th>
<th>Principles of visual understanding</th>
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<tr>
<td>Phonology</td>
<td>Syntax</td>
<td>Meanings</td>
<td>Visual representations</td>
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It’s an important challenge to work out the character of visual representations and how they relate to linguistic meaning, and there is indeed a small industry in linguistics working on the ramifications of spatial language. The work of Mike Tanenhaus and his colleagues shows a lot about how this visual information is integrated in the course of language processing. As an
aside, you might notice that the classical architecture does not lend itself to being integrated with visual representations this way: there is not going to be a way to derive visual representations from syntactic structures.

My book *Foundations of Language* shows how the Parallel Architecture is superior to the classical architecture in integrating the components of linguistic theory, in integrating linguistic theory with psycholinguistics and other aspects of cognition, and even in offering a somewhat more believable story of the evolution of language. In addition, in the parallel architecture, syntactic structure is no longer responsible for all aspects of meaning, because meaning has its own generative capacity. This means that syntax needs to be only complex enough to be able to map between meaning and sound. The result is what Culicover and I have called Simpler Syntax. Syntax is not entirely eliminated, but it’s far simpler than in the classical approach. Its structures are quite similar to those that psycholinguists have been working with for decades – except that it deals with a far wider range of phenomena, including most of the things I mentioned earlier.

Now let’s think about what these observations mean for language processing. The first thing is that building sentence meaning cannot just be a function of activating all the words of the sentence in longterm memory. Building sentence meaning involves combining word meanings into phrase meanings, using phrase meanings to instantiate variables in other word meanings, overlaying the whole with meaning related to stress and intonation, integrating the meaning with the meanings of previous sentences and nonlinguistic context, and filling in portions of meaning that are not expressed by any of the words. The resulting structure has to be available for making inferences, for instance whether there exists a motorcycle that Kathrin is riding, or that she eats a different salad every day, or that the whistling bullets are moving, or that Joe is jumping multiple times.

These requirements rule out theories of cognition in which working memory consists just of those portions of longterm memory that are activated. In particular, they rule out many semantic network models and many connectionist approaches – certainly the most popular ones. Rather, we need a processing architecture in which structures are built up in working memory out of pieces stored in longterm memory. I don’t think we know at the moment how this can be accomplished, given our current-day understanding of how neurons operate. I take this to be an important challenge for tomorrow’s neuroscience: how can structured representations be built up online?

I think the observations I’ve made about meaning here also pose a strong challenge to theories of meaning like Walter Kintsch’s Latent Semantic Analysis, in that the computation of inference cannot just be based on the statistics of the cooccurrence of words, in that it involves the interaction of many factors in word meanings and of aspects of meaning that are nowhere to be found in the words. I’d also want to mention that meaning has to serve as what’s preserved in translation between languages, and statistical cooccurrence of words can’t serve this purpose. But perhaps Walter can dispel my doubts in the course of his talk.

Another thing that follows from these observations about meaning is that we can’t identify building meaning with the process of parsing – that is, constructing the syntactic
structure of a sentence online. Many approaches to psycholinguistics unfortunately do equate the two, at least implicitly – once you have a parse, you’re done. This follows on the classical view that meaning is constructed just from syntax. But on the broader view I’ve been arguing here, much more has to be going on. Parsing does indeed play an important role in building meaning, but there is much more to meaning than is contributed by syntactic structure alone. In fact, as Gina Kuperberg’s talk tomorrow will show, there is some evidence that to some extent meaning is being built in advance of parsing.

More generally, what I’ve tried to show you today is that syntactic structure only places one set of constraints on building meaning. Other constraints come from the intrinsic structure of meaning itself – the autonomous semantic principles that determine for instance that buying requires four semantic arguments, that something that’s eaten is consumed, that an event such as jumping has a determinate ending but sleeping doesn’t, that ham sandwiches can’t want something, that making a noise doesn’t inherently make something traverse a trajectory, and so on. Principles like these are deeply involved in building the meanings of sentences I’ve mentioned today, and they have nothing to do with syntax.

In addition, the building of meaning is constrained by information outside the sentence, both by previous discourse, as we saw in discourse connection and ellipsis, and by nonlinguistic understanding of the situation, as we saw in deictic expressions and again in ellipsis. That is, meaning is a sort of an informational meeting ground between a current utterance and current understanding of the situation in the world. When we’re perceiving a sentence, we’re using the incoming language plus our current understanding to build meaning. When we’re producing a sentence, we’re using our current understanding of the world (including our understanding of the other person’s state of mind) to create a linguistic output. From what I see in the abstracts, it looks as though this view is nicely compatible with what Rolf Zwaan and Mike Tanenhaus are going to tell us about tomorrow.

One last point, which also looks like it converges with Rolf Zwaan and again Gina Kuperberg: from what I’ve seen in the literature on the cognition of babies and of apes, it looks as though many elements of meaning are present in their thinking without the use of language. Again, if the classical architecture for language were correct, and meaning were built from syntax alone, this would be impossible. Within the parallel architecture, meaning – or thought – can exist without language, and we can then think of language as a vehicle for communicating thought – rather than one for creating thought, as, say, Descartes and perhaps Chomsky seem to claim. Meaning is thus a bridge between linguistic and nonlinguistic understanding. This approach to meaning helps explain why there are so many aspects of meaning that don’t come from the words. First, there are some aspects that can’t be expressed in words, and second, the speaker can often rely on the hearer to figure out parts of meaning that aren’t expressed, given the understanding of context.

This is now beginning to get outside the ambit of my topic of building linguistic meaning, and into what meaning is, but it does seem like an appropriate framing for the whole enterprise. So I’ll stop here. Thank you.