Relatives and there-insertion

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This paper offers an explanation for why unexpected things happen when relatives relativise into *there*-insertion contexts. Unlike restrictive relatives, such relatives only allow determiners that are universal or definite (e.g., *{Every, *a} lion there is eats meat*.), they can't stack (e.g., **The sailor there was on the boat there had been on the island died*.), and while they allow *that* or the empty relativiser, they disallow *wh*-relativisers (e.g., *The men {that, ∅, *who} there were on this island are dead by now*.).

1. Introduction

A number of researchers (e.g., Carlson 1977, Safir 1982, Heim 1987, Grosu & Landman 1998) have observed that unexpected things happen when relatives relativise into *there*-insertion contexts. Unlike restrictive relatives, such relatives only allow determiners that are universal or definite. Hence the contrast between the ordinary relatives of (1a) and (2a), and the ungrammatical versions of (1b) and (2b).

(1) a. John has stolen {everything, something, {the, a} watch} that was in Mary's bag.
    b. John has stolen {everything, *something, {the, *a} watch} there was in Mary's bag.

(2) a. They outlined {the, some, four, most, many} differences that are in their various positions.
    b. They outlined {the, *some, *four, *most, *many} differences there are in their various positions.

In addition, as (3b) and (4b) show, such relatives, while allowing *that* or the empty relativiser, disallow the *wh*-relativisers *who* and *which*. In contrast, the restrictive relatives (3a) and (4a) can take the full range of relativisers.

(3) a. The men {that, ∅, who} Palinurus sailed with are dead by now.
    b. The men {that, ∅, *who} there were on this island are dead by now.

(4) a. The light {that, ∅, which} is/shown in this picture is unlikely to disturb anyone.
b. The light {that, ∅, *which} there is in this picture is unlikely to disturb anyone.

Also, relatives that relativise into *there*-insertion contexts can't stack (e.g., (5b)), unlike restrictive relatives (e.g., (5a)). Relatives are stacked when two or more are associated with the same head in a non-conjoined manner.

(5) a. The sailor that was on the boat that had been on the island died.
b. *The sailor there was on the boat there had been on the island died.

The aim of this paper is to provide an explanation for the data in (1)-(5). I will proceed as follows. In section 2, I introduce the semantics used throughout the paper. Section 3 looks at *there*-insertion contexts and gives an analysis of the (in)definiteness effect. Section 4 gives an explanation for a number of interpretation facts from the full range of relative clause-like constructions. Section 5 combines the findings of sections 3 and 4 to account for the data of this introduction. In section 6, additional evidence for the proposed analysis is presented. In section 7, I conclude.

2. The interpretation process

With a dynamic view of interpretation (e.g., Groenendijk & Stokhof 1991), words are typically actions that read some input, perform a simple transformation, and write some output. To make this idea concrete, consider how it might apply to (6).

(6) There is someone. He is walking in the park.

Assume the first sentence translates as an existential quantifier. This adds a new object to its input (provided there is someone in the domain, that is; otherwise the sentence is false), which I'll take to be a sequence of objects from the domain. The resulting output is precisely the kind of input needed to interpret the second sentence, that is, if *he* is associated with the newly introduced object. The second sentence then tests for whether the newly introduced object is *walking in the park*. If the test succeeds, its input is passed on as its output. This process might be pictured as follows, using < for "takes as input" and > for "gives as output":

(7) $\exists <[c_1,\ldots, c_n] >[c_1,\ldots, c_n, c_{n+1}]. W(n+1) <[c_1,\ldots, c_n, c_{n+1}] >[c_1,\ldots, c_n, c_{n+1}].$

In addition to the existential quantifier and simple predicate tests, a dynamic semantics has available a third type of operation: the ability to quantify over inputs and outputs. In what follows, I'll call operators that do this *control* *operators*. The propositional connectives are typical examples of control operators.

2.1. Smart DQMLE

In this section I introduce the semantics used throughout the remainder of the paper. This is a smart dynamic quantified modal logic with exhaustification (henceforth, *DQMLE*). It is based on van Eijck's (1998) *Incremental Dynamics* system (see also Dekker's (1994) system of *Predicate Logic with Anaphora*). The logic is 'smart' because it builds controls on the context into the syntax of its formulas. The logic doesn't use variables, but instead uses term indices to indicate the distance of an argument place to its binding quantifier, counting from the outside in. Locations that indices are linked to can come from the input context (a sequence of objects from the domain), which has size n in the formula (n, ϕ).

DEFINITION 2.1.1. The primitive non-logical vocabulary of *DQMLE* is a set *RC* of relation constants: $P_1^{\,n}$, $P_2^{\,n}$, ... ($n \geq 1$). I'll use capitalised relation names like P, Q, ... as typical members of *RC*. In addition to this non-logical vocabulary, I'll use the following logical vocabulary:

[1] The set N^+ of positive natural numbers;

[2] The control operators ;, $\neg$, T and E, the quantifier $\exists$, and $\top$.

DEFINITION 2.1.2. The set of *DQMLE* formulas, L, is the smallest set containing:

[1] $(n, \top)$ whenever $n \in \mathrm{N}$ (the set of natural numbers);

[2] $(n, \exists\ ; \phi)$ provided $(n{+}1, \phi) \in \mathrm{L}$;

[3] $(n, P^m(v_1,\ldots,v_m)\ ; \phi)$ provided $P^m \in RC$, $v_1,\ldots,v_m \in \mathrm{N}^+$, $\sup(\{v_1,\ldots,v_m\}) \geq n$ and $(n, \phi) \in \mathrm{L}$;

[4] $(n, (\neg\phi)\ ; \psi)$ provided $(n, \phi) \in \mathrm{L}$ and $(n, \psi) \in \mathrm{L}$;

[5] $(n, (T_v\phi)\ ; \psi)$ provided $v \in \mathrm{N}^+$, $(n, \phi) \in \mathrm{L}$ and $(n + e(\phi), \psi) \in \mathrm{L}$;

[6] $(n, (E_X\phi)\ ; \psi)$ provided $X \subseteq \mathrm{N}^+$, $(n, \phi) \in \mathrm{L}$ and $(n + e(\phi), \psi) \in \mathrm{L}$.

If X is a non-empty finite set of indices from N^+, $\sup(X)$ gives the maximum, 0 otherwise.

The presentation of syntax is not yet complete, since T and E require the calculation of the 'existential depth' of a formula. Notation for this is $e(\phi)$. Intuitively, the existential depth of (n, ϕ) calculates the number of positions by which the input sequence has grown after the semantic processing of ϕ. For example, the existential depth of $(n, \exists\ ; \top)$ is 1, for any n. If $(\mathrm{n}, \phi) \in \mathrm{L}$, the existential depth of ϕ is given by:

DEFINITION 2.1.3. Existential depth:

$e(\top) := 0$
$e(\exists\ ;\ \phi) := 1 + e(\phi)$
$e(P(v_1,\ldots, v_m)\ ;\ \phi) := e(\phi)$
$e((\neg\phi)\ ;\ \psi) := e(\psi)$
$e((T_v\phi)\ ;\ \psi) := e(\phi) + e(\psi)$
$e((E_X\phi)\ ;\ \psi) := e(\phi) + e(\psi)$

This completes the presentation of syntax. Every formula has the form (n, ϕ_1 ; ... ; ϕ_k ; $\top$), with k > 0. If k > 0 we will write (n, ϕ_1 ; ... ; ϕ_k ; $\top$) as (n, ϕ_1 ; ... ; ϕ_k). To ease reading, I'll omit unnecessary parentheses whenever possible. For example, I'll write the formula (3, (R(2,3))) as 3, R(2,3), etc. Also, I'll usually write $\exists$; ϕ as $\exists\phi$. Thus L contains such formulas as in (8). However, (9) is not a well-formed formula because $e(\neg\exists P(1)) = 0$ and e($\exists$) = 1, so that 2 is not less than or equal to 0 + 0 + 1.

(8) a. 0, $\exists\exists$.
b. 4, P(2,4).
c. 2, $\exists\exists G$(3,4,2).
d. 0, $\neg\exists P(1)$; $\exists Q(1)$.

(9) *0, $\neg\exists P(1)$; $\exists Q(2)$

I now turn to the semantic definition of satisfaction for *DQMLE*. This takes the form: $[[n, \phi]]^{M,w} < \sigma > \tau$. ($n$, ϕ) is an L-formula. M is a quantified modal logic model with constant domain (see e.g., Fitting & Mendelsohn 1998). w is a world from the set of worlds in M. A world assigns to each predicate symbol with arity n an n-arity relation on D (the domain of M). σ is an input (a.k.a. the anaphoric context). τ is an output. Inputs and outputs {σ, τ, θ, ζ, ...} are finite sequences of elements from D (D*). Upon meeting an existential quantifier, an input gets extended with a single value $o \in D$. Notation for this is σ^o. I'll use $\sigma[n]$ for the n-th element of σ and $l(\sigma)$ for the length of σ. $diffsim_X(\sigma,\tau)$ is used to say that σ, τ differ and that they differ at most in their n-th elements, where $n \in$ X.

DEFINITION 2.1.4. A model M for the non-logical vocabulary *RC* is any quadruple $\langle W,D,R,V\rangle$ satisfying the following conditions:

[1] W is a non-empty set of worlds,
[2] D is a non-empty domain of (plural) objects,
[3] R is a binary accessibility relation on W, i.e., $R \subseteq W \times W$,
[4] V is a valuation function where if $P^n \in RC$, $V(P^n) \in \{g \mid g : W \rightarrow \wp(D^n)\}$.

DEFINITION 2.1.5. The denotation of term v with respect to finite sequence σ is defined as follows: $d_\sigma(v) := \sigma[v]$ if $v \leq l(\sigma)$, undefined otherwise.

DEFINITION 2.1.6. The input output relations σ, τ satisfy L-formula (n, ϕ) with respect to world w (in symbols: $[[n, \phi]]^{M,w} < \sigma > \tau$) as follows:

[1] $[[n, \top]]^{M,w} <\sigma >\tau$ iff $\sigma = \tau$;

[2] $[[n, \exists ; \phi]]^{M,w} <\sigma >\tau$ iff $l(\sigma) = n$ & $\exists o \in \mathrm{D}([[n{+}1, \phi]]^{M,w} <\sigma \wedge o >\tau)$;

[3] $[[n, P(v_1,\ldots, v_m) ; \phi]]^{M,w} <\sigma >\tau$ iff $l(\sigma) = n$ & $\langle d_\sigma(v_1),\ldots, d_\sigma(v_m)\rangle \in [V(P)](w)$ & $[[n, \phi]]^{M,w} <\sigma >\tau$;

[4] $[[n, (\neg\phi) ; \psi]]^{M,w} <\sigma >\tau$ iff $l(\sigma) = n$ & $\neg\exists\theta \in \mathrm{D}^*([[n, \phi]]^{M,w} <\sigma >\theta)$ & $[[n, \psi]]^{M,w} <\sigma >\tau$;

[5] $[[n, (T_v\phi) ; \psi]]^{M,w} <\sigma >\tau$ iff $l(\sigma) = n$ & $\exists\theta \in \mathrm{D}^{e(\phi)}(1 \leq v\text{-}n \leq \mathrm{l}(\theta)$ & $[[n, \phi]]^{M,w} <\sigma >\tau\wedge\theta$ & $[[n{+}e(\phi), \psi]]^{M,w} <\sigma\wedge\theta >\tau)$;

[6] $[[n, (E_X\phi) ; \psi]]^{M,w} <\sigma >\tau$ iff $l(\sigma) = n$ & $\exists\theta \in D^*([[n, \phi]]^{M,w} <\sigma >\theta$ & $\neg\exists\zeta \in D^*(\mathit{diffsim}_X(\sigma,\theta)$ & $[[n, \phi]]^{M,w} <\sigma >\zeta$ & $\forall w' \in W(Rww'$ & $[[n, \phi]]^{M,w'} <\sigma >\zeta \Rightarrow [[n, \phi]]^{M,w'} <\sigma >\theta))$ & $[[n{+}e(\phi), \psi]]^{M,w} <\theta >\tau)$.

DEFINITION 2.1.7.
$\mathit{diffsim}_X(\sigma,\tau)$ iff $l(\sigma) = l(\tau) = n$ & $\exists v \in X(\sigma[v] \neq \tau[v])$ & $\forall m \in \mathrm{N}^+((m \leq n$ & $\neg\exists v \in X(m = v)) \rightarrow \sigma[m] = \tau[m])$.

3. There-insertion

There-insertion contexts have the form in (10). The postverbal DP is called the "associate".

(10) There verb DP (XP).

3.1. Agreement facts

As the data in (11) and (12) shows, the verb has to agree with the associate.

(11) a. There [F_i-is/*are] [F_i-a book] on the table.
b. There [F_i-are/*is] [F_i-some books] on the table.

(12) a. There [F_i-is/*are] likely to be [F_i-a book] on the table.
b. There [F_i-are/*is] likely to be [F_i-some books] on the table.

While *there* satisfies the EPP (T's need for a specifier), it fails to satisfy the requirement that T check off its number features (and possibly others) (see e.g., Chomsky 1995). Consequently, the features must move to T from somewhere inside TP. The associate provides the necessary features, giving rise to a relation between the associate, T and *there be*.

3.2. The associate must be an indefinite

With data like (13), Milsark (1977), Heim (1987) and others, note that the associate must be an indefinite.

(13) There is {a man, *the man, *everyone, *Jim, *he/him} at the door.

Data from bare plurals accords with this observation. While (14a) allows both generic ('Books generally are out of stock') and existential ('Some books are out of stock') readings, (14b) has only the existential reading.

(14) a. Books are out of stock.
 b. There are books out of stock.

This also rules out the possibility of the associate being a trace, which, for example, predicts the impossibility of a reading for (15) where the associate *someone* outscopes *thinks* (see e.g., Williams 1984) and predicts that indefinites extracted from the associate position will necessarily undergo scope reconstruction (see e.g., Cresti 1995). This latter prediction is borne out in (16).

(15) John thinks that there is someone in the house.

(16) How many people do you need there to be at the meeting?
 a. *For what *n*: there are *n* people *x* such that you need *x* to be at the meeting.
 b. For what *n*: you need there to be *n* people at the meeting.

3.3. T for there-insertion contexts

The existential control operator T_v defined in section 2.1 introduces a new context sequence θ that has the length of the existential depth of the formula ϕ over which it scopes, and contains the location *v-n*. It appends θ to its input σ, and requires this to be the output of the ϕ-transition when σ is given as input.

I'll suppose that *there* is T_v, and that feature movement from the associate sets the value of *v*. This gives, for example, (11a), which has the LF (17), the L-formula (18), using *B* for *book* and *O* for *on the table*.

(17) *n*, There$_{n+1}$ [F$_{n+1}$-is] [F$_{n+1}$-a book] on the table.

(18) n, $T_{n+1}(\exists\ ;\ B(n+1)\ ;\ O(n+1))$.

It follows from the semantics of T_v that (18) is interpretable, since the existential quantifier brings about a change in the input that agrees with the addition to the input that T_{n+1} must bring about. If, however, (11a) had encoded either L-formula in (19), then it would have been ill-formed. This is because in the formulas of (19), T_v forces a change to the input that the formula in its scope isn't able to match. The same reasoning captures the data in (13)-(16).

(19) a. $\# n, \exists ; B(n+1) ; T_{n+1}O(n+1)$.
b. $\# n, B(i) ; T_iO(i)$ (where $i \leq n$).

3.4. Schemata for there-insertion sentences

To sum up the findings of this section, the interpretation of T_v in *there*-insertion sentences, while licensing structures of the form (20a), will rule out structures of the form (20b).

(20) a. $n, T_{n+1}(\ldots \exists \ldots)$. (e.g., *There is someone on the life-raft*.)
b. $\#$ n, $T_{n+1}(\ldots)$. (e.g., **There is everyone/Mary/she on the life raft*.)

4. Relative clauses
4.1. Free relatives

Free relatives have overtly realised relative clause internal heads (see e.g., Grosu 1996). They always return contextually restricted exhaustive values (see e.g., Zeevat 1994, Butler 2001). We say that a value is exhaustive if a stronger value can't be found. A value is stronger than value *v* if it necessarily entails *v*. For example, the free relative in (21a) returns a maximum value, since this will be the strongest value (suppose the maximum true value is £5,000, then this will necessarily entail all other true values: £4,000, £400, £4, etc.), and the free relative in (21b) returns a minimum value, since this will be the strongest value (suppose the minimum true value is £5,000, then this will necessarily entail all other true values: £6,000, £60,000, £600,000, etc.).

(21) a. Mary has seen what Barbara can spend.
b. Mary has seen what Barbara can live on.

4.2. E for relatives

I'll suppose that the exhaustification operator E_X is the topmost part of every CP-projection, and that *wh*-movement's *raison d'être* is to raise phrases to [spec, CP] to place their indices in *X*.

$E_X\phi$, as defined in section 2.1, works by insuring that there is no output ζ that is different from θ with respect to an *n*-th element, where $n \in X$, and stronger than θ. An output ξ will only be stronger than θ if it is a different output and every accessible world that supports ϕ with input σ and output ξ also supports ϕ with input σ and output θ. If no output ξ can be found, then θ must be exhaustive with respect to the contents of *X*. Taking σ to be the input and θ to be the output of a transition, note that the only source for variation between σ and θ will be from extensions to σ brought about by occurrences of existential quantifiers. Also, note that E_X's presence in a formula will have no truth-conditional effect if all indices in X happen to be greater than $l(\theta)$. As a consequence, any real application of E_X will be in situations where σ and θ differ and there are indices n in X such that $l(\sigma) < n \leq l(\theta)$.

To trigger a truth-conditional effect from E, we will assume that *what* introduces an existential quantifier. So, (21b), having the LF (22a), encodes the interpretable L-formula (22b), using B for *Barbara can live on* and M for *Mary has seen*. In (22b), the existential quantifier that introduces sequence location n+1 falls under the scope of an E that has registered its index. This forces an exhaustive value for n+1 with respect to the predicate context B.

(22) a. n, Mary has seen [$_{\text{CP}}$ $E_{\{n+1\}}$ what Barbara can live on n+1].
  b. n, $E_{\{n+1\}}\exists B(n+1)\ ;\ M(n+1)$.

Notably, (22b) shares the same interpretation as the quantified modal logic formula (23), which, given the intuitive interpretation of B (*Barbara can live on*) is equivalent to (24), which returns the minimum value that Barbara can live on.

(23) $\exists x(B(x) \wedge \neg\exists y(y \neq x \wedge B(y) \wedge \Box(B(y) \rightarrow B(x))) \wedge M(x))$.

(24) $M(min(\lambda y\ .\ B(y)))$.

4.3. Comparatives

To be interpreted, comparatives need, in addition to an external head, a *than*-clause internal head. This latter head must return an exhaustive value. This follows immediately from having CP encode E, giving, for example, (25a), which has the LF (25b) with internal head ∃-things, the L-formula (25c), using M for *John was saying about Mary*, Y for *John was saying about you* and N for *nastiness*.

(25) a. John said nastier things about Mary than he did about you.
  b. n, John said nastier things about Mary than [$_{\text{CP}}$ $E_{\{n+1\}}$ ∃-things he did say n+1 about you].
  c. n, $\exists\ ;\ M(n+1)\ ;\ E_{\{n+2\}}\exists Y(n+2)\ ;\ N(n+1) > N(n+2)$.

In (25c) the internal head falls under the influence of E, making (25c), given the usual interpretation of Y (*John was saying about you*) equivalent to (26), in which the *than*-clause returns the maximum *nastiness that John said about you* (see e.g., von Stechow 1984).

(26) $\exists x(M(x) \wedge N(x) > max(\lambda y\ .\ \exists z(Y(z) \wedge N(z) = y))$.

4.4. Non-restrictives

Non-restrictives require *wh*-relativisers (see e.g., (27a)). These are essentially anaphoric pronouns. This gives (27a) the LF-structure (27b) which encodes the L-formula (27c), using H for *has just arrived* and M for *you wanted to meet*. Notably, in (27c), E is left without anything to influence. As a consequence, with the one-place input sequence [*john*], (27c) translates into the predicate logic formula (27d).

(27) a. John, {who, *that, *∅} you wanted to meet, has just arrived.
b. 1, John has just arrived. 1, $[_{\text{CP}}\ E_{\{n+1\}}\ n{+}1$. you wanted to meet n+1].
c. 1, $H(1)$ <[*john*] >[*john*]. 1, $E_{\{1\}}M(1)$ <[*john*]> [*john*].
d. $H(john) \wedge M(john)$.

That E in (27c) has no truth-conditional effect is welcome. If it had, then it would have entailed that you wanted to meet only John, which is not an entailment of (27a).

4.5 Ordinary restrictives

Ordinary restrictives optionally take *wh*-relativisers (recall (3a) and (4a)). These act as abstraction operators. This gives (28a) the LF-structure (28b) which directly encodes the L-formula (28c). As was the case with non-restrictives, this leaves E without anything to influence. As a consequence, (28c) will translate into the predicate logic formula (28d), using M for *wanted to meet* and A for *has just arrived*.

(28) a. Someone who you wanted to meet has just arrived.
b. n, [Someone $[_{\text{CP}}\ E_{\{n+1\}}\ \lambda x$. you wanted to meet x]] has just arrived.
c. n, $\exists$; $E_{\{n+1\}}M(n+1)$; $A(n+1)$.
d. $\exists x(M(x) \wedge A(x))$.

That E in (28c) has no truth conditional effect is again welcome. If it had, then it would have entailed that you wanted to meet only the *someone that has just arrived*, which is not an entailment of (28a).

4.6. Schemata for relatives

To sum up the findings of this section, when the head of a relative clause contains an existential quantifier, we get the following possible schemata:

(29) a. n, ... $E_{\{n+1\}}$(... $\exists$ ...) ... where the head is relative clause internal
b. n, ... $\exists$ ... $E_{\{n+1\}}$(...) ... where the head is relative clause external

If (29a) holds, the head falls under the influence of an E_X that has registered its index, forcing the location it introduces to take an exhaustive reading with respect to the contents of the material under E_X's scope. If (29b) holds, the head lies outside of E_X's influence, allowing it to take a non-exhaustive reading. Notably, in (29b), E_X carries out its usual role of requiring its output to necessarily entail all other possible outputs with respect to the contents of X (here n+1). It's just that in (29b), for E_X, there is no newly introduced value n+1 to direct.

5. Relatives that relativise into there-insertion contexts

The previous section gave an analysis for relatives and section 3 gave an analysis for *there*-insertion contexts. Together, these analyses predict what happens when *there*-insertion contexts are relativised into.

5.1. The restriction on determiners explained

Since the head of the relative clause provides, when relativising into a *there*-insertion context, the associate, T will rule out structures (30b,c,d). In (30b), the head doesn't involve an existential quantifier. In (30c,d), the head is outside T's scope. Notably, (30a), the only interpretable formula in (30), has T_{n+1} requiring that the existential quantifier adds the location n+1 to the input sequence, which E will thereafter force to take an exhaustive interpretation.

(30) a. n, ... $E_{\{n+1\}}$(... T_{n+1}(... $\exists$ ...) ...) ...
b. # n, ... $E_{\{i\}}$(... T_i(...) ...) ... (where $i \leq n$)
c. # n, ... $E_{\{n+1\}}$(... $\exists$ ... T_{n+1}(...) ...) …
d. # n, ... $\exists$ ... $E_{\{n+1\}}$(... T_{n+1}(...) ...) ...

This buys us a solution to the puzzle of the restriction on determiners in (1b) and (2b). Suppose relative clauses are adjoined to NP (see e.g., Partee 1973, and contra a raising analysis e.g., Vergnaud 1974). This forces external determiners to remain external. But if the relative clause is to be interpretable, T will require an internal head that is an indefinite. This non-overt internal head will fix the denotation of the relative clause, so that an external determiner can only support in kind the fixed denotation. Since E will make the denotation of any internal head exhaustive, the only external determiners acceptable will be those that continue to guarantee the same interpretation, e.g., definites and universals, ruling out indefinites and cardinals.

As an example, this gives (31a) the LF in (31b), which encodes the L-formula (31c), using J for *John has stolen* and B for *was in Mary's bag*.

(31) a. John has stolen everything there was in Mary's bag.
b. n, John has stolen [~~everything~~ [$_{\text{CP}}$ $E_{\{n+1\}}$ n+1 there$_{n+1}$ [F$_{n+1}$-was] [F$_{n+1}$-$\exists$] in Mary's bag]].
c. n, $E_{\{n+1\}}T_{n+1}\exists B(n+1)$; $J(n+1)$.

Notably, in (31c), the semantic contribution of *everything* is lost. The role of *everything* is rather to lend support to the process of interpreting (31c), which, given the usual interpretation of *B* (*was in Mary's bag*), is equivalent to (32).

(32) $\forall x(B(x) \rightarrow J(x))$.

5.2. The inability to stack explained

Relatives are stacked when two or more are associated with the same head in a non-conjoined manner. Stacking is only possible if the head is outside its relative clause, and so free to join the relatives in a stack via set-intersection. Having external heads, ordinary restrictives can stack (e.g., (5a)). Since relatives that relativise into *there*-insertion contexts must have internal heads, they can't stack (e.g., (5b)).

5.3. The restriction on relativisers explained

Who and *which* in ordinary restrictives (e.g., (3a), (4a)) have to be abstraction operators (see e.g., Partee 1973). Suppose they can only be abstraction operators. Their exclusion from (3b) and (4b) follows, since they would be taking up the structural slot needed by the non-overt indefinite head that licenses the *there*-insertion construction.

6. Two additional facts

6.1. The associate as a relative clause relativising into a there-insertion context

The idea that the semantic contribution of *everything* in (31a) is in effect lost at LF is strengthened by the observation that it is possible to have as the associate of a *there*-insertion context a relative clause that relativises into a *there*-insertion context. We might expect this to introduce conflict: while the *there*-insertion context of which the relative is the associate will require an indefinite, the relative itself will require an exhaustive determiner like *every* or *the*, as (33) confirms.

(33) There will be {everyone, the people, *four people} that there should be at the party.

As (34b/c) shows, conflict is averted under the current analysis, since when the relative clause relativises into a *there*-insertion context, there is a non-overt indefinite internal head to take over the semantic contribution of the external determiner. This gives both instances of *there* exactly what they need: an indefinite associate that will change the input to match the extensions to the input they bring about.

(34) a. There will be everyone that there should be at the party.

b. n, There$_{n+1}$ will [F$_{n+1}$-be] [~~everyone~~-[$_{CP}$ $E_{\{n+1\}}$ n+1 that there$_{n+1}$ should [F$_{n+1}$-be] [F$_{n+1}$-∃] at the party]] at the party.

c. n, $T_{n+1}(E_{\{n+1\}}T_{n+1}\exists SAP(n+1)\ ;\ AP(n+1))$.

6.2. Coordinating relatives

Grosu (1994) notes that, while the coordinate restrictive relatives in (35a) may be construed as purporting to identify a single set of boys all of whom both sang and danced, the coordinate clauses in (35b) do not purport to identify the same set of people, and (35c) does not carry the implication that John bought and Mary sold the same thing(s).

(35) a. The boys who sang and who danced...

b. The people that there were at Bill's party and that there had been at Mary's party...

c. What(ever) John bought and what(ever) Mary sold...

This further confirms the idea that *there*-insertion contexts pattern with free relatives by taking internal indefinite heads, giving the LF structures in (36), respectively.

(36) a. n, The boys [[$_{CP}$ $E_{\{n+1\}}$ λx . x sang] and [$_{CP}$ $E_{\{n+2\}}$ λx . x danced]] ...

b. n, The people-[[$_{CP}$ $E_{\{n+1\}}$ n+1 that there were [∃ people] at Bill's party] and [$_{CP}$ $E_{\{n+2\}}$ n+2 that there had been [∃ people] at Mary's party]] ...

c. n, [[$_{CP}$ $E_{\{n+1\}}$ What John bought n+1] and [[$_{CP}$ $E_{\{n+2\}}$ what Mary sold n+2]] ...

7. Conclusion

In this paper I've argued that relatives that relativise into *there*-insertion contexts have a non-overt internal indefinite head, that *there* is not semantically vacuous, rather it's the existential control operator *T*, that every CP encodes an exhaustification operator *E*, and that *wh*-movement and feature movement have a semantic function. In the case of *wh*-movement, it tells *E* what it should control. Feature movement is used likewise for telling *T* what it should control. Placed together, these components give a mechanism that feeds off the observation that the location of a relative clause's head can force an exhaustive reading. This accounts for why relativising into a *there*-insertion context leads to the exclusion of determiners that fail to match the exhaustive reading, why such relatives disallow *wh*-relativisers and why they can't stack. Notably, these results come from a single syntax/semantics setup that fits all types of relatives, including ordinary restrictives, comparatives, free relatives and non-restrictives. The next step is to see how this picture fits with other *wh*-

constructions e.g., questions, clefts, correlatives etc., and to see the implications of the analysis cross-linguistically.

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