How pronominal are expletive pronouns?

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1. Introduction

Following a persistent tendency in linguistic theory to equate differences in syntactic or semantic behaviour with different construction types, expletive uses of pronouns are invariably analysed as unrelated to anaphoric ones, cf. the two instances of *it* in (1) and *there* in (2).

(1) It's likely that it's been sick on the carpet.

(2) There are no buskers there this year.

In this paper, I propose a theory of *it* and *there* which assumes that expletive uses follow directly from a minimal modification of the properties of a full pronoun and that expletive pronouns are identical to their non-expletive counterparts.

The framework of *Dynamic Syntax* (*DS*, Kempson et al 2001) defines the process of natural language understanding as a monotonic tree growth process over the left-right sequence of words, with the goal of establishing some propositional formula as interpretation. Taking information from words, pragmatic processes and general rules, the theory derives partial semantic tree structures that represent the content of a string as interpreted in context up to the current point in the parse. Intrinsic to this process are concepts of underspecification whose resolution is driven by requirements which determine the process of tree growth, having to be satisfied for a parse to be successful.

All nodes in the semantic trees constructed during a parse are introduced with requirements to be fulfilled, folowing the universal initial requirement to build a representation of the propositional content of a string, expressed as $?Ty(t)$. To satisfy such requirements, a parse relies on information from various sources. General processes of construction modify partial trees: e.g. a tree rooted in $?Ty(Y)$ may be expanded to one with argument daughter $?Ty(X)$ and functor daughter $?Ty(X \rightarrow Y)$. Other construction rules introduce nodes that are underspecified with respect to position within the current tree, associated with the requirement to find such a position.[1] This is the basis for analysing long distance dependencies, analysed in terms of unfixed nodes whose position in the emergent tree structure is fixed at some later stage in the parsing process. Additional information comes from actions induced by parsing words in sequence, which provide formula values of

[1]This requirement is of the form $?\exists x Tn(x)$, where Tn is the treenode label which provides the address of some node in terms of its relative position with respect to the topnode of the tree.

appropriate types and may build and/or annotate other nodes with labels or requirements.

Interacting with these tree growth processes is the context-dependent processing of anaphoric expressions. This phenomenon is modelled in *DS* as the projection of a metavariable, $Fo(\mathbf{U})$, with an associated requirement to find a fixed value, $?\exists\mathbf{x}.Fo(\mathbf{x})$, to be provided by some term through the process of SUBSTITUTION. This process is pragmatic and system-external, but may be constrained by additional restrictions (e.g. gender on pronouns) that lead to additional presuppositions derivable from the containing propositional formula (e.g. that something is neither male nor female). Thus, the pronoun in *It is possible* projects a metavariable which must be substituted by a formula of type t provided by the context (e.g. $Happy(Ronnie)$) to yield a complete propositional formula (e.g. $Possible(Happy(Ronnie))$), representing the content of this string in context.

2. *It* extraposition

All tree-theoretic characterisations of the structure of natural languages assume that contentive expressions provide labels for the terminal nodes of the trees they inhabit, reflecting compositionality of meaning. The *DS* analogue of this is provided by the so-called 'bottom restriction', resulting from the parse of a contentive item. Represented as the modality $[\downarrow]\bot$, the effect of this restriction is to prevent further tree growth below the current point, because no node may lack any annotation.[2]

One of the differences between functional and contentive expressions may, however, be ascribed to the absence of this restriction. In English, most pronouns are like fully contentive expressions in being associated with the bottom restriction. Amongst other things, this prevents unfixed trees (the *DS* analogue of movement) from merging with a node annotated by a pronoun, so accounting for the ungrammaticality of, e.g. **Which students did John not like them?*. If an expression does not impose the bottom restriction, it will allow further development of that node. This property is characteristic of an expletive and so if a pronoun loses the bottom restriction, it may act as an expletive by allowing substitution not just by some *formula* but by some structural representation provided (e.g.) by an unfixed node, as in:

(3) It is possible that I am wrong.

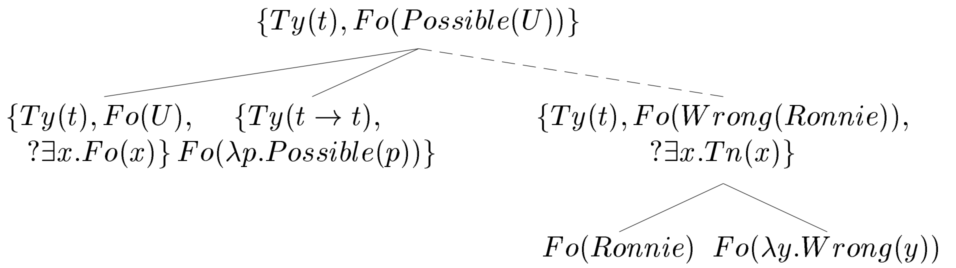
This example may be analysed as involving the normal annotation by *it* of

[2] The formula exemplifies the Logic of Finite Trees (LOFT, Blackburn and Meyer-Viol 1994) which forms the backbone of *DS* by defining relations between nodes in trees using modal operators such as: $\langle\downarrow\rangle$ the general daughter relation; $\langle\downarrow_0\rangle$ and $\langle\downarrow_1\rangle$ the argument and functor daughter relations, respectively; $\langle\downarrow_*\rangle$ the dominance relation (the reflexive, transitive closure of the daughter relation); and the inverses of these using the mother relation, $\uparrow$. $\langle.\rangle$ is the existential modality of the system while $[.]$ is the universal.

a (propositional) node in subject position with a metavariable and its associated formula requirement. If SUBSTITUTION does not apply at this point, the predicate is then parsed and the resulting propositional tree is completed to yield an incomplete formula value: $Fo(Possible(\mathbf{U}))$. At this point, a construction rule may be invoked which provides an unfixed node:[3]
*Final*Adjunction*

$$\frac{\{\{Tn(a), \ldots Ty(t), \diamond\}\}}{\{\{Tn(a), \ldots, Ty(t)\}, \quad \{\langle\uparrow_*\rangle Tn(a), \ldots, ?Ty(X), \diamond\}\}}$$

In parsing (3), an application of Final*Adjunction permits the construction of an unfixed node of $Ty(t)$ that allows the the string final clause to be analysed. This unfixed tree carries a requirement that a fixed position is to be found within the larger tree and so must MERGE with some node in this structure, as illustrated in Figure 1:



The only node with which the final unfixed node can merge successfully is that decorated by the metavariable, yielding a final formula value for (3) as $Possible(Wrong(Ronnie))$.

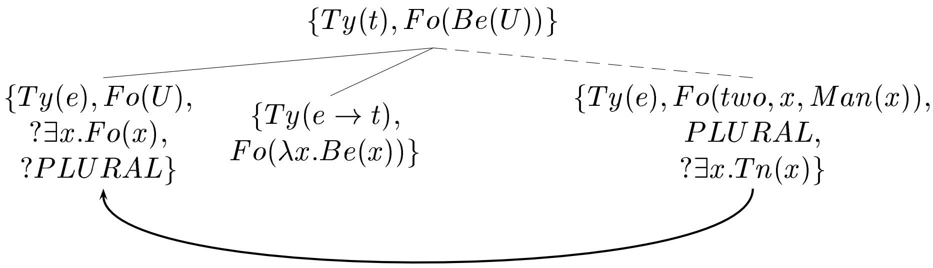
Apart from the loss of the bottom restriction nothing distinguishes this use of *it* from others and the pragmatic process of SUBSTITUTION could have applied at the point at which the pronoun is parsed, e.g. instantiating $\mathbf{U}$ as $Happy(Ronnie)$. In such a circumstance, however, the tree analysing the string final clause would have no resolution to its requirement $?\exists\mathbf{x}.Tn(\mathbf{x})$, precluding all such derivations. Hence, the 'expletive' characterisation of this construction.

3. *There* Constructions

There constructions can be analysed in the same way. *There* projects a metavariable like any other pronoun, but, like *it*, without a bottom restriction, thus permitting merger by a later unfixed node. The analysis of a sentence like *There are two men* thus involves the projection of a metavariable by the subject pronoun and completion of the main predicate provided

[3]See Cann et al. 2001 for a justification of this rule.

by parsing *are*, which I take to be the *be* of existence, i.e. a one-place predicate (see also McNally 1998). An application of Final*Adjunction licenses the parsing of the ASSOCIATE, *two men*. This unfixed tree must merge with the node decorated by the metavariable to satisfy the requirements associated with both nodes. Figure 2 shows that all oustanding requirements are (only) satisfied by the merger of the unfixed node with the subject.[4]



The theory allows a predicate to follow the associate, as in *There are two men sitting on a wall*, with *sitting on a wall* analysable either as a restrictive relative where the structure projected from it is required to contain a copy of the variable introduced by the nominal *men*, giving an interpretation *two men who are sitting on a wall exist*; or as a correlative, in which it is the epsilon term projected from *two men* which is required to be copied into the associated structure, yielding an interpretation *two men exist such that they are sitting on a wall.* On either analysis, the structural properties of the postposed modifying phrases emerge from general properties of LINKed structures (Kempson et. al. 2001 ch 4).

The fact that expletive *there* may be analysed as a pronoun without a bottom restriction does not, however, show that the locative and expletive uses of the expression are closely related. Under the assumption espoused here, that there is no essential difference between expletive pronouns and their non-expletive counterparts and so only a single representation of *there* in English, the properties of the expletive construction should be derivable from those associated with the adverbial, i.e. from its locative and demonstrative characteristics. In fact, these properties do account in a large part for the properties of the expletive construction under the analysis given above.

In the first place, that *there* is a locative accounts for the fact that the associate may determine the form of the main verb. In Figure 2, the requirement for a plural subject is projected by the copula but is not satisfied by *there*, as this expression, not being nominative, does not project agreement

[4]All noun phrases are taken to project expressions of type e with quantification expressed as variable-binding term operators using the epsilon calculus (Kempson et al, ch. 7). The $PLURAL$ requirement on the subject is imposed by the agreement morphology of the verb.

information (only nominative expressions inducing full agreement on finite verbs in Indo-European generally). Because the associate merges with the subject node, its agreement properties can (indeed must) satisfy the requirements imposed by the verb.[5] Thus, one of the aspects of this construction that proves most puzzling for other accounts is directly captured (see e.g. Chomsky 1995).

It is again the locative dimension of the pronoun that accounts for both locational and existential readings of the *there* construction. I suggest that *there* does not assert a locative relation as part of the content (formula value) of some node, but imposes it instead as a condition on substitution of the metavariable it projects. This treats the locative information like gender on personal pronouns as a presupposition of the resulting formula.[6] Representing such presuppositions as subscripts on metavariables, *there* in subject position projects as its formula value, $\mathbf{U}_{LOC(\mathbf{U},\mathbf{V})}$. Anything that substitutes for $\mathbf{U}$ must, therefore, truthfully satisfy the first argument of some locative relation (which I treat as a weak semantic relation, interpretable more or less abstractly depending on context).[7]

The locative relation is itself underspecified since the second argument (the x where something is located) is itself a metavariable which requires to be substituted in order to provide some full presupposition that can be used in determining the appropriateness of the substitution operation for $\mathbf{U}$. This metavariable must itself (by the interpretation of the locative relation) be substituted by some expression denoting some spatial or spatio-temporal entity. With some spatial term substituting $\mathbf{V}$, we derive typical locative readings of the pronoun such as in *There are those two men outside (again).* In parsing such a string we derive a presupposed locative context, $LOC((Two, x, Man(x)), \mathbf{V})$ where $\mathbf{V}$ is substituted by some formula value describable as *outside.* The metavariable may otherwise be substituted by the index of the proposition under construction, S_i. This gives rise to existential readings, since what is being constructed is a statement, $Be(Two, x, Man(x))$ which has a presupposition that 'locates' the two men at the current index, $LOC((Two, x, Man(x)), S_i)$, thus yielding a reading for the sentence: *Two men are (exist) at the current index*, a necessarily existential statement. No-

[5] Where the singular copula appears with a plural associate, the assumption must be that the latter is not 'nominative' and so does not project agreement properties. This can most clearly seen in the contrast between *There am/*is I with my hair in curlers* and *There *am/is me with my hair in curlers.*

[6] See Kempson et al 2001:236, for a characterisation of the anaphoric properties of definite NPs in similar terms.

[7] As a locative adverbial, *there* projects $\mathbf{V}_{LOC(\mathbf{U},\mathbf{V})}$, a distinction that is probably ultimately reducible to the properties of different lexical entailments.

tice further that where **V** is substituted by an index, the dependence of the term expressed by the associate has narrow scope with respect to that index.

Finally, it is the demonstrative force of the pronoun that gives rise to notions of new information connected with the associate (see e.g. Ward and Birner 1995). I assume a relevance-theoretic approach to demonstratives whereby the use of such expressions by a speaker makes manifest to the hearer that some contextually accessible referent has current relevance. The merging of the information provided by the associate with that of *there* signals the relevance of the former: where the associate is definite, there is a foregrounding of a contextually accessible referent, re-presenting it for further consideration; where the associate is indefinite, it is the existence of some object denoted by the associate that is foregrounded, buttressing the existential force derived from the existential verb and the locative property.

Although the hypothesis that adverbial and subject *there* are identical does not provide a complete account of the expletive constructions (e.g. why some quantifiers are excluded from existential readings), it does allow a uniform account of expletive and non-expletive uses of the same pronoun. The demonstrative and locative nature of the pronoun yielding the multiple ways of construing *there* constructions according to: the salience of some spatial location; the definiteness or otherwise of the associate; and the relevance of the latter's being made manifest within the current context. This analysis thus allows the treatment of expletives as a regular, though extended, anaphoric device. The sole difference between pronouns that can be used expletively and those that cannot is that the former have lost their 'bottom restriction' and so may be substituted by unfixed trees. This simple difference provides a means of accounting for expletive uses of pronouns without assuming homonymy, reducing the distinction to an epiphenomenon.

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