1.   'There' Insertion

Many quantified sentences incorporate the word 'there', as in the following examples.[1]

>   **there** is a dog in the yard
>   **there** are no dogs in the yard

We first note that the verb after 'there' is usually some form of 'be',[2] although other verbs are occasionally used, as in the following famous example.[3]

>   When out on the lawn there **arose** such a clatter,
>   I sprang from the bed to see what was the matter

There are indeed surprisingly many verbs that combine with 'there'.[4]   We, however, concentrate on 'be' which is far and away the most common.

We next note that 'there' is also usually paired with a quantifier-phrase or indefinite-noun-phrase, illustrated in the following examples, including singular, plural, and mass nouns.[5]

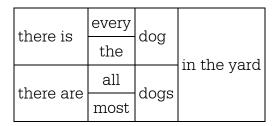|			
there is	a one at least one exactly one some no	dog	in the yard
there are	∅ səm some no many few several two at least two exactly two [etc] more fewer	dogs	in the yard
there is	∅ səm some no little more less	milk	in the refrigerator

---

[1] 'There' is also commonly used as a locative demonstrative, as in 'over there'. Some sentences we consider can plausibly be read treating 'there' in this manner, but we propose to disregard these readings, and concentrate on just the "expletive" reading.

[2] Including 'is', 'are', 'seems to be', 'might be', …

[3] From the poem '"Twas the night before Christmas", anonymously published in the *Sentinel* (Troy, NY, 1823), later attributed to Clement Clarke Moore, still later attributed to Henry Livingston Jr.

[4] For example, James McCawley (*The Syntactic Phenomena of English*, 2nd Edition, page 96) writes:
    "there are a fairly large number of verbs (some two-hundred) that allow *there*-insertion,
    notwithstanding a surprisingly widespread belief among linguists that only a few verbs allow it."

[5] Note that the comparative terms – 'more', 'fewer', 'less' – must embed in a 'than' construction.

On the other hand, certain determiners[6] do not *readily* combine with 'there', as illustrated in the following examples, which sound odd, perhaps ill-formed.

there is	every	dog	in the yard
	the		
there are	all	dogs	
	most		

These determiners are sometimes described as *definite*, while the earlier ones are correspondingly described as *indefinite*.

The definite/indefinite distinction cannot be the whole story, however. On the one hand, the following involve indefinite determiners, but they sound *incomplete*.

?	there is a dog
?	there are cats
?	there are many/few/several dogs
?	there is milk

On the other hand, the following involve a definite determiner, but they sound ok.

| ☺ | there is on the kitchen table **every** newspaper from the past week |
| ☺ | there seems to be **every** kid in town at the mall today |

The problem of what/when/how determiners and verbs properly combine with 'there' is a vexing topic for which we offer no general solution. Rather, our more modest goal is to answer the following question.

> What semantic information does
> 'there be' contribute to
> compound phrases in which it figures?

2. Proposal A

The simplest hypothesis is that 'there' is an *expletive*, which is to say it plays a purely syntactic role,[7] but basically contributes nothing semantically. That leaves 'be', which we hypothesize is copular-be. The following derivation is in line with this proposal.

there	[+1]	is	a-dog	in-the-yard
$\varnothing$	$\lambda x.x_1$	$\lambda x_1.x_0$	$\lambda x_0 \mathbf{D}x$	
$\lambda x.x_0$			$\Sigma x \mathbf{D}x$	
$\Sigma\{\, x_0 \mid \mathbf{D}x \,\}$				$\lambda x_0 \mathbf{Y}x$
$\Sigma\{\, \mathbf{Y}x \mid \mathbf{D}x \,\}$ $\exists x \{\, \mathbf{D}x \,\&\, \mathbf{Y}x \,\}$				

---

[6] Here, 'determiner' refers to all manner of words that convert common-noun-phrases into NPs.
[7] In particular, it behaves **a lot** like the subject of the verb. For example, it swaps location with the verb when a question is formed, as in
are there many dogs in the yard?

Notes on this construction.

1.   'there' is treated as semantically-empty;
2.   'there' is treated as the subject of the sentence, being marked nominative;
3.   'is' is treated as copular-be,
   which is given a (slightly) stronger interpretation than we proposed earlier.[8]
4.   the junction is marked nullative, which has not happened before

Notwithstanding the novelty of the semantic derivation, it does produce the desired reading.

What is more, this approach yields the following **non-derivation**.

there [+1]	is	a-dog
$\lambda x.x_1$	$\lambda x_1.x_0$	$\lambda x_0 \mathbf{D}x$
$\lambda x.x_0$		$\Sigma x \mathbf{D}x$
$\Sigma\{\, x_0 \mid \mathbf{D}x \,\}$		

Notice that the phrase does not compute to a sentence. Many authors maintain that sentences like this are infelicitous – not in the sense of being *nonsense*, but rather in the sense of being *incomplete*. The completing phrase is sometimes referred to as the *coda*.[9] Still, it is tricky to account for its deficiency *semantically*.

Yet the "trick" we propose seems to work! In particular, the above computation suggests that the coda can be any phrase of type $\mathsf{D_0 {\to} S}$, which is the type of common-noun-phrases and bare-adjective-phrases. In the previous example, the coda is 'in the yard', which is a bare-adjective-phrase.

3. Proposal B

Proposal A treats 'is' as a copula. Proposal B treats 'is' as existential-be.

there [+1]	is	a-dog	in-the-yard
$\lambda x.x_1$	$\lambda x_1 \exists y[x{=}y]$	$\lambda x_0 \mathbf{D}x$	$\lambda x_0 \mathbf{Y}x$
		$\lambda x_0\{\mathbf{D}x\ \&\ \mathbf{Y}x\}$	
$\lambda x_1 \exists y[x{=}y]$		$\Sigma\{\, x \mid \mathbf{D}x\ \&\ \mathbf{Y}x \,\}$	
$\Sigma\{\, \exists y[x{=}y] \mid \mathbf{D}x\ \&\ \mathbf{Y}x \,\}$			
$\exists x\,\{\, \mathbf{D}x\ \&\ \mathbf{Y}x\ \&\ \exists y[x{=}y]\}$			
$\exists x\,\{\, \mathbf{D}x\ \&\ \mathbf{Y}x \,\}$			

Note that logically speaking the existence-predicate is empty, being absorbed by the existential quantifier.

Unfortunately, Proposal B also sanctions the following derivation.

there [+1]	is	a-dog
$\lambda x.x_1$	$\lambda x_1 \exists y[x{=}y]$	$\lambda x_0 \mathbf{D}x$
$\lambda x \exists y[x{=}y]$		$\Sigma x \mathbf{D}x$
$\Sigma\{\, \exists y[x{=}y] \mid \mathbf{D}x \,\}$		
$\exists x\,\{\, \mathbf{D}x\ \&\ \exists y[x{=}y] \,\}$		
$\exists x \mathbf{D}x$		

---

[8] In particular, $\lambda x_1.x_0 \vdash \lambda \mathrm{P}_0.\mathrm{P}_1$, but not conversely. We hereby strengthen copular-be in this way.
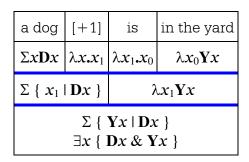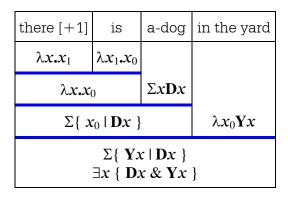[9] From Latin 'cauda', which means 'tail'.

As mentioned earlier, this phrase is widely regarded as infelicitous (by being *incomplete*). Unlike Proposal A, Proposal B provides no semantic explanation for why/how the above sentence is deficient.

Examples like this suggest that, unlike mathematics and logic, ordinary English takes 'there is' to involve copular-be, not existential-be.[10]

4.   What is the point of 'there'?

Compare the above sentence with an equivalent sentence not containing 'there'.

a dog	[+1]	is	in the yard
$\Sigma x \mathbf{D}x$	$\lambda x.x_1$	$\lambda x_1.x_0$	$\lambda x_0 \mathbf{Y}x$
$\Sigma \{ x_1 \mid \mathbf{D}x \}$		$\lambda x_1 \mathbf{Y}x$	
$\Sigma \{ \mathbf{Y}x \mid \mathbf{D}x \}$ $\exists x \{ \mathbf{D}x \,\&\, \mathbf{Y}x \}$			

there [+1]	is	a-dog	in the yard
$\lambda x.x_1$	$\lambda x_1.x_0$		
$\lambda x.x_0$		$\Sigma x \mathbf{D}x$	
$\Sigma \{ x_0 \mid \mathbf{D}x \}$			$\lambda x_0 \mathbf{Y}x$
$\Sigma \{ \mathbf{Y}x \mid \mathbf{D}x \}$ $\exists x \{ \mathbf{D}x \,\&\, \mathbf{Y}x \}$			

What is the difference? Although these sentences are truth-conditionally equivalent, they are different in connotation; in particular, they are different as to *topic* and *focus*.[11]

(1)   the subject-predicate statement is
       about a presupposed reference class (dogs),   *topic*
       and says that one of <u>them</u> is in the yard.   *focus*

(2)   the there-statement is
       not about a presupposed reference class (dogs),
       but is rather ***about*** the location (the yard),   *topic*
       and says that <u>it</u> has a dog in it.   *focus*

This difference is made more clear when we talk about entities whose existence is completely derivative – e.g., holes. The following are clearly different in connotation.

    there is a hole in my pocket
    a hole is in my pocket

The first one is about my pocket, and says it has a hole in it. The second one says that among a presupposed class of holes (e.g., holes in my pants, or holes I have to mend today), at least one of these is in my pocket.

Then there are loony examples in which holes are portable.[12] Perhaps the most famous such hole appears in the movie *The Yellow Submarine*, starring the Beatles. In the story, Ringo collects a hole from the Sea of Holes, which he places in his pocket, claiming

    I've got a hole in me pocket.

Later, the band is trapped in an anti-music globe, and Ringo saves them by deploying his hole.

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[10] That still leaves the most famous example of existential-being: to be, or not to be; that is the question.
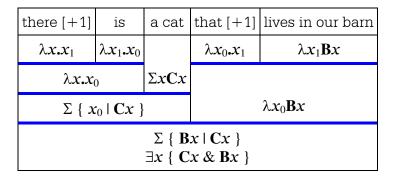
[11] This often described as a distinction between *old information* and *new information*. Communication presupposes old information and proposes new information.

[12] As in Looney Toons. They also appear in *Monty Python's Flying Circus*. See Wikipedia article on portable holes.

5. Other Coda Forms

In the previous example, the coda is a locative-prepositional-phrase. It can also be a restrictive relative clause, as in the following example.
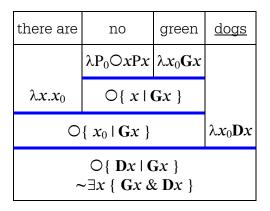
there is a cat that lives in our barn

there [+1]	is	a cat	that [+1]	lives in our barn
$\lambda x.x_1$	$\lambda x_1.x_0$		$\lambda x_0.x_1$	$\lambda x_1 \mathbf{B}x$
$\lambda x.x_0$		$\Sigma x \mathbf{C}x$		
$\Sigma \{ x_0 \mid \mathbf{C}x \}$			$\lambda x_0 \mathbf{B}x$	
$\Sigma \{ \mathbf{B}x \mid \mathbf{C}x \}$				
$\exists x \{ \mathbf{C}x \ \& \ \mathbf{B}x \}$				

So far, we have concentrated on post-fix adjectives, including restrictive relative clauses. Pre-fix adjectives also work, as in the following.

there are no green dogs

The written sentence by itself does not distinguish topic and focus, which is accomplished phonetically by stress – on 'green', or on 'dogs'. The two computations proceed as follows.

there are	no	green	dogs
	$\lambda P_0 \bigcirc xPx$	$\lambda x_0 \mathbf{G}x$	
$\lambda x.x_0$	$\bigcirc\{ x \mid \mathbf{G}x \}$		
$\bigcirc\{ x_0 \mid \mathbf{G}x \}$			$\lambda x_0 \mathbf{D}x$
$\bigcirc\{ \mathbf{D}x \mid \mathbf{G}x \}$			
$\sim\exists x \{ \mathbf{G}x \ \& \ \mathbf{D}x \}$			

there are	no	green	dogs
	$\lambda P_0 \bigcirc xPx$	$\lambda x_0 \mathbf{G}x$	$\lambda x_0 \mathbf{D}x$
$\lambda x.x_0$	$\bigcirc\{ x \mid \mathbf{D}x \} \times \lambda x_0 \mathbf{G}x$		
$\bigcirc\{ x_0 \mid \mathbf{D}x \} \times \lambda x_0 \mathbf{G}x$			
$\bigcirc\{ \mathbf{G}x \mid \mathbf{D}x \}$			
$\sim\exists x \{ \mathbf{D}x \ \& \ \mathbf{G}x \}$			

Notice that the second one is a bit more complicated, requiring **ternary**-composition, since the focus is between 'no' and 'dogs'.[13] In effect, we first combine 'no' with 'dogs', then combine 'there are' with 'no dogs', and finally combine 'there are no dogs' with 'green'.[14]

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[13] Notice that the two examples reverse if do them in French.

il n'y a pas de chiens verts [there are no dogs green]

The phrase 'il y a' sounds like the name of a Russian spy, but is in fact the French counterpart of 'there be'. Also notice the indefinite/partitive article 'de'. Finally, notice that a very similar phrase

il n'y a pas de quoi ["there is no what"]

 is one way to 'you are welcome'.

[14] More generally, the need for some sort of deferred-composition is fairly wide-spread, since many examples contain phrases that have gotten "mis-placed" in the final/overt form. If we allow non-adjacent compositions, then we don't need deferred composition. But then our graphical presentation is considerably more complicated. There is a reason linguists and logicians like trees! Alternatively, if we allow syntactic-transpositions, then we can rewrite the original sentence so that no branch-crossing is required.

6.   Examples Off the Beaten Path

Mostly, 'there' does not combine with definite determiners, such as 'every', 'most', and 'the'. But, *occasionally*, it does, as in the following examples.

(1)   there is on the kitchen table **every** newspaper we received this week;
(2)   there is in our organization **every** person you would expect;
(3)   as the year stretched on, there came to pass **every** calamity the Prophet predicted;
(4)   there suddenly appeared before us **the** entire Soviet army;
(5)   there are still living in this town **most** of the original families.

By way of illustration, we analyze (1).

there is	on the kitchen table	every	newspaper we received this week
$\lambda x.x_0$	$\lambda x_0\mathbf{K}x$	$\lambda\mathrm{P}_0\wedge x\mathrm{P}x$	$\lambda x_0\mathbf{N}x$
$\lambda x\mathbf{K}x$		$\wedge\{\ x\mid\mathbf{N}x\ \}$	
$\wedge\{\ \mathbf{K}x\mid\mathbf{N}x\ \}$ $\forall x\ \{\ \mathbf{N}x\rightarrow\mathbf{K}x\ \}$			

What happens when we consider examples involving verbs other than 'be', such as our example from "The Night before Christmas"?

out on the lawn there <u>**arose**</u> such a clatter

on the lawn	there [+1]	arose	a clatter
	$\lambda x.x_1$	$\lambda x_1\mathbf{A}x$	
	$\lambda x\mathbf{A}x$		$\Sigma x\mathbf{C}x$
$\lambda x_0\mathbf{L}x$	$\Sigma\{\ \mathbf{A}x\mid\mathbf{C}x\ \}$ $\exists x\{\mathbf{C}x\ \&\ \mathbf{A}x\}$ $\Sigma x\{\mathbf{C}x\ \&\ \mathbf{A}x\}$ $\lambda x_0\{\mathbf{C}x\ \&\ \mathbf{A}x\}$		
$\lambda x_0\{\mathbf{C}x\ \&\ \mathbf{A}x\ \&\ \mathbf{L}x\}$ $\Sigma x\{\mathbf{C}x\ \&\ \mathbf{A}x\ \&\ \mathbf{L}x\}$ $\exists x\{\mathbf{C}x\ \&\ \mathbf{A}x\ \&\ \mathbf{L}x\}$			

The computation is very circuitous, but eventually yields the desired reading.[15]

Our final example has both a definite quantifier and a verb other than 'be'.

there suddenly **appeared** in front of me **all** my cats

there [+1]	suddenly appeared in front of me	all my cats
$\lambda x.x_1$	$\lambda x_1\mathbf{A}x$	
$\lambda x\mathbf{A}x$		$\wedge x\mathbf{C}x$
$\wedge\ \{\ \mathbf{A}x\mid\mathbf{C}x\ \}$ $\forall x\ \{\ \mathbf{C}x\rightarrow\mathbf{A}x\ \}$		

---

[15] Note also that the entities in question are *events*, not the usual objects studied in elementary logic.

7.   Interrogative Who

We have not officially discussed interrogatives [questions], so the following is a bit sketchy. Briefly, we propose that categorially-speaking a **wh-question** is a fill-in-the-blank sentence, of type $K_?{\to}S$, where ? is yet another inflectional-marker, and K is the relevant category of the fill-in-the-blank answer. In other words, we treat questions as open sentences with interrogative-inflection. For example, a who-question has category $D_?{\to}S$.[16] We propose to analyze interrogative-who as follows, which is yet another allomorph of 'who'[17].

$$\llbracket\text{who?}\rrbracket \;\; = \;\; \lambda x_?{:}x \qquad\qquad [\text{type: } D_?{\to}D]$$

The following are simple examples.

who? respects Kay

who?	[+1]	respects	Kay
$\lambda x_?.x$	$\lambda x.x_1$	$\lambda y_2\lambda x_1\mathbf{R}xy$	K
$\lambda x_?.x_1$		$\lambda x_1\mathbf{R}x$K	
$\lambda x_?\mathbf{R}x$K			

whom? does Jay respect

who?	m	does	Jay	[+1]	respect
$\lambda x_?.x$	$\lambda x.x_2$		J	$\lambda x.x_1$	
		$\varnothing$	J_1		$\lambda y_2\lambda x_1\mathbf{R}xy$
$\lambda x_?.x_2$				$\lambda y_2\mathbf{R}Jy$	
$\lambda x_?\mathbf{R}Jx$					

8.   Wh-Questions containing 'there be'

The following example involves 'there' insertion.

who? is **there** who can tutor intro students

Its analysis goes as follows.

who?	[+1]	is	there	who can tutor intro students
$\lambda x_?.x$	$\lambda x.x_1$	$\lambda x_1.x_0$	$\varnothing$	
$\lambda x_?.x_1$		$\lambda x_1.x_0$		
$\lambda x_?.x_0$				$\lambda x_0\mathbf{T}x$
$\lambda x_?\mathbf{T}x$				

---

[16] Although we officially write the type of wh-questions as $D_?{\to}S$, admissible answers include phrases like 'everyone' and 'no one', which of course are QPs. But QPs are in effect included, since the type $D_?{\to}S$ type-logically-entails type $QP_?{\to}S$ ($=_{df}$ $[(D_?{\to}S){\to}S]{\to}S$).

[17] Recall that allomorphs [a relational term!] are expressions that differ from one another only with regard to inflectional-markers. So 'tall', 'is tall', and '–he is tall' are allomorphs. Similarly, 'who' and 'who?' are allomorphs. Later we see the non-restrictive use of 'who' is yet another allomorph of these.

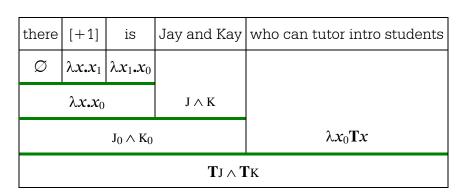Compare this sentence with the following not containing 'there'.

who?	[+1]	can tutor intro students
$\lambda x_?.x$	$\lambda x.x_1$	
$\lambda x_?.x_1$		$\lambda x_1 \mathbf{T}x$
$\lambda x_? \mathbf{T}x$		

In answering this question, the following sentences seem perfectly acceptable. Note that they involve definite determiner phrases, whose combination with 'there' is generally regarded as problematic.[18]

(1)	there's Jay	[who can tutor…]
(2)	there's Jay and Kay	[who can tutor…]
(3)	there's every A-student	[who can tutor…]

The semantic analyses go as follows.

there	[+1]	is	Jay	who can tutor intro students
$\varnothing$	$\lambda x.x_1$	$\lambda x_1.x_0$		
$\lambda x.x_0$			J	
J$_0$				$\lambda x_0 \mathbf{T}x$
TJ				

there	[+1]	is	Jay and Kay	who can tutor intro students
$\varnothing$	$\lambda x.x_1$	$\lambda x_1.x_0$		
$\lambda x.x_0$			J $\wedge$ K	
J$_0$ $\wedge$ K$_0$				$\lambda x_0 \mathbf{T}x$
TJ $\wedge$ **T**K				

there	[+1]	is	every A-student	who can tutor intro students
$\varnothing$	$\lambda x.x_1$	$\lambda x_1.x_0$		
$\lambda x.x_0$			$\wedge x \mathbf{A}x$	
$\wedge\{\, x_0 \,|\, \mathbf{A}x \,\}$				$\lambda x_0 \mathbf{T}x$
$\wedge\{\, \mathbf{T}x \,|\, \mathbf{A}x \,\}$ $\forall x \{\, \mathbf{A}x \rightarrow \mathbf{T}x \,\}$				

---

[18] Some authors refer to this as the "list use" of 'there'. Our analysis suggests that the list-use of 'there' is semantically just like the standard use.

9.   Expletive 'it'

We have proposed that one use of 'there' can be understood as an expletive pronoun. The other prominent expletive pronoun is 'it', which figures heavily in academic writing, especially philosophical writing. Indeed, philosophers are especially adept at using this form of 'it'. For example, rather than asking a server at a restaurant to bring him more water, a former colleague of mine asked the server to *bring **it** about **that*** he had more water![19]

Sometimes, however, philosophical humor is intentional! The logician Charles Dodgson penned two classics in whimsical philosophy under the pen-name 'Lewis Carroll'. In *Alice in Wonderland*, he remarks how silly the expletive 'it' can seem. In particular, there is a passage that goes as follows. The characters have gotten wet, so they need something to dry them off, so the Mouse proposes that he read out loud some history of England, since that is surely the driest topic he can think of! Anyway, the Mouse proceeds to read:

> 'Edwin and Morcar, the earls of Mercia and Northumbria, declared for him; and even Stigand, the patriotic archbishop of Canterbury, found it advisable…'
>
> "Found what?" said the Duck.
>
> "Found it," the Mouse replied rather crossly: "of course you know what 'it' means."
>
> "I know what 'it' means well enough, when I find a thing," said the Duck: "it's generally a frog, or a worm. The question is, what did the archbishop find?"

Intro Logic students are quickly introduced to 'it' as in the following examples,

> it is not the case that P
> it is not true that P
> it is false that P

which might also puzzle the Duck; in particular, what is *it*?

It has been suggested that the 'it' at the beginning of sentences like this one is just like the 'it' in 'it is raining'. This can't be right. There is no "it" in 'it is raining', whereas there is clearly an "it" in 'it has been suggested…'. **It**'s just that we have to wait to hear what **it** is! So, if I were the Mouse, I would have said:

> Duck, if only you would wait, I would tell you what the Archbishop found!

It is largely irrelevant what the archbishop found.[20] So let us consider a much simpler example. For example, if I say

> it is false that it raining

I am saying that something ("it") is false… what?

> that it is raining

The latter is a complementizer-phrase (CP), which is a somewhat undernourished NP. Probably the most famous examples of this phrase-type are found in the U.S. Declaration of Independence.

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[19] The colleague is Herbert Heidelberger (1933-1982), and the story is from his wife Delores Harris, a lexicographer (for American Heritage Dictionary, and later Oxford English Dictionary).

[20] As it turns out, the archbishop found it advisable to go with Edgar Atheling to meet William and offer him the crown. William of course accepted, and Norman rule in England officially began in 1066 . Ironically perhaps, the Norman language [a dialect of Old French] was eventually annexed by English, which won the day linguistically.

We hold these truths to be self-evident,
that all men are created equal,
that they are endowed by their Creator with certain unalienable Rights,
that among these are Life, Liberty and the pursuit of Happiness.
That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed.
That whenever any Form of Government becomes destructive of these ends, **it** is the Right of the People to alter or to abolish it, …

Presumably, the above is a list of truths the undersigned held to be self-evident. Each item on the list is a proposition the undersigned deemed to the self-evidently true. Insofar as they denote propositions, CPs can be subjects and objects of verbs.[21] For example, in the following

Jay believes that it is raining

the object of the verb 'believes' is a CP. And in the sentence

that it is raining is false

the CP is the subject of the sentence. But the latter sentence seems odd, so the CP is usually moved to the end, leaving a "trace" behind, which is 'it'.

But what does 'it' do semantically? Well, it is just like 'there' – it syntactically serves as a subject, and is marked nominative, but it is semantically empty.

it	[+1]	is false	that	it	is	raining
$\varnothing$	$\lambda x.x_1$			$\varnothing$	$\varnothing$	$\mathbf{R}$
$\lambda x.x_1$		$\lambda x_1 \mathbb{F}x$	$\lambda P\langle P\rangle$		$\mathbf{R}$	
$\lambda x \mathbb{F}x$			$\langle \mathbf{R}\rangle$			
$\mathbb{F}\langle \mathbf{R}\rangle$						

Notice that 'it' and 'is' [in 'it is raining'] are both treated as vacuous, and 'raining' is treated as a zero-place predicate, and hence an atomic sentence.[22] This tree introduces two new expressions in the semantic language.

(1) $\mathbb{F}$ is the falsity-predicate, which applies to propositions, which are a special sort of entity, whose exact nature is not universally agreed upon. On one account, propositions are sets of worlds. In that case, $\mathbb{F}$ is set-complementation.

(2) The corner-brackets form an out-fix function-sign associated with 'that', which corresponds to intensional-assent.[23] For example, $\langle \mathbf{R}\rangle$ is the set of worlds where $\mathbf{R}$ obtains.

---

[21] But CPs cannot play any other functional role, which is why they are not full-fledged NPs.
[22] Syntactically, 'it' is the subject and 'is' is an auxiliary-verb, so they can be inverted to form a question. Also, 'is' can be modified in various ways to form 'is not', 'might be', etc.
[23] For example, the **extension** of 'that it is raining' is identical to the **intension** of 'it is raining'.