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0. *Pas de deux*: negation and spatiotemporal quantification. A *pas de deux* locks in step negation and quantification over times, places or events, in any clause prefixed with both (Partee 1973, Burge 1974, Ogihara 1995):

- (1) It didn’t rain.
- (2) It isn’t sunny.

Given the density of space-time and its states and events, it would trivialize (1)-(2) for negation to follow quantification, as there is always somewhere rain or sunshine isn’t:

- (3) * $\exists e \neg \text{rain}(e)$
- (4) * $\exists e \neg \text{sunny}(e)$

Even where (1)-(2) are false, it is still too often that scattered among the rain or sunshine *then and there*, there is where it isn’t, again trivializing the translation of (1)-(2) that puts negation after quantification:

¹ For discussion *sine qua non*, much thanks to Elena Herburger, Yael Sharvit and Anna Szabolcsi, and thanks too to audiences at the University of Arizona, Tucson and Stanford University and to two anonymous reviewers for sound and critical advice.

- (5) * $[\exists e: \text{then}\&\text{there}(e)](\text{Past}(e) \ \& \ \neg\text{rain}(e))$
 (6) * $[\exists e: \text{then}\&\text{there}(e)](\text{Present}(e) \ \& \ \neg\text{sunny}(e))$

Rather, negation must lead it— not as in (7)-(8), too global for the meaning of (1)-(2) — but to say of *then and there* that it is a sterile zone bereft of rain or sunshine, (9)-(10) (Ogihara 1995):

- (7) * $\neg\exists e(\text{Past}(e) \ \& \ \text{rain}(e))$
 (8) * $\neg\exists e(\text{Present}(e) \ \& \ \text{sunny}(e))$
 (9) $\neg[\exists e: \text{then}\&\text{there}(e)](\text{Past}(e) \ \& \ \text{rain}(e))$
 (10) $\neg[\exists e: \text{then}\&\text{there}(e)](\text{Present}(e) \ \& \ \text{sunny}(e))$

As this is the only meaning for (1)-(2), it must be a fact of grammar that it regiments translation as in (9)-(10), fixing the relative scope of negation and quantification as shown. To be more faithful to the syntax of English, taken since Chomsky 1957 to be Tense-Neg-VP, the canonical logical form for (1)-(2) refines (9)-(10) as (11)-(12):

- (11) $[\lambda E^{\circ}: \text{then}\&\text{there}[E^{\circ}]][\lambda E: \text{Past}[E] \ \& \ \text{therein}[E, E^{\circ}]] \ \neg[\exists e: Ee] \ \text{rain}(e)^{2,3}$

² Or, equivalently, for present purposes:

- (i) $[\lambda E: \text{then}\&\text{there}[E]] (\text{Past}[E] \ \& \ \neg[\exists e: Ee] \ \text{rain}(e))$

The text treats Tense itself as a restricted, definite description of spatiotemporal regions, events or states. All the logical forms to follow do the same but could be redone as in (i).

³ The metalanguage is monadic second-order logic (*v.* Schein 2006).

In first-order logic, quantification is restricted to argument position. Confronted with a natural language sentence such as (i) or (ii), translation into first-order logic must interpolate a relation between objects, even if the quantification is meant predicatively as in (ii).

- (i) a. There is something that Sandy Koufax is, *viz.*, the pitcher on 9 September 1965 of the greatest game ever pitched.
 b. Sandy Koufax is something, *viz.*, the pitcher on 9 September 1965 of the greatest game ever pitched.

$\exists y(\mathbf{s} = y)$
 $[\lambda y: \text{pitcher} \dots [y]](\mathbf{s} = y)$

- (ii) a. There is something that Sandy Koufax is, *viz.*, Jewish.
 b. Sandy Koufax is something, *viz.*, Jewish.

$\exists y(\mathbf{s} \text{ is-one-of } y)$
 $[\lambda y: \forall z(z \text{ is-one-of } y \leftrightarrow \text{Jewish}(z))](\mathbf{s} \text{ is-one-of } y)$; alternatively, $\mathbf{s} \text{ is-one-of } \{z: \text{Jewish}(z)\}$
 Therefore, $\text{Jewish}(\mathbf{s})$.

In monadic second-order logic, quantification is enlarged to include quantification into monadic predicate position, for which purpose second-order variables are introduced, allowing the translation in (iiib) without assistance from a relation such as *is-one-of*:

(iii) a. Sandy Koufax is Jewish.

J_s

b. Therefore, there is something that Sandy Koufax is. (By second-order existential generalization)

$\exists X J_s$.

The example in the text is the first of many that put at issue the translation and logical form of sentences that quantify in the nominal restriction to (in)definite descriptions and restricted quantifiers, like in (iv)-(v), answering the rhetorical question posed:

Fragile lives, what about them?—

Fragile life, what about it?—

(iv) One will thrive, and one will wither.
Some will thrive, and some will wither.
All will thrive, and all will wither.

(v) One of them will thrive, and one of them will wither.
Some of it/them will thrive, and some of it/them will wither.
All of it/them will thrive, and all of it/them will wither.

Taking the nominal restrictions, singular, plural or mass, to be predicates, monadic second-order logic affords translation such as (vi) (suppressing singular, plural/mass):

(vi) $[\lambda X: \forall x(Xx \leftrightarrow \text{fragile life}(x))]$ ([Some $x : Xx$] x will thrive, and [Some $x : Xx$] x will wither)

A first-order logic is however committed to translations such as (vii):

(vii) $[\lambda y: \forall x(x \text{ is-some-of } y \leftrightarrow \text{fragile life}(x))]$ ([Some $x : x \text{ is-some-of } y$] x will thrive,
and [Some $x : x \text{ is-some-of } y$] x will wither)

An innocent might look at (v), and see in the partitive *of* overt expression of the relation ‘*is-some-of*’ in (vii), and in turn she may find in its absence from (iv), plain indication of the second-order quantification in (vi). Those who are not the prisoner of my convictions (Schein 2006) are freer to mix and match or to regiment the translation of (iv)-(v) in yet other ways. Here monadic second-order logic is convenient in two respects. First, in talking about the framing eventy E and framed e such that Ee , the logical syntax is constant reminder that the second-order term E is multiply-denoting, dividing its reference one way or another, like any count or mass noun. How it does so is always at issue, and however it does so, the values of e are its denotata.

The second convenience is just that second-order logic relieves definite description of existential commitment:

(viii) (Comprehension) $\exists X \forall x(Xx \leftrightarrow \Phi[x])$

(ix) $\exists X \forall x(Xx \leftrightarrow x \neq x)$

In validating Comprehension (viii) and in particular its instance in (ix), neither second-order existential quantification nor second-order definite description entails the existence of anything that satisfies the description Φ . Hence, $[\lambda X: \Phi]$ is glossed “what(ever) Φ if any that there be”.

(12) $[\lambda E: \text{then}\&\text{there}[E^*]][\lambda E: \text{Present}[E] \ \& \ \text{therein}[E, E^*]] \neg[\exists e: Ee] \text{ sunny}(e)$

The spatiotemporal restriction to *then&there* is often understood to be demonstrative in a context in which (1)-(2) is uttered (Partee 1973, Burge 1974).⁴ Yet, it may be explicitly disavowed as such:

(13) Once upon an unknown time and place in darkest rainforest, it didn't rain.

(14) $[\exists E^*: \text{once upon...}[E^*]][\lambda E: \text{Past}[E] \ \& \ \text{therein}[E, E^*]] \neg[\exists e: Ee] \text{ rain}(e)$

The spatiotemporal frame adverbial, *once upon an unknown time and place...*, describes the spatiotemporal region where what wasn't—rain—wasn't. Canonical logical form for negation (15) is thus divided between description Ψ of what there isn't and reference or description Φ of the spatiotemporal region where there was none of it:

(15) a. $[\lambda E^*: \Phi[E^*]][\lambda E: \ \& \ \text{Tense}[E] \ \& \ \text{therein}[E, E^*]] \neg[\exists e: Ee] \Psi[e]$

b. $[\exists E^*: \Phi[E^*]][\lambda E: \ \& \ \text{Tense}[E] \ \& \ \text{therein}[E, E^*]] \neg[\exists e: Ee] \Psi[e]$

Negated, tensed sentences never escape reference, tacit or spoken, to spatiotemporal regions that are asserted to be sterile of what is described in the scope of negation.

If the logical form of negated, tensed sentences indeed distinguishes the *e* that isn't so-and-so from the *E* wherein it isn't, it is then a matter of syntax which phrases in a negated sentence describe *e* and which *E*, provided that logical form offers both, which is all that tells apart (16) and (17):

(16) Under the Southern New England sky for two hours, it wasn't calm for two minutes.

(17) # Under the Southern New England sky for two minutes, it wasn't calm for two hours.

Despite a focus on evidence from negated, tensed sentences, the argument's conclusion must be that negated or not, a sentence may divide its phrases between description of the framed *e* and the framing *E*, as much as this appears to have nothing to do with negation itself and everything to do with spatiotemporal reference and quantification:

(18) Under the Southern New England sky for two hours, it was calm for two minutes.

(19) # Under the Southern New England sky for two minutes, it was calm for two hours.

Some further notational conventions: i. Brackets '['.]' indicate that the enclosed variables occur free in the (possibly) complex formula to which the bracketing is appended; ii. spoken *all, some, the, etc.* appear as such in logical form, reserving '∀', '∃', and 'ι' for inaudible, interpolated logical form.

⁴ Burge (1974: 218 n.11) cites Russell (1940: ch. VII) and Reichenbach (1947: 284-298) for the insight that tensed constructions contain a demonstrative element and Prior (1968) for its spurious rejection.

- (20) $[\exists E: \text{Under the SNE sky for 2 hr./min.}[E]][\exists E: \text{Past}[E] \ \& \ \text{therein}[E,E]]$
 $[\exists e: Ee] \text{ it be calm for 2 min./hr.}[e]$

So it is that the contrast in (16) and (17) is repeated in (18) and (19) derived from the logical form (20).

Because no reading of (21) is equivalent to (23), the first-order (*i.e.*, distributive) event quantification in (15) and (20), absent from (22), owes its presence to an adverbial phrase or adverb, (23)-(26), among which must be *not*:⁵

- (21) Under the Southern New England sky for two hours, it was calm.
(22) $[\exists E: \text{Under the SNE sky for 2 hr.}[E]][\exists E: \text{Past}[E] \ \& \ \text{therein}[E,E]] \text{ it be calm}[E]$
(23) Under the Southern New England sky for two hours, it was *sometimes* calm.
(24) Under the Southern New England sky for two hours, it was *often* calm.
(25) Under the Southern New England sky for two hours, it was *mostly* calm.
(26) Under the Southern New England sky for two hours, it was *rarely* calm.

Thus canonical logical forms for tensed sentences are (27) without the intrusion of an adverb and (28) with an adverb of event quantification:

- (27) a. $[\exists E: \Phi[E]][\exists E: \ \& \ \text{Tense}[E] \ \& \ \text{therein}[E,E]] \Psi[E]$
b. $[\exists E: \Phi[E]][\exists E: \ \& \ \text{Tense}[E] \ \& \ \text{therein}[E,E]] \Psi[E]$
(28) a. $[\exists E: \Phi[E]][\exists E: \ \& \ \text{Tense}[E] \ \& \ \text{therein}[E,E]] [\text{Adv } e: Ee] \Psi[e]$
b. $[\exists E: \Phi[E]][\exists E: \ \& \ \text{Tense}[E] \ \& \ \text{therein}[E,E]] [\text{Adv } e: Ee] \Psi[e]$

The logician's $\neg\Psi$ is no sentence of natural language, not even (1) or (2). There is always reference to framing events E that $\Phi[E]$, and *not* is “noughtly”, an adverb, not a connective:

- (29) a. $[\exists E: \Phi[E]][\exists E: \ \& \ \text{Tense}[E] \ \& \ \text{therein}[E,E]] [\text{No } e: Ee] \Psi[e]$
b. $[\exists E: \Phi[E]][\exists E: \ \& \ \text{Tense}[E] \ \& \ \text{therein}[E,E]] [\text{No } e: Ee] \Psi[e]$

Spatiotemporal density prompts a further observation:

- (30) (Under the Southern New England sky), it wasn't (ever) calm.

In having in mind the airspace of a summer afternoon's flight, (30) says there was not a calm within it (Ogihara 1995), as per above. More often than not, (16) is less than report of a perfect storm. It does not entail that there was not in any sub-region of that airspace

⁵ Combinations of tense and aspect other than the simple past and stative aspect of (21) might also license existential event quantification. The example is chosen rather to demonstrate that *not* like other adverbs is more event quantification beyond whatever tense and aspect is about.

at any moment in flight a calm without turbulence. If not report of a perfect storm, then some other standard is intended and understood for parsing airspace and flight time into events worthy of current notice. It suffices for (16) that each of these flight segments is disturbed by some turbulence. Some event segmentation is presumed even when little else is known about the spatiotemporal region at issue:

- (31) George: Once upon a time—I don't know when, don't ask me—nothing happens.
 Jerry: What do you mean “nothing happens”? Never, nothing happens. Always, *something* happens. You just might not know about it if you haven't been invited.⁶

- (32) * $\exists T \neg[\exists e: Te]$ Nothing happens[*e*]

Despite the unknown whereabouts and George's blind quantification over it, (31) still does not sink to the vacuous assertion (32) of time and place so confined that nothing noteworthy happens to happen within it. The existence of such is not what Jerry objects to. At issue is whether or not there be time and place with events therein all large enough for current notice and worthy of television in which nothing happens. Reference to time and place and to events and states therein never escapes an implicit standard for what is to count for current notice—for how to parse it all into times, places, events and states.⁷

Negation in (29) (and the other adverbs falling under (28)) is like a modal operator quantifying over those times, places, events or states *e* (rather than worlds *w*) that are noticeable (rather than accessible) according to some standard (rather than modal base). In §§2-3, the standards for parsing space-time loom large in the explanation of what negated sentences mean—yet, only the weakest, most banal and uncontroversial of standards.

Description of the framing *E* often mentions landmarks within, the clouds across Southern New England:

- (33) Close to the clouds across the Southern New England sky for two hours, it was (not) calm for two minutes.

Mentioning them for the framing *E*, the point is often to refer to them again as landmarks for the framed *e*:

- (34) Close to the clouds across the Southern New England sky for two hours, it was (not) calm for two minutes underneath.
 (35) Close to the clouds across the Southern New England sky for two hours, it was (not) calm for two minutes underneath them.

⁶ Freely adapted with apologies from *Seinfeld*, “The Pitch,” Season 4 Episode 3, 16 September 1992.

⁷ I cannot anticipate what commitments would arise in properly characterizing how a token of *then&there* denotes—whether a formal mereotopology (*v.*, *e.g.*, Casati & Varzi 1999) would suffice or it requires appeal to a full-throated theory of spatial perception and orientation, event segmentation and object perception (*v.*, *e.g.*, Palmer 1999, Shipley & Zacks 2008, Spelke 1990).

Referring to them again, the point is not to squeeze the clouds across Southern New England into a two-minute flight segment. It is to say something just about those of them then in that segment. The unspoken and spoken pronouns in (34)-(35) are anaphoric definite descriptions further restricted to the local event e :

- (36) [The X : clouds of SNE[X]] [$\uparrow E$: close-to for 2 hr. [E^* , X]] [$\uparrow E$: Past[E] & there[E, E^*]],
 $(\neg) [\exists e: Ee](\text{calm for 2 min.}[e] \& [\uparrow Y: [\forall y: Yy]Xy \& \text{there}[e, Y]])^8$

Close to the clouds across the Southern New England sky for 2 hours, there was(n't) a calm e for 2 minutes underneath [them that were at e].

Close to the clouds across the Southern New England sky for 2 hours, there was(n't) a calm e for 2 minutes underneath [those clouds across the Southern New England sky that were at e].

Sentences (37) and (38), also understood not to squeeze the entire Southern New England sky into the flight's two-minute segments, export their (in)definite descriptions and quantify-in definite descriptions also restricted to the local event e :

- (37) Aloft for two hours, it was (not) calm for two minutes underneath the clouds across the Southern New England sky.
 (38) Aloft for two hours, it was (not) calm for two minutes underneath some thousands of clouds scattered across the Southern New England sky.

- (39) ...[The/Some X : clouds of SNE[X]]... $(\neg)[\exists e: Ee](\dots[\uparrow Y: [\forall y: Yy]Xy \& \text{there}[e, Y]]\dots)$
...the clouds across the Southern New England sky..., there was(n't) a calm e for 2 minutes underneath [them that were at e].

- (40) * ...[The/Some X : clouds of SNE[X]]... $(\neg) [\exists e: Ee](\dots X \dots)$

If logical form distinguishes the framing and the framed, any given (in)definite description may be thought of as grounded in the global frame of reference for the framing events E or as dependent on the local frames of reference for the framed events e . A sentence with a spatiotemporal frame adverbial, as in (34)-(35) and (37)-(38), with or without negation therein, happens to be a context, among many in natural language, for *trans-frame-of-reference reference* (§4), where as in (39) reference from within the local frame of reference to the so-and-so of the global frame of reference is restriction of the so-and-so to the local frame of reference. Equally at home in natural language, *definite description by abstraction trans-frame-of-reference* (§5) culls the so-and-so it refers to in the global frame of reference from across the local frames of reference, as in (41)-(46), which refer to all and only that airspace or flight time (un-)disturbed by turbulence—less than the airspace and total flight

⁸ Only to compress logical forms, ' $\neg[\exists e: Ee]$ ' here and elsewhere rather than the official idiom '[No $e: Ee$]' (*v.* (29)). Also suppressed is discussion of how adverbial phrases such as *for 2 minutes* come to license the existential event quantification shown. Presumably, they too should be quantificational rather than predicative.

of two-hours but more than the airspace and flight time of a two-minute segment that was(‘nt) a calm:⁹

- (41) a. the airspace(s) where/ flight time(s) when underneath the clouds of Southern New England it was(n’t) calm.
 b. where/when(ever) underneath the clouds of Southern New England it was(n’t) calm.
- (42) $[1E: [\text{The } X: \text{SNE clouds}[X]][1E^{\circ}: \text{under}[E^{\circ}, X]][1E^{\circ\circ}: \text{Past}[E^{\circ\circ}] \& \text{there}[E^{\circ}, E^{\circ\circ}]]$
 $\neg[\exists e: Ee \& \text{there}[E^{\circ\circ}, E]]\text{calm}(e)]$
- (43) a. the airspace(s) where/ flight time(s) when close to the clouds across Southern New England, it was(n’t) calm underneath (them).
 b. where/when(ever) close to the clouds across Southern New England, it was(n’t) calm underneath (them).
- (44) $[1E: [\text{The } X: \text{SNE clouds}[X]][1E^{\circ}: \text{close-to}[E^{\circ}, X]][1E^{\circ\circ}: \text{Past}[E^{\circ\circ}] \& \text{there}[E^{\circ}, E^{\circ\circ}]]$
 $(\neg) [\exists e: Ee \& \text{there}[E^{\circ\circ}, E]](\text{calm}(e) \& [1\mathcal{Y}: [\forall y: \mathcal{Y}y]Xy \& \text{there}[e, \mathcal{Y}]] \text{under}(e, \mathcal{Y}))]$
- (45) a. the airspace(s) where/ flight time(s) when it was(n’t) calm underneath the clouds of Southern New England.
 b. where/when(ever) it was(n’t) calm underneath the clouds of Southern New England.
- (46) $[1E: [\text{The } X: \text{SNE clouds}[X]][1E^{\circ}: \text{Past}[E^{\circ}]]$
 $(\neg) [\exists e: Ee \& \text{there}[E^{\circ}, E]](\text{calm}(e) \& [1\mathcal{Y}: [\forall y: \mathcal{Y}y]Xy \& \text{there}[e, \mathcal{Y}]] \text{under}(e, \mathcal{Y}))]$

A *canonical logical form* (28) divided between description of the framing E and the framed e , *trans-frame-of-reference reference and abstraction*, and the *event segmentation* necessary to understand tensed sentences rest on a few observations, largely descriptive, about spatiotemporal reference and quantification in natural language, which also serve to fix that negation is as it is in (29). For all tensed sentences to fall under the same regime, these elementary aspects of logical form join the more tendentious neo-Davidsonian thesis (Castañeda 1967, Parsons 1990) that *all* nominal arguments are arguments in their own, separate relation to events, spoken, as in *close to the clouds* ‘[the X : clouds(X)]close-to[E, X]’, or left silent as in ‘[the X : clouds(X)] Theme[E, X]’. There is then little to tell apart the logical forms for (47) and (49), except for the substitution of a thematic relation:

- (47) Close to the clouds, it was (not) calm for two minutes (underneath).
- (48) $[\text{The } X: \text{clouds}[X]][1E^{\circ}: \text{close to}[E^{\circ}, X]][1E: \text{Past}[E] \& \text{there}[E, E^{\circ\circ}]]$,
 $(\neg) [\exists e: Ee](\text{calm for 2 min.}[e] \& [1\mathcal{Y}: [\forall y: \mathcal{Y}y]Xy \& \text{there}[e, \mathcal{Y}]] \text{underneath}(e, \mathcal{Y}))]$
- (49) The clouds were (not) calm for two minutes (underneath).
- (50) $[\text{The } X: \text{clouds}[X]][1E^{\circ}: \text{Theme}[E^{\circ}, X]][1E: \text{Past}[E] \& \text{there}[E, E^{\circ\circ}]]$,
 $(\neg) [\exists e: Ee](\text{calm for 2 min.}[e] \& [1\mathcal{Y}: [\forall y: \mathcal{Y}y]Xy \& \text{there}[e, \mathcal{Y}]] \text{underneath}(e, \mathcal{Y}))]$

⁹ Assumed in (42),(44), (46) and later is that, absent negation, *when(ever)* and *where(ever)* are among the adverbs or adverbial phrases (*v. for two minutes* in (18), (23)-(26)) that license existential event quantification when simple past tense and stative aspect does not (*v.* (21)).

If so, it becomes again a matter of syntax whether a phrase with a silent thematic relation, ‘[the X : clouds(X)] Theme[$_$, X]’ describes the framing E or the framed e , with a difference in meaning that impersonal constructions (§2) elicit:

- (51) In flights across Southern New England that July, the clouds of a hot summer afternoon were not calm (underneath) for even two minutes.
- (52) In flights across Southern New England that July, there weren’t the clouds of a hot summer afternoon calm (underneath) for even two minutes.

There is not a summer afternoon in Southern New England with two minutes’ calm lacking some turbulence somewhere in the region’s airspace, as (52) reports. Yet, (51) is a pilot’s exaggeration. The turbulence is spotty and intermittent so that many a flight enjoys many a flight segment of two minutes (and longer) unperturbed by turbulence near that segment’s clouds.¹⁰

The neo-Davidsonian logical form matters twice. First, as above, the logical syntax is the same for ‘[the X : clouds(X)] Theme[E , X]’ and any other prepositional phrases. Second, in translating verb or predicate as a monadic concept of events, ‘calm(e)’, it divorces what is denoted from what else might participate therein or how. Clouds or not, a calm in flight is when and where prevailing winds are at constant air pressure, velocity and heading throughout. A flight segment through clouds is not *a* calm, and the pilot fighting its wind shears unrelieved, even if within every cloud the winds within it are constant for the brief moment before the aircraft slams into the winds of the next cloud also at a constant but different air pressure, velocity and heading. The event segmentation of Southern New England airspace and flight time frames events E that need not be equinumerous with the clouds of Southern New England. Then whether any event e among the E is a calm or not is, as just illustrated, irreducible to a condition on the individual cloud that the clouds of e severally meet. Monadic concepts of events are essential to understanding event segmentation, reference and quantification over the events therein, the conditions that tensed sentences impose on the individual event e , and the frequency and distribution of meeting those conditions, all of which remains essential, as is seen in (§§2-3), when the tensed sentences are also negated.

In the sections to follow, *canonical neo-Davidsonian logical form* conforming to (27)-(28), *trans-frame-of-reference reference and abstraction*, and *event segmentation* explain away the noughtiness of negation (§1)— illusion that *not* is in need of special remarks. It suffices to recognize that it is an adverb, “noughtly”, like any other in (23)-(26), with its logical form and position fixed as in (28), and to leave the rest to independent and fully general aspects of grammar and interpretation. Much of the noughtiness carries over *mutatis mutandis* to decreasing quantifiers (§7) like those in (53)-(54) and distinguishes them from their increasing counterparts in (55)-(56):

- (53) Close to few clouds was it calm (underneath (them)).

¹⁰ The contrast in (51) and (52)’s salient readings exposes an ambiguity. It does not deny to either a latent reading that inverts the relative scope of negation and the definite description.

- (54) Few clouds were calm (underneath (them)).
- (55) Close to a few clouds, it was calm (underneath (them)).
- (56) A few clouds were calm (underneath (them)).

It turns out that decreasing quantification is a context for *trans-frame-of-reference abstraction*, and increasing quantification is not. As decreasing quantification imposes an upper bound on whatever its scope describes, its logical form includes a definite description of whatever is so described. The logical form for (54) includes, as it were, the definite description *whatever events or states of calm there were (underneath)*, of which it is asserted that few clouds participated in any such. This definite description (§5) culls its reference to calms from anywhere there is a calm— abstraction trans-frame-of-reference (*v.* (41)-(46)). In contrast, the logical form for increasing quantification in (56) just says that there were some events or states of calm, in which a few clouds participate, without reference or indication of any other such states let alone to the accumulation of them all. Thus, whatever emerges from trans-frame-of-reference reference under decreasing quantification is absent under increasing quantification. Already on stage prior to any remarks about negation is a *canonical logical form* (27)-(28) for tensed sentences, *event segmentation*, and *trans-frame-of-reference reference and abstraction* (§§4,5). Joining the received position for negation fixed as in (29) (or, as in (15)), it is further supposed that the syntactic distribution for trans-frame-reference abstraction distinguishes decreasing from increasing quantification, so that all the noughtiness then reduces to matters of logical syntax and the assignment of scope to (in)definite descriptions.

1. Noughtiness.

1.0. *The Homogeneity Condition.* Since Fodor 1970,¹¹ negation has worn a Homogeneity Condition custom made to the effect that homogeneous predicates under negation (57) denote homogeneously—*all* are not so— in contrast to non-homogeneous predicates under negation (58), for which it suffices that merely *some* are not so:

- (57) The maidens at the ball didn't fit into the glass slipper.
- (58) The maidens at the ball didn't fit into the carriage.

Slipping into the glass slipper, Cinderella all by herself falsifies (57), falsifying that all did not fit— the *distributive condition*. For (58), it suffices that some not fit, despite other maidens who pack the carriage, *the collective condition*. Overlooked in this opposition between decree that all not fit and decree merely that some do not, is an intermediate *semidistributive* condition:

- (59) The maidens at the ball didn't fit into the carriages.

¹¹ *v.*, *e.g.*, Breheny 2005, von Stechow 1997, Fodor 1970, Gajewski 2005, Higginbotham 1994, Krifka 1996, Löbner 1985, 2000, Lønning 1987, Magri 2013, Roeper 1983, Schwarzschild 1993, Spector 2013, Szabolcsi & Haddican 2004, Yoon 1996.

The maidens need not all not fit; yet, it is not enough for (59) that one maiden fail to squeeze into one of the carriages. Rather, as the carriages roll up to the palace, the maidens do not fit into any of them. Every one strands at least one maiden. That is, the carriages are all not a fit for the maidens. While the Homogeneity Condition conjures *ad hoc* the distributive and collective conditions from defective logical forms like ‘ \neg FitSlipper(m)’ and ‘ \neg FitCarriage(m)’, semidistributive conditions elude it altogether. Yet, what goes on in (57)-(59) is just that the events E at issue (*v.* (28)) are the trials, attempts to fit, not a one e of which is a fit. The alleged homogeneity of (57) is just the coincidence that the trials are solo trials as numerous as the maidens tried. In (58) and (59), the trials are equinumerous with the carriages, and none of these events is a fit either (*v.* (28)).

1.1. *Plural definite descriptions under negation.* Plural definite descriptions (*v. op. cit.* n. 11) suffer the illusion of an ambiguity between a universal meaning that demands Cinderella to fit into every slipper and an existential one that emerges under negation to require that she fit not a one:

- (60) Cinderella fit into the glass slippers.
- (61) Cinderella didn’t fit into the glass slippers.

As for the princes who wander the realm with glass slipper in hand, (62) reports that the glass slippers have all found their match, while (63), with its definite description under negation, reports that not a one has:

- (62) Maidens fit into the glass slippers.
- (63) Maidens didn’t fit into the glass slippers.

In (60)-(62), the reference of *the glass slippers* is scattered across the realm, across their solo trials. There is no ambiguity in the meaning of *the* if its existential force derives from definite description about the framing E quantifying-in a definite description restricted to the local e (*v.* (37)):

- (64) [The \mathcal{Z} : glass slippers[\mathcal{Z}]]
 $[\exists X$: maidens[X]][$\uparrow E$: Theme[E, X]][$\uparrow E$: Past[E] & there[E, E^*]]
 $\neg [\exists e: Ee](\text{fit}(e) \ \& \ \uparrow Y: [\forall y: \mathcal{Z}y]Xy \ \& \ \text{there}[e, Y]) \ \text{into}(e, Y)$

1.2. *Déjà vu: as with negation, so it is with negative quantifiers.* The noughtiness recurs with negative or decreasing quantifiers (*v. op. cit.* n. 11) so that there is little daylight between the meanings of (65) and (66), and the illusion of ambiguous definite description distinguishes the scope of decreasing quantifiers (68) from that of increasing quantifiers (67):

- (65) Maidens didn’t fit into the glass slippers.
- (66) No maidens fit into the glass slippers.

- (67) A few maidens fit into the glass slippers.
 (68) Few maidens fit into the glass slippers.

As remarked above, decreasing quantification imposes an upper bound on what its scope describes, on *whatever events (there are if any) of the glass slippers being fit into* (v. (45), (46)):

- (69) $[1E : [\text{The } \mathcal{Z}: \text{glass slippers}[\mathcal{Z}]] [1E': \text{Past}[E']]]$
 $[\exists e: Ee \ \& \ \text{there}[E', E]](\text{fit}(e) \ \& \ [1\mathcal{Y}: [\forall y: \mathcal{Z}y] Xy \ \& \ \text{there}[e, \mathcal{Y}]] \ \text{into}(e, \mathcal{Y}))]$

Within the definite description of events (69), *the glass slippers* is again exported and it quantifies in a definite description restricted to the local event e , so that (69) culls any event of any glass slipper fitting. Of the events (69) refers to, (68) says that few maidens were involved. In contrast, the logical form for (67) is to say just that there were some good fits throughout the realm, a few maidens and the glass slippers were the participants therein, entailing a fit for every glass slipper.

Section §2 argues that the *canonical logical form* for tensed sentences is divided between description of the framing events E and the framed events e , as in (28). In §3, *neo-Davidsonian logical form* shows the way in which all sentences conform to (28) so that event segmentation can in full generality explain away the Homogeneity Condition (§1.0). Shown to be a pervasive and general feature of natural language in §4, *trans-frame-of-reference reference* dissolves the illusion (§1.1) that *the* has more than one meaning. It suffices to explain away this noughty bit that definite descriptions are restricted to the local frame of reference and exported (in)definite descriptions quantify-in definite descriptions restricted to the local frame of reference. *Definite description by abstraction trans-frame-of-reference* is then and only then called upon, to rescue decreasing quantification from noughtiness (§1.2). If tensed sentences are as in (27)-(28) and the hosts for trans-frame-of-reference reference, it can be no surprise that they continue as such when embedded in a definite description that abstracts on one of their variables. Whether the variable is ' E ' as in (41)-(46) ($= \lceil [1E: (28)] \rceil$), or another (§5), such definite descriptions ought to be as prolific as the tensed sentences themselves that host trans-frame-of-reference reference. They abound in natural language (§5), and their meaning must out, inviting separate questions. As to what semantics fits them best, §6 amends the semantics of definite description to accommodate abstraction trans-frame-of-reference. But, they mean what they mean, an empirical observation prior to a semantics for them, and there is a separate inquiry into what their distribution is in logical form, spoken and unspoken. That distribution and the logical syntax proposed in (§7) to distinguish decreasing from increasing quantification conclude the argument proper that noughtiness is an illusion of those aspects of grammar and interpretation canvassed above.

2. Impersonal constructions.

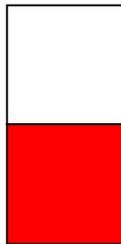
The syntax and semantics to be defended is at its plainest in impersonal sentences, with tense, negation, a frame adverbial, and not much else:

- (70) Over 5000m², it didn't burn to ashes.
 (71) Over 5000m², there didn't flame (a) flame bright as day.
 (72) Over 5000m², there wasn't (a) fire.
 (73) Underneath the clouds, it wasn't calm/still/silent.
 (74) Underneath the clouds, it didn't calm (down)/become still/fall silent.
 (75) Underneath the clouds, there wasn't (a) calm/stillness/silence.

First (§2.0), a truth-conditional scope effect will demonstrate that the logical syntax is as in (27) (*v.* also (11)-(12), (14)), dividing the sentence between description of what isn't so—the sentence fragment after negation—and description of where not so—the fragment before it including frame adverbials. The following section (§2.1) then turns to the standards for parsing the spatiotemporal region where not so into the noticeable times, places, events or states that are each not so. Section §3 proceeds to negation in general, beyond impersonal constructions.

2.0. A study of forest fire conditions studied a prepared study area of 5000 hm², 500 hm N-S by 10 hm E-W, of which the southern 2500 hm² ignited and was aflame:

(76)



In the impersonal sentences to follow, the predicate, *burn*, *burn through(out)*, *burn across*, *burn over*, *aflame*, *ablaze*, *consumed by fire*, is chosen to express a *dissective* condition (Quine 1960), that is, one true of (almost) all of whatever it is true of. The southern 2500 hm² was aflame and all of it within it; but, there were not 5000 hm², the area of the entire forest, so consumed:

- (77) It didn't burn through(out)/across/over 5000 hm².^{12, 13}
 (78) It didn't burn through(out)/across/over the entire area under study.
 (79) It didn't burn through(out)/across/over the entire forest.
 (80) There wasn't (a) fire through(out)/across/over (the) 5000 hm².
 (81) There wasn't (a) fire through(out)/across/over the area of the study.

¹² Cf. (German, p.c. Elena Herburger, 2014):

- (i) Es brannte durch 5000 hm² durch.
 it burnt through 5000 hm² through.
 (ii) Es hat durch 5000 hm² durchgebrant.
 It has through 5000 hm² burnt.through.

¹³ An anonymous reviewer notes that (77)-(79) (and presumably the rest) seem ambiguous depending on where focus falls, which is alright, see n. 10.

- (82) There wasn't (a) fire through(out)/across/over the entire forest.
- (83) There didn't flame flame(s) through(out)/across/over (the) 5000 hm².
- (84) There didn't flame flame(s) through(out)/across/over the area of the study.
- (85) There didn't flame flame(s) through(out)/across/over the entire forest.
- (86) There didn't burn (a) scorching fire through(out)/across/over (the) 5000 hm².
- (87) There didn't burn (a) scorching fire through(out)/across/over the area of the study.
- (88) There didn't burn (a) scorching fire through(out)/across/over the entire forest.

In contrast to the self-evident truths of (77)-(88), their counterparts that front their prepositional phrases are just as plainly not true:

- (89) Through(out)/across/over 5000 hm², it didn't burn.
- (90) Through(out)/across/over the entire study area, it didn't burn.
- (91) Through(out)/across/over the entire forest, it didn't burn.
- (92) Through(out)/across/over (the) 5000 hm², there wasn't (a) fire.
- (93) Through(out)/across/over the area of the study, there wasn't (a) fire.
- (94) There wasn't (a) fire through(out)/across/over the entire forest.
- (95) Through(out)/across/over (the) 5000 hm², there didn't flame flame(s).
- (96) Through(out)/across/over the area of the study, there didn't flame flame(s).
- (97) Through(out)/across/over the entire forest, there didn't flame flame(s).
- (98) Through(out)/across/over (the) 5000 hm², there didn't burn (a) scorching fire.
- (99) Through(out)/across/over the area of the study, there didn't burn (a) scorching fire.
- (100) Through(out)/across/over the entire forest, there didn't burn (a) scorching fire.

Any 5000 hm² in (76) is nothing less than (76) itself, and it or what occupies it is not a singular spatiotemporal region or event that burns throughout, verifying (77)-(88) and the logical form in (101):

- (101) $[\neg E: \text{then} \& \text{there}_{(76)}[E]]$
 $[E: \text{Past}[E] \& \text{therein}[E,E]] \neg[\exists e: Ee] (\text{burn}(e) \& \text{through } 5000 \text{ hm}^2(e))$

Yet, (76) is *where within* there are (uncountably) many spatiotemporal regions or events of burning throughout, the largest of which consumes its southern 2500 hm²,¹⁴ rendering (89)-(100) and the logical form in (102) untrue:

- (102) $[\exists E: \text{through } 5000 \text{ hm}^2[E]] [E: \text{Past}[E] \& \text{therein}[E,E]] \neg[\exists e: Ee] \text{burn}(e)$

¹⁴ Also (76) is *where within* there are (uncountably) many spatiotemporal regions or events, including (76) itself, of not burning throughout.

After all, the *frame* adverbials so-called that introduce sentences—*framing* them—*frame* the action therein described, as in (102), rather than describe it directly, in contrast to adverbs that belong to the action’s description, as in (101). This truth-bearing distinction, the result of logical form containing distinct variables to which the adverbs may be applied, ‘*E*’ and ‘*e*’ in (101)-(102), is lost to any logical form too impoverished to contain them:

(103) $\neg[\exists e: \textit{then}\&\textit{there}_{(76)}(e)](\text{Past}(e) \ \& \ \text{burn}(e) \ \& \ \text{through } 5000 \text{ hm}^2(e))$

(104) $\neg[\exists e: \textit{then}\&\textit{there}_{(76)}(e)](\text{through } 5000 \text{ hm}^2(e) \ \& \ \text{Past}(e) \ \& \ \text{burn}(e))$

The pattern and its import for logical form find precedent in the interaction of adverbial modification and distributive quantifiers (Taylor 1985, Davies 1991, Schein 1993):

(105) In slow progression for several measures, every organ student struck a single note on the Wurlitzer.

(106) # Every organ student struck a single note in slow progression for several measures on the Wurlitzer.

The students’ slow progression for several measures (105) is that within which a single note is not slow progression for several measures (106). Yet, with even less of a commitment than precedent to Davidsonian events, one arrives at the logical form in (101)-(102). It has been enough to concede that: i. there is natural language quantification over times and places; ii. given the density of time and space, negation must be construed as the denial that certain times and places exist within a zone *then&there* large enough for notice; and, iii. if reference to such zones is not all to be demonstrative, it includes its definite or indefinite description as the frame adverbials provide in (13), (31), (70)-(75) and (89)-(100).¹⁵

¹⁵ As above, the frame adverbial outside the scope of negation in (i) and (ii) renders them untrue in (76):

(i) Over (the) 5000 hm², there didn’t burn (a) scorching fire.

(ii) Over (the) 5000 hm², there wasn’t (a) scorching fire.

In contrast, it seems to me that (iii) and (iv) have salient readings true in (76) and equivalent to (v) and (vi):

(iii) Covering (the) 5000 hm², there didn’t burn (a) scorching fire.

(iv) Covering (the) 5000 hm², there wasn’t (a) scorching fire.

(v) There didn’t burn (a) scorching fire covering (the) 5000 hm².

(vi) There wasn’t (a) scorching fire covering (the) 5000 hm².

It is, I assume, that *covering (the) 5000 hm²* demands a subject and reconstructs in logical form to be predicated of (*a scorching fire* so that (iii)-(iv) come to resemble (v)-(vi), unlike *over (the) 5000 hm²*, a frame adverbial proper that remains and is interpreted *in situ*. Note that the argument in the text rests on the existence of the ambiguity and the logical forms to represent it. It could be that all the sentences, adverbs in sentence-initial position or not, are in fact ambiguous, pronounced one way or another merely to suggest a favored interpretation.

A neo-Davidsonian (Castañeda 1967, Parsons 1990) analysis is not however to be forestalled for long if the scope ambiguity with respect to negation is to be represented in its fullest generality. The impersonal constructions (107)-(114), just like those in (77)-(88), are unambiguously true of (76):

- (107) There weren't 5000 hm² aflame/consumed in flames in a forest fire.
- (108) There weren't the 5000 hm² of an area under study aflame/consumed in flames in a forest fire.
- (109) There wasn't the entire area of a forest aflame/consumed in flames in a forest fire.
- (110) There wasn't the entire forest in a forest fire aflame/consumed in flames.

- (111) There didn't burn 5000 hm² in a forest fire.
- (112) There didn't burn the 5000 hm² of an area under study in a forest fire.
- (113) There didn't burn the entire area of a forest under study.
- (114) There didn't burn the entire forest in a study of forest fire conditions.

And, again, like (89)-(100), fronting to a position before negation delivers an interpretation that is not true of (76), because some of it did not burn:

- (115) 5000 hm² weren't aflame/consumed in flames in a forest fire.
- (116) The 5000 hm² of an area under study weren't aflame/consumed in flames in a forest fire.
- (117) The entire area of a forest wasn't aflame/consumed in flames in a forest fire.
- (118) The entire forest in a forest fire wasn't aflame/consumed in flames.

- (119) 5000 hm² didn't burn in a forest fire.
- (120) The 5000 hm² of an area under study didn't burn in a forest fire.
- (121) The entire area of a forest under study didn't burn.
- (122) The entire forest didn't burn in a study of forest fire conditions.

It is all the same on a neo-Davidsonian analysis that sees little daylight between a thematic-relational phrase, *e.g.*, '[$\exists X$: 5000 hm²(X)]Theme(e,X)', and any other prepositional phrase, '[$\exists X$: 5000 hm²(X)]through(e,X)', that may be fronted. Alongside (101)-(102), there is (123) for the impersonal constructions (107)-(114) with postverbal subjects, and (124) for (115)-(122) with fronting of the thematic relation and further raising of the DP into preverbal subject position:

- (123) [$\exists E$: *then*[&]*there*₍₇₆₎ [E]]
 $[\exists E: \text{Past}[E] \ \& \ \text{therein}[E,E]] \ \neg[\exists e: Ee] \ (\text{burn}(e) \ \& \ [\exists X: 5000 \text{ hm}^2(X)]\text{Theme}(e,X))$
- (124) [$\exists X$: 5000 hm²(X)] [$\exists E$: Theme [E , X]]
 $[\exists E: \text{Past}[E] \ \& \ \text{therein}[E,E]] \ \neg[\exists e: Ee] \ \text{burn}(e)$

Crucial for the scope ambiguity is that the logical form for negation distinguish the e that isn't so-and-so from the E wherein it isn't. It is then a matter of syntax which phrases describe e and which E , provided that logical form offers both. That the thematic

relation associated with the subjects in (115)-(122) may, as much as an adverbial phrase in preverbal position, describe events E' in (124) separately from events e that the verb and the rest of the sentence describe is just another instance of thematic *separation*, argued for in Schein 1993, 2006, 2012, forthcoming, and with far superior exposition in Lohndal 2014 and Williams 2015. As above in (103)-(104), the difference in meaning is lost absent the two variables e and E' , even with thematic relations:

- (125) $\neg[\exists e: \text{then}\mathcal{E}\text{there}_{(76)}(e)](\text{Past}(e) \ \& \ \text{burn}(e) \ \& \ [\exists X: 5000 \text{ hm}^2(X)]\text{Theme}(e,X))$
(126) a. $\neg[\exists e: \text{then}\mathcal{E}\text{there}_{(76)}(e)][\exists X: 5000 \text{ hm}^2(X)](\text{Past}(e) \ \& \ \text{Theme}(e,X) \ \& \ \text{burn}(e))$
b. $[\exists X: 5000 \text{ hm}^2(X)]\neg[\exists e: \text{then}\mathcal{E}\text{there}_{(76)}(e)](\text{Past}(e) \ \& \ \text{Theme}(e,X) \ \& \ \text{burn}(e))$
(127) $\neg[\exists e: \text{then}\mathcal{E}\text{there}_{(76)}(e)](\text{Past}(e) \ \& \ \text{burn}(e) \ \& \ [\exists X: 5000 \text{ hm}^2(X)]\text{Theme}(e,X))$
(128) a. $\neg[\exists e: \text{then}\mathcal{E}\text{there}_{(76)}(e)][\exists X: 5000 \text{ hm}^2(X)](\text{Past}(e) \ \& \ \text{Theme}(e,X) \ \& \ \text{burn}(e))$
b. $[\exists X: 5000 \text{ hm}^2(X)]\neg[\exists e: \text{then}\mathcal{E}\text{there}_{(76)}(e)](\text{Past}(e) \ \& \ \text{Theme}(e,X) \ \& \ \text{burn}(e))$

Whether referring to some 5000 hm² or the 5000 hm², the entirety of (76) is denoted, and thus all of (125)-(128) are true of (76) without distinction. From here, to further impoverish logical form and shoehorn it into the literature on negation and predication since Fodor 1970 would only render it even more desolate of anything to tell apart the meaning of sentences with postverbal subjects from those with preverbal subjects:

- (129) $\neg[\exists X: 5000 \text{ hm}^2(X)] \text{ burn}(X)$ (*cf.*, *e.g.*, (111))
(130) $[\exists X: 5000 \text{ hm}^2(X)]\neg \text{ burn}(X)$ (*cf.*, *e.g.*, (119))
(131) $\neg[\exists X: 5000 \text{ hm}^2(X)] \text{ burn}(X)$ (*cf.*, *e.g.*, (112))
(132) $[\exists X: 5000 \text{ hm}^2(X)]\neg \text{ burn}(X)$ (*cf.*, *e.g.*, (120))

As the only 5000 hm² in (76) is all of it, (129)-(132) must all agree, without distinction between pre- and post- verbal subjects.

2.1. *Event segmentation.* If there is a *pas de deux* between negation and spatiotemporal reference and thus warrant for a canonical logical form (27)-(28) and its instances (11)-(12), (14) and (101)-(102)—whether or not it extends via thematic separation to (123)-(124)—reference to time and place or to events and states then & there never escapes an implicit standard for what is to count for current notice—for how to parse it all into times, places, events and states. Out of the blue, literally, there were clouds and one of (133)-(135) is uttered:

- (133) Underneath the clouds, it wasn't calm/still/silent.
(134) Underneath the clouds, it didn't calm (down)/become still/fall silent.
(135) Underneath the clouds, there wasn't (a) calm/stillness/silence.

(136) $[1E^? : \text{under the clouds}[E^?]] [1E : \text{Past}[E] \ \& \ \text{therein}[E, E^?]] \neg [\exists e : Ee] \text{ calm}(e)$

What are the events or states—the boundaries for the meteorological conditions— taken to be underneath the clouds then and there and then judged calm/*etc.* or not? Suppose that these clouds are all shapely pillows equal in dimension and uncloudy in their number, so that the volume between cloud and ground level is also uncloudy. But, consider various conditions under which they are scattered and encountered by a narrator uttering (133)-(135). With the clouds scattered across Southern New England, none within 20 nautical miles of another, the pilot reports on a slow flight path through the airspace underneath them. It may even have been that these clouds were not contemporaries, having each formed shortly before the pilot enters its airspace and dissipated shortly thereafter. Or, perhaps a stationary observer on the ground has measured the winds underneath these clouds similarly spaced and passing overhead. Or perhaps, the weather station issuing (133)-(135) has received contemporaneous reports from scattered sensors underneath stationary scattered clouds, *etc.* Or, perhaps the scatter is all mental, the narrator’s memories underneath clouds in spatiotemporal locations absolute or relative that have been forgotten. The clouds’ scatter grounds several observations about the events or states then and there, that any utterance of (133)-(135) must intend if uttered under any of these conditions. First, for any cloud, the state of the volume underneath it for the duration of its observation and what occurrence is occupying it then constitute *an* event or state among the events or states parsed *then&there* for current notice. If so, given the above semantics, any of (133)-(135) is true only if for each cloud, there was turbulent air underneath it within the period of its observation—a necessary condition for the truth of (133)-(135). Underneath the scatter, it can hardly be imagined how it could be otherwise given any cognizance of event perception and segmentation. The necessary condition becomes sufficient with two further remarks, the first of which must also derive from event perception and segmentation alone, and the second, from a further semantic consideration. As a matter of event perception and segmentation, there are no gerrymandered events of current notice —not a one event that would, for example, be the fusion of what happens underneath one cloud in the first few minutes of its observation and what happens underneath another cloud 100 nautical miles away in the last few minutes of its observation 90 minutes later. There is no understanding (133)-(135) that entails that such an absurd event be discovered to contain air turbulence. Such an event is never among those parsed for current notice. Further reflection on the meaning of (133)-(135) prompts a further remark about their semantics. It is, after all, sufficient for (133)-(135) that pilot or observer encounter underneath each cloud, *some* air turbulence, an eddy here or there. It is not required that turbulence roil the entire air mass underneath the cloud. It must then be that this volume is not dense with sub -events or -states, each a fraction of that volume and enduring for a fraction of the period under observation. For, if such events or states were indeed among those then and there for current notice, it would roil the entire air mass. Rather, the events or states then and there for current notice are countable; the event quantification in (9)-(10), is count quantification over some events or states (Gillon 1990; Schwarzschild 1996: 82f., 92f.; Schein 2006: §29.2.2.2). In the contexts entertained for (133)-(135), the events or states within the volume underneath a cloud for the period of its observation amount to countable events or states only if the one event or state that occupies the entire volume for

the entire period is the only one that counts. Then and only then, does it suffice for (133)-(135) that underneath each cloud, only some turbulence is encountered. So much holds of the events presented then and there for current notice when conditions scatter the clouds, none near any other. Under such conditions, one might even mistake (133)-(135) to express a condition that applies directly to the clouds, distributively. An honest mistake, since with deliberate malice, despite the variation in circumstances, I contrived that the clouds individuate equinumerous events for current notice. Let me introduce the relation ‘ $\sum[X,E]$ ’ for when the scatter of X induces the parse or segmentation of scene, frame of reference or spatiotemporal region into equinumerous E of events or states, scenes, frames of reference, or spatiotemporal regions. It is left open that the X which induce segmentation may be either objects such as clouds or other events or states, *etc.* from a prior segmentation. Nothing more substantive or formal needs to be said except to name the obvious a principle of scattering, *viz.* that if X frames and induces the segmentation of E , then zooming-in to a region α that isolates an e from the other E isolates an x from the other X :

$$(137) \sum[X,E] \rightarrow. \quad (\text{SCATTER})$$

$$(\text{there}(\alpha, e) \ \& \ ((Ee' \ \& \ \text{there}(\alpha, e')) \rightarrow e = e')) \rightarrow$$

$$((Xx \ \& \ Xx' \ \& \ Ee) \rightarrow ((\text{there}(\alpha, x) \ \& \ \text{there}(\alpha, x')) \rightarrow x = x'))$$

Usually, in circumstances less contrived, clouds do not individuate equinumerous events. At the opposite end, it could have been that the clouds were all in a single cluster or blanket. Given what is known about the prevailing meteorological conditions underneath such a cluster, the clouds belong to a system and participate in a single meteorological event, generating a certain amount of air turbulence from their interaction, enough for the truth of (133)-(135), but hardly requiring from most clouds—let alone each—air turbulence within each volume underneath them. More likely in ordinary experience is that the clouds are scattered in clusters, and the observer’s encounters with those clusters are separated so that the events presented then and there for current notice coincide with the clusters, in which case it is necessary and sufficient for (133)-(135) that underneath each cluster, there is some air turbulence—a semi-distributivity down to clusters rather than clouds. Note that even as I move these clouds around the Southern New England sky, the clouds and the volumes underneath them remain the same throughout, despite the variation it induces in event segmentation and the events presented for current notice.¹⁶

¹⁶ Varying the parameters for (i) familiar from studies in gestalt perception,

- (i) $\square\square \ \square\square$
 $\square\square \ \square\square$

e.g., ratio of enclosed area to interstitial area, ratio of the area of individual enclosures to area of aggregate enclosure, ratio of aggregate enclosed area to interstitial area, ratio of aggregate area to the number aggregate, absolute number aggregated, geometric regularity of individual enclosures, similarity and scaling, heterogeneity, symmetry and axial orientation and alignment, color, shading, (partial) occlusion, animation with rigid vs. elastic motion.

In any example discussed so far, the description of the events said not to exist does not itself offer any cues for event segmentation, and it is left to the observer’s experience to present what events are intended for current notice. But, the description could otherwise indicate that larger events are at issue, perhaps even an event no smaller than the observer’s entire experience (examples adapted from Breheny 2005):

- (138) Underneath the clouds, it wasn’t calm/still/silent for (any more than) twenty minutes.
 (139) Underneath the clouds, it didn’t calm (down)/become still/fall silent for (any more than) twenty minutes.
 (140) Underneath the clouds, there wasn’t (a) calm/stillness/silence for (any more than) twenty minutes.
 (141) Underneath the clouds, it wasn’t calm/still/silent across (all) Southern New England.
 (142) Underneath the clouds, it didn’t calm (down)/become still/fall silent across (all) Southern New England.
 (143) Underneath the clouds, there wasn’t (a) calm/stillness/silence across (all) Southern New England.
 (144) Underneath the clouds, it wasn’t calm/still/silent by nightfall.
 (145) Underneath the clouds, it didn’t calm (down)/become still/fall silent by nightfall.
 (146) Underneath the clouds, there wasn’t (a) calm/stillness/silence by nightfall.

If there is at issue just the one event with a dimension across all Southern New England, then it suffices that it is not a calm, with some air turbulence anywhere—despite any cloud scatter, which is now not intended to individuate the events of current notice, in what is perhaps a comment on the entire regional weather system.

For an utterance of (147) that first presents as above the skeletal logical form in (148), it is to be asked what are the events or states—the boundaries for the meteorological conditions— taken to be underneath the clouds then and there and then judged calm/*etc.* or not?

- (147) Underneath the clouds, it wasn’t calm.
 (148) $[\uparrow E': \text{under the clouds}[E^*]] [\uparrow E: \text{Past}[E] \ \& \ \text{therein}[E, E^*]] \neg [\exists e: Ee] \text{ calm}(e)$

Uttered out-of-the-blue, the thought might very well be that the clouds fix those boundaries:

- (149) $[\text{The } X: \text{clouds}[X]] [\uparrow E': \text{under } [E^*, X]]$
 $[\uparrow E: \sum[X, E]^{17} \ \& \ \text{Past}[E] \ \& \ \text{therein}[E, E^*]] \neg [\exists e: Ee] \text{ calm}(e)$

But, that thought is vacuously true given SCATTER (137), if the utterance continues to elaborate the description of the individual *e* as in (141):

¹⁷ The position of ‘ $\sum[X, E]$ ’ within this logical form is arbitrary.

(150) # [The X : clouds[X]] [$\uparrow E$: under [E , X]]
 $[\uparrow E: \sum[X,E] \& \text{Past}[E] \& \text{therein}[E,E]] \neg[\exists e: Ee](\text{calm}(e) \& \text{across SNE}(e))$

No event within the airspace underneath a solitary cloud is an event across Southern New England. Retreating then to (151) for the thought the utterance intended, it must be that some other standard parses the events for current notice:

(151) [$\uparrow E$: under the clouds[E]] [$\uparrow E$: Past[E] & therein[E,E]]
 $\neg[\exists e: Ee](\text{calm}(e) \& \text{across SNE}(e))$

Given context and the shape of this particular utterance, salient are only those events spanning all Southern New England. It suffices then for (141) and (151) that there is some air turbulence anywhere. Here then is a persistent feature of Φ -ing and Ψ -ing in (152):

(152) ... [$\uparrow E$: Φ [E] & Tense[E] & therein[E,E]] $\neg[\exists e: Ee] \Psi(e)$

For any given spatiotemporal region such as the airspace of Southern New England, the larger the e of Ψ -ing, the fewer the E Φ -ing. Now if an e 's not Ψ -ing implies some failure among its participants—the failure, say, of its clouds to overlook only calm—and if the participants in all the non- Ψ -ings are the participants in the Φ -ing—the clouds of Southern New England—then, the larger the individual e of Ψ -ing, the lower the failure rate needs to be among these participants for (152) to be true.

1.2. *The logical syntax of ‘not’.* If a sentence is tensed, and thus reference to (spatio-) temporal region uncontroversial, it is remiss—so it has been argued—to neglect the *pas de deux* that ensues between tense and negation in any negated sentence. As much still leaves room to translate ‘not’ as logical negation, ‘not Φ ’ as ‘ $\neg\Phi$ ’, a sentential connective, so long as spatiotemporal reference and quantification outside and inside its scope is as suggested above. But, if that is all there is to ‘not’, it leaves little room for *not-many* (‘Not many NP Φ ’) and *few* (‘few NP Φ ’) to diverge as they do in (153)-(164). The translation of ‘not’ as “noughtly”, the quantificational adverb ‘[No e : then & there(e)] Φ [e]’, provides the occasion and yet another locus for subatomic scope effects to shine through.

- (153) a. Not many square miles were flooded.
 b. There were not many square miles flooded.
 (154) a. # Few square miles were flooded.
 b. #There were few square miles flooded.
 (155) a. Not many feet are left before we strike bedrock.
 b. There are not many feet left before we strike bedrock.

- (156) a. # Few feet are left before we strike bedrock.
 b. # There are few feet left before we strike bedrock.
- (157) a. Not many rows and columns are in the table in fig. 18.
 b. There are not many rows and columns in the table in fig.18.
- (158) a. # Few rows and columns are in the table in fig. 18.
 b. # There are few rows and columns in the table in fig. 18.

Wine stains; but, since it was not served at tables set with this heirloom tablecloth—

- (159) a. Not many spills stained it.
 b. Not many stains stain it.
 c. There were not many spills staining it.
 d. There are not many stains staining it.
- (160) a. # Few spills stained it.
 b. # Few stains stain it.
 c. # There were few spills staining it. (*Cf.* There were few spills to stain it.)
 d. # There are few stains staining it.
- (161) a. Not many ties were on campus in the sixties.
 b. There were not many ties on campus in the sixties.
- (162) a. # Few ties were on campus in the sixties.
 b. ? There were few ties on campus in the sixties.
- (163) a. Not many protesters were arrested in violent clashes with the police last year.
 b. Not many violent protesters were arrested at non-violent demonstrations last year.
 c. There were not many protesters arrested in violent clashes with the police last year.
 d. There were not many violent protesters arrested at non-violent demonstrations last year.
- (164) a. Few protesters were arrested in violent clashes with the police last year.
 b. Few violent protesters were arrested at non-violent demonstrations last year.
 c. There were few protesters arrested in violent clashes with the police last year.
 d. There were few violent protesters arrested at non-violent demonstrations last year.

The sentences $\lceil \dots \text{few NP } \Phi \rceil$ are interpreted, it seems, as if the NP anchor a frame of reference to host the things and events that Φ describes. Thus, it is odd when the NP are units of measure, square miles or feet, in (154) and (156), unless the units of measure are reified as real estate. Similarly, it is odd in (158) to anchor a frame of reference on rows and columns, as if they were independent landmarks, some of which might then be found in the given table and some not. It is odd in (160) to anchor a frame of reference on stains or spills under a bias that they do not exist. If (161) is neutral report of campus fashion in

constructions. Given the density of space and time, there is no escape from the question of what times, places, or events or states *then&there* are to count for current notice:

- (171) a. The mirrors weren't smooth.
- b. The mirrors' glass wasn't smooth.

- (172) a. The mirrors were smooth.
- b. The mirrors' glass was smooth.

When and where must there be an absence of smoothness and a flaw present, according to (171)? As with the clouds, given a scatter of mirrors referred to without a shared frame of reference for them in mind, what counts for current notice is at least as numerous as the mirrors themselves, including those spatiotemporal regions, events or states each of which is coincident with a mirror for the period at issue if not for its lifetime. If so, (171) are true only if each mirror is flawed. As with the sentences about clouds, (171) are indeed so understood uttered out of the blue. Note that this holds of (171)b. despite reference to the glass *en masse*. For it to be otherwise, one would have to imagine that the glass is somehow organized, arranged or divided among spatiotemporal regions, events or states individuated by an implicit standard that does not coincide with the mirrors—which would be what, given what little is known other than that there were the mirrors? In contrast, suppose that it is known that the mirrors referred to are the mosaic components of a large, mountaintop reflector telescope. All of a sudden made salient is a single spatiotemporal region, event or state, coincident with the entire surface of the reflector and perhaps now the only one worthy of current notice. Then, it suffices for the truth of (171) that any flaw *anywhere* disturb its parabolic perfection and disrupt the perfection of the telescope's imaging. Correlatively, suppose instead discussion of several such reflector telescopes scattered among the world's mountaintop observatories:

- (173) a. The telescopes' mirrors weren't smooth.
- b. The telescopes' mirrors' glass wasn't smooth.

Then, (171) and (173) are true semidistributively—like the above about clouds in clusters— only if each telescope has a flaw. Such examples are freely multiplied. What is to be understood about defective rivets at large and out of the box in the attribution of a causal disposition toward catastrophe, except that each rivet suffers from it?

- (174) The defective rivets are not safe.
- (175) The defective rivets are not a safe risk.

Unless they are saliently located in the same bridge,

- (176) The defective rivets in the George Washington Bridge are not safe.
- (177) The defective rivets in the George Washington Bridge are not a safe risk,

in which case it suffices that the risk is in their number, while fewer of them might not have put the public at risk. Yet, again, semidistributively, (178)-(179) entail that the spatiotemporal regions that the bridges define are each not one of safety:

- (178) The defective rivets in the city's bridges are not safe.
(179) The defective rivets in the city's bridges are not a safe risk.

Sometimes, reference out-of-the-blue comes with some self-organizing principle that excuses one from reference to spatiotemporal regions, events or states as numerous as what is referred to:

- (180) The days of your life are not over.
(181) The best days of your life are not over.

The truth of (180) does not require it to be addressed only to the unborn and newborn, nor must (181) be addressed to only those who have not seen past glories. Yet, again, semidistributively, (182) is infelicitous if members of the audience have died of boredom prior to its utterance, nor is (183) true if several in the audience had peaked in high school.

- (182) The days of your lives are not over.
(183) The best days of your lives are not over.

Also, again as in (138)-(146), the description of what isn't may itself cue what out there and then is an event of current notice (examples adapted from Breheny 2005, *v.* (138)-(146)):

- (184) The mirrors weren't smooth after polishing.
(185) The mirrors' glass wasn't smooth after polishing.

- (186) The defective rivets were not safe by the mandated deadline.

The meaning of (184)-(185) is contingent on the number of polishings. It suffices that each such polishing left behind some defects in the lot, without implying defect in every mirror. Similarly, it suffices for (186) that there remained only as many defective rivets as there were deadlines. In referring to a single city contract to repair all the defective rivets in the city's bridges, (186) reports merely a breach of that contract.¹⁹

¹⁹ Breheny (2005) remarks that (i) can be understood to deny that John did *any* walking toward the store, rather than to deny only the final destination. Similarly, (ii) can be understood to deny that John read any of the book rather than to deny only its completion:

- (i) John didn't walk to the store.
(ii) John didn't read the book.

The judgments are somewhat obscure but not uncongenial to my point of view. Anything that qualifies the event description may affect event segmentation. Perfective verbal morphology, spoken or not, would construe a singular completed event, the walk to the store or the book read, the denial of which denies its completion. Imperfective morphology derives a nonsortal description of events true of any amount of walking in walking to the store or any amount of reading in reading the book. If so, Breheny (2005) reports understanding the sentences as if marked imperfective.

In parsing the density then and there into the regions, events or states intended for current notice, one accepts navigational guidance from whatever landmarks are mentioned—clouds, mirrors, glass, telescopes, rivets, bridges, days, lives, *etc.* If logical form is to host the *pas de deux* between negation and quantification over times, places, events or states, and if it is to generalize beyond impersonal constructions, it must—pity—take on the commitment to neo-Davidsonian analysis already on display in (123)-(124) to represent the difference in meaning between pre- and post- verbal subjects:

(187) [The: X : mirrors[X]][$\uparrow E$: Theme[E , X]]
 $[\uparrow E$: Past[E] & therein[E , E]] $\neg[\exists e: Ee]$ smooth(e)

The neo-Davidsonian logical form in (187) is important to (171) in two respects. First, if the mirrors are scattered among several spatiotemporal regions, events or states—as in the condition where they are on their own or belong to several telescopes—each of which is said not to be a smoothness, it had better be that the description of such a smoothness not imply the presence and participation of all the mirrors X at the singular smoothness e :

(188) a. * [The X : mirrors[X]]... $\neg[\exists e: Ee]$ (smooth(e) & Theme(e , X))
 b. * [The X : mirrors[X]]... $\neg[\exists e: Ee]$ (smooth(e , X))

Even if the mirrors and the several telescopes were all perfect and (171) therefore false, a logical form including (188) would be vacuously true in that no one mirror and no one telescope is itself a smoothness of all the mirrors. The parallel applies to the interpretation of the frame adverbial *underneath the clouds* in contexts where the clouds are scattered. Once *underneath the clouds* frames the spatiotemporal E *then&there* in (136) it quits the description of the e therein, as obviously whatever calm or lack thereof is found in any one such e cannot be underneath the entire cloud scatter. So too is it that the participation of the mirrors as Themes in (187) describes the E and not any e in the logical form for (171), just another poster child for thematic *separation* (Schein *op cit.*, Lohndal 2014, Williams 2015).²⁰

²⁰ Corroborating thematic separation and its interaction with the logical syntax of negation is the asymmetry of identity statements (Schein 2012, forthcoming):

- (i) Venus wasn't Hesperus the winter of 1892.
- (ii) Venus wasn't the evening star the winter of 1892.
- (iii) #Hesperus wasn't Venus the winter of 1892.
- (iv) #The evening star wasn't Venus the winter of 1892.

Hesperus, the evening star, and Phosphorus, the morning star, are alternating appearances of Venus, the omnipresent planet. That is, within Venus' presence, there was not an event or state of being Hesperus, the evening star, the winter of 1892. But, it is incoherent that within Hesperus', the evening star's appearance, there was not an event or state of being Venus the winter of 1892. That is, it may have been that for some events E in which Venus was present, *i.e.*, as their Theme *qua* Venus, there was not among these E an e of the evening star as e 's Theme *qua* evening star. But, it is incoherent that for some events E in which the evening star is their Theme *qua* evening star, there was not among these E an e of Venus as e 's Theme *qua*

The second respect in which neo-Davidsonian logical form matters for the meaning of (171) and the like is in the robustness of its monadic concepts translating verbs and other predicates, ‘calm(e)’, ‘burn(e)’, ‘smooth(e)’, ‘safe(e)’, ‘over(e)’, which denote what they denote independently of what else is related to the e denoted—a point engraved in the impersonal constructions and in those languages more liberal in their use. Thus it is that the surface of a telescope’s parabolic reflector is judged a smoothness or not independent of any cognizance of the number or shapes of its component mirrors, as seamless as it may be. Most telling of this autonomous denotation is where the component mirrors have been manufactured to perfection, but their installation is misaligned at some seams. Then again (171) is true. Although the mirrors are each a perfect smoothness, the smoothness of current notice that coincides with the reflector’s surface isn’t. A more down-to-earth example of the same—my complaint in (189) to the contractor and demand to redo it is not a comment on the quality or manufacture of any of the tiles:

- (189) The bathroom tiles are not smooth.
The bathroom tiles are not flat.

The same univocal, monadic concept, ‘smooth(e)’ or ‘flat(e)’, is tokened throughout invoking the same geometry of surfaces. It would be fair paraphrase of (171) or (189) in this context to have said instead that:

- (190) The mirrors are in such a state that there is not a telescope-sized smoothness.
The mirrors are where there is not a telescope-sized smoothness.
The mirrors are not a telescope-sized smoothness.
- (191) The bathroom tiles are in such a state that there is not a bathroom-sized flatness.
The bathroom tiles are where there is not a bathroom-sized flatness.
The bathroom tiles are not a bathroom-sized flatness.

In the semidistributive context:

- (192) The mirrors are not telescope-sized smoothnesses.

In the out-of-the-blue, fully distributive context:

- (193) The mirrors are not mirror-sized smoothnesses.

When telescope refractors or bathroom walls are the surfaces of current notice, note that the smoothness of every mirror or bathroom tile is not sufficient for (194) nor is a flaw in any mirror or bathroom tile necessary for (195):

Venus. More is to be said about what in logical form translates ‘*qua* Venus’ and ‘*qua* evening star’ (*v.* Schein 2012, forthcoming).

(194) The mirrors are smooth.
The bathroom tiles are smooth.

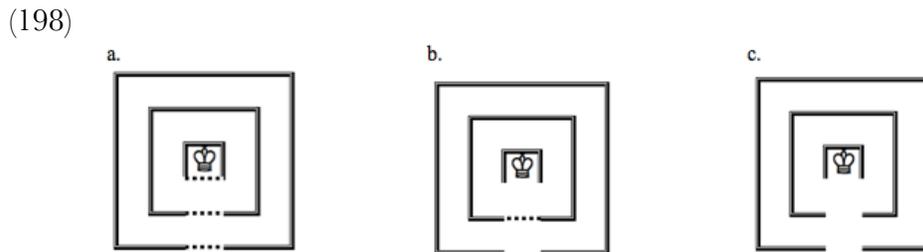
(195) The mirrors are not smooth.
The bathroom tiles are not smooth.

Yoon (1996) and Krifka (1996) discuss dual contexts for (196) and (197):

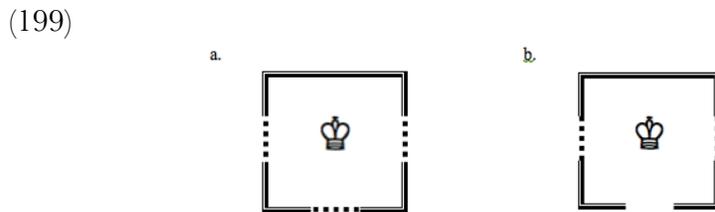
(196) a. The doors are open.
b. The doors are not closed.

(197) a. The doors are not open.
b. The doors are closed.

In the first, concentric chambers guard a vault that requires entry through a series of doors:



In the second a courtyard is defended by a single-walled perimeter, which may be breached at any of its doors:



For (196), all the doors to the vault must be open ((198)c.), but it suffices that any door to the courtyard is ((199)b.). For (197), the doors to the courtyard must all be closed ((199)a.); but, it suffices that any door to the vault is ((198)a.,b.). There is no equivocation in understanding these sentences in these contexts. The very same univocal concept ‘open(*e*)’, or ‘closed(*e*)’, is in play throughout. There is an opening at vault or courtyard just in case there is a breach, a way from outside in, with implications for the doors contingent on the geometry of their arrangement, as in “Through the doors, there is an opening.” Likewise, assertion of (200) is true or false, with demonstrative reference to any of the five scenes in (198)-(199), according to the geometry of the scene, without regard for the doors or anything else that may constitute its barriers or breaches:

- (200) a. That is an opening (to the crown jewels).
 b. That is not an opening (to the crown jewels).

In understanding (196)-(197) and (200) in the contexts (198)-(199), demonstrative reference to the scene parses it as a single event, (201), then said to conform or not to the geometry of an opening or a closing:

(201) $\forall e(\text{then}\mathcal{E}\text{there}_{(198)\text{a.}}(e) \leftrightarrow e = (198)\text{a.})$

(202) [The: X : doors[X]][$\uparrow E$: Theme[E^* , X]]
 $[\uparrow E^*]: \text{then}\mathcal{E}\text{there}_{(198)\text{a.}}[E^*] \ \& \ \text{Present}[E^*] \ \& \ \text{therein}[E, E^*] \ \neg[\exists e: Ee] \ \text{open}(e)$

This is the understanding salient to speakers in Krifka's (1996) and Yoon's (1996) evocation of the truth conditions reported. Contexts that instead scatter the doors among several scenes or merely fail to present them together in the same one invite semidistributive and distributive distributions of the framing events E , as canvassed above.

In these authors' discussions, the logical form entertained is not more than 'open(D)' and 'not open(D)'. There is no fixed meaning to *open* that entails that the vault's doors must all be open and yet only some of the courtyard's need be, and the stipulated ambiguity might just as well have reversed the conditions at vault and courtyard. The examples of a tiled surface—telescope refractor or bathroom—exacerbate the representational dead end. As noted in (194)-(195), the smoothness of a surface is not reducible to the smoothness of its components, whether all or any (or a fraction thereof). Worse yet is the semidistributive context, with several refractors or bathrooms, in which 'not smooth(M)' is to prompt the understanding that at each telescope, its mirrors are not a smoothness, while allowing that each mirror might itself be one.

In defining events autonomous from what else participate in them, the monadic concepts of neo-Davidsonian translation may take on board the distributional or topological properties native to the likes of 'cluster(e)' vs. 'scatter(e)', even when what is so plotted is plainly supervenient on point-wise conditions, as is the health of a population, 'healthy(e)', 'sick(e)'. As I love my children, *I* could not utter (203) except that all are healthy and none sick, and I am quick to worry that (204) as soon as one snuffles:

- (203) a. My children are healthy.
 b. My children are not sick.

- (204) a. My children are not healthy.
 b. My children are sick.

Yet, the school principal who loves less and answers to the school district reports that the school population is healthy just in case the daily school-wide absentee rate does not exceed 18%, the daily classroom absentee rate does not spike above 25% in any one classroom, and no pupil has been absent for more than two consecutive days in the past seven school days:

- (205) a. The pupils of PS 185K are healthy today.
 b. The pupils of PS 185K are not sick today.

On any given day of the school calendar, there is within the precincts of PS 185K, exactly one event at issue, the health of its population, with all its students participating in its assessment, contributing their personal information, of which event, ‘healthy(*e*)’, ‘not healthy(*e*)’, ‘sick(*e*)’, and ‘not sick(*e*)’ are true or not, according to the distributional profile just stipulated. *That is a state of health*, when such states are scaled to populations, just in case its population fits a certain distribution. This sense of ‘healthy(*e*)’ and ‘sick(*e*)’ as it applies to the school population joins the evidence from ‘smooth(*e*)’, ‘flat(*e*)’, ‘open(*e*)’, ‘closed(*e*)’, ‘cluster(*e*)’ and ‘scatter(*e*)’ in support of neo-Davidsonian monadic concepts of events. Although I hold a higher standard for health than the principal does for her population, my family is no excuse for a gerrymandered logical form that would divide (203) from (205), finding in (203) predicates ‘healthy(*C*)’ and ‘sick(*C*)’ and their spurious classification into those with universal force, ‘healthy(*C*)’, and those with existential force, ‘sick(*C*)’.²¹

4. *Trans-frame-of-reference reference: definite description in the scope of negation.*

With no change in the weather from (133)-(135), the expected air turbulence given the cloud scatter is the same for (206)-(208), except that the turbulence may be above or to the side as well as underneath:

- (206) Close to the clouds, it wasn’t calm/still/silent.
 (207) Close to the clouds, it didn’t calm (down)/become still/fall silent.
 (208) Close to the clouds, there wasn’t (a) calm/stillness/silence.

As far as I can tell, weather identical to (133)-(135) is in turn described if (206)-(208) is elaborated:

²¹ To have in mind a certain distribution or geometry presupposes for its data points presentation on a common scale or frame of reference, the little good it does to ask of arcs on scattered sheets of graph paper whether or not they are a circle. *A smoothness can be a topology of mirrors in the same one telescope, an opening is such through the doors in an arrangement of them, and so on.* Contexts that offer compliant presentations invite reference to events scaled to entire populations, even for *blond*, the poster child for a fully distributive, homogeneous, non-episodic property of the individual child:

- (i) The newborns are not blond!

The Nazi nurse sputtering (i) as she flees the maternity ward, cradling the evidence of non-Aryan genes in the gene pool, is not saying that none of the newborns is blond. Here absolute blondness is necessary for population welfare. Similarly, as an anonymous reviewer points out, it suffices for (ii) that there is any chatter at all from the common bedroom after lights out at the orphanage:

- (ii) The children are not asleep.

- (209) Close to the clouds, it wasn't calm/still/silent underneath.
 (210) Close to the clouds, it didn't calm (down)/become still/fall silent underneath.
 (211) Close to the clouds, there wasn't (a) calm/stillness/silence underneath.
- (212) Close to the clouds, it wasn't calm/still/silent underneath them.
 (213) Close to the clouds, it didn't calm (down)/become still/fall silent underneath them.
 (214) Close to the clouds, there wasn't (a) calm/stillness/silence underneath them.

There is again no change in the weather if a preverbal subject displaces the impersonal construction altogether:

- (215) The clouds weren't calm/still/silent underneath (them).
 (216) The clouds didn't calm (down)/become still/fall silent underneath (them).
 (217) The clouds weren't (a) calm/stillness/silence underneath (them).

The remarks that follow rest on the frame adverbial construction in (209)-(214) and extend with scant amendment to (215)-(217) if an unspoken thematic relation, *e.g.*, 'Theme', replaces *close-to* as it does in the neo-Davidsonian logical forms above with thematic separation. The frame adverbials in (209)-(217) describe the events E *then&there* wherein there was not an e the description of which now includes *underneath*. The null or overt pronoun—*underneath pro_i* or *underneath them_i*—is anaphoric to *the clouds* without referring to the clouds of Southern New England. It refers to the clouds of Southern New England at e :

- (218) [$\uparrow E$: close to the clouds[E]] [$\uparrow E$: Past[E] & therein[E, E]]
 $\neg[\exists e: Ee](\text{calm}(e) \ \& \ [\uparrow Y: \text{clouds}[Y] \ \& \ \text{there}[e, Y]] \ \text{under}(e, Y))$

Or,

- (219) [The X : clouds[X]] [$\uparrow E$: close-to[E, X]] [$\uparrow E$: Past[E] & therein[E, E]]
 $\neg[\exists e: Ee](\text{calm}(e) \ \& \ [\uparrow Y: [\forall y: Yy]Xy \ \& \ \text{there}[e, Y]] \ \text{under}(e, Y))$

It would be self-defeating to have the clouds of Southern New England frame the weather across Southern New England and then to demand the presence of them all at each local weather event therein. Consonant with the suggestion that negation is in effect a modal operator quantifying over those times, places, events or states e noticeable *then&there*, it is unsurprising to relativize the definite descriptions within its scope to the parameter e . This is a remark about definite descriptions rather than anaphoric pronouns in particular:

- (220) It wasn't calm/still/silent underneath the clouds of Southern New England.
 (221) It didn't calm (down)/become still/fall silent underneath the clouds of Southern New England.
 (222) There wasn't (a) calm/stillness/silence underneath the clouds of Southern New England.

Again no change in the weather. The experience *then&there* that the speaker has in mind for her report segments that experience into those events not a one of which was a calm

undisturbed by some air turbulence. If a pilot has in mind a flight across Southern New England and the clouds are scattered among intermittent clusters and each event therein is a transit beneath a cluster—the semidistributive condition—it suffices for (220)-(221) that there be some turbulence in the airspace beneath the cluster, without turbulence under every one of its clouds:

$$(223) \quad [\text{I}E: \text{then}\&\text{there}(E^*)][\text{I}E: \text{Past}[E] \ \& \ \text{therein}[E, E^*]] \\
\quad \quad \quad [\text{The } X: \text{clouds of SNE}[X] \ \& \ \text{there}[E^*, X]] \\
\quad \quad \quad \neg[\exists e: Ee](\text{calm}(e) \ \& \ [\text{I}Y: [\forall y: Yy]Xy \ \& \ \text{there}[e, Y]] \ \text{under}(e, Y))$$

If all DPs are addressed to a frame of reference (Schein forthcoming), or if, at least, incomplete definite descriptions are completed that way—the *clouds of Southern New England there*— and this parameter is locally bound, then the definite description in (222) is exported somewhere outside the scope of negation, in order to refer to the clouds across the entire frame of reference for the flight across Southern New England rather than those on location at any one event e , as in (223) and (224):

$$(224) \quad \dots[\text{The } X: \text{clouds of SNE}[X] \ \& \ \text{there}[E^*, X]]\dots \\
\quad \quad \quad \neg[\exists e: Ee](\dots[\text{I}Y: [\forall y: Yy]Xy \ \& \ \text{there}[e, Y]]\dots)$$

$$(225) \quad * \dots[\text{The } X: \text{clouds of SNE}[X] \ \& \ \text{there}[E^*, X]]\dots \neg[\exists e: Ee](\dots X \dots)$$

That is, Quantifier Raising leaves behind not a bare variable ‘ X ’ ((225)) but a full-blooded definite description, relativized to the local e , “those X that are at e ” (224). The same is to be said about indefinite descriptions:²²

- (226) It wasn’t calm/still/silent underneath 6130 clouds across the Southern New England sky.
(227) It didn’t calm (down)/become still/fall silent underneath 6130 clouds across the Southern New England sky.
(228) There wasn’t (a) calm/stillness/silence underneath 6130 clouds across the Southern New England sky.

$$(229) \quad [\text{I}E: \text{then}\&\text{there}(E^*)][\text{I}E: \text{Past}[E] \ \& \ \text{therein}[E, E^*]] \\
\quad \quad \quad [\exists X: 6130(X) \ \& \ \text{clouds of SNE}[X] \ \& \ \text{there}[E^*, X]] \\
\quad \quad \quad \neg[\exists e: Ee](\text{calm}(e) \ \& \ [\text{I}Y: [\forall y: Yy]Xy \ \& \ \text{there}[e, Y]] \ \text{under}(e, Y))^{23}$$

²² The ease with which (in)definite descriptions raise to wide scope is consistent with the earlier observation and argument that post-verbal adverbial phrases prefer (*cf.* nn. 10, 13) to remain *in situ* as description of the framed e , in contrast to the pre-verbal frame adverbials describing the framing E . In (223) and (229), the raised (in)definite description quantifies into a phrase that has remained *in situ* description of e , ‘...under(e, Y)’. That is, (in)definite descriptions QR wantonly, and PPs ‘pied-pipe’ reluctantly (*cf.* nn. 10, 13).

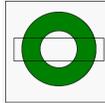
²³ Magri (2013) notes that plural morphemes, just like the definite article *the*, seem to lose their force when they occur in the scope of negation and urges a common treatment. Let it be remarked that like definite description, the conditions for plural reference that the plural morpheme expresses, whether arithmetic or

Consider last some ordinary weather, the semidistributive condition that scatters clusters of clouds across Southern New England:

- (230) a. Gliding below the clouds of Southern New England, moonlight from above enveloped them in a cool glow.
 b. Gliding below, moonlight from above enveloped the clouds of Southern New England in a cool glow.

about countability, are contingent for their satisfaction on a scene or frame of reference (Schein 2012: 289f; forthcoming: Chapter 1 §6.3, Chapter 8 §3, Chapter 9 §4.2, Chapter 11 §1, Chapter 12.). Counting one or two greens is dependent on the scene in (i) being narrow or wide and the resulting presentation of what is green:

(i)



- (ii) Two greens flank white.
 (iii) * Two greens surround white.
 (iv) One green surrounds white.

If so, for the plural reference of *towering storm clouds* in (v)-(vii) to be intended and recognized as such in the speaker's global frame of reference, at least the NP is exported as in (viii):

- (v) It wasn't calm/still/silent underneath towering storm clouds.
 (vi) It didn't calm (down)/become still/fall silent underneath towering storm clouds.
 (vii) There wasn't (a) calm/stillness/silence underneath towering storm clouds.

(viii) ..._{[NP]X}: towering storm clouds[X] & there_[E',X]...
 $\neg[\exists e: Ee](\dots[\exists Y: [\forall y: Yy]Xy \text{ \& there}[e,Y]]\dots)$

As what remains within the scope of negation in (viii) contains no plural morphology, (v)-(vii), in contrast to (ix)-(xi), deny the calm underneath the individual cloud:

- (ix) It wasn't calm/still/silent underneath (at least) two (or more) towering storm clouds.
 (x) It didn't calm (down)/become still/fall silent underneath (at least) two (or more) towering storm clouds.
 (xi) There wasn't (a) calm/stillness/silence underneath (at least) two (or more) towering storm clouds.

Note, importantly, that in understanding these sentences, what counts as countable towering storm clouds and their count is fixed for the framing condition *then&there* and is consistent across the Southern New England sky. It may very well be that from the local perspective and resolution scaled to the individual event *en route*, the single cloud resolves into several, so that the sum of clouds so enumerated and counted *en route* differs and is greater than the clouds that the global frame of reference resolves and counts. But, if it is understood that the clouds are just so many from the global perspective, why should they, zooming in to any given location, still be that many there too, reasoning as above in the text? Suppose it is made explicit that the meteorological conditions were so stormy that whether or not there is unbroken cloud cover or this or that number of clouds is a swirl in constant flux. The conditions satisfying plural morphology are satisfied only at the moment if at all, and it seems then that (v)-(vii) only make claims about when they are satisfied, when clouds—plural—are in plain sight. The meaning of plural morphology itself is also dependent on scope to fix its parameter for a frame of reference.

- (231) a. Gliding below the clouds of Southern New England, moonlight from above didn't envelop them in a cool glow.
 b. Gliding below, moonlight from above didn't envelop the clouds of Southern New England in a cool glow.
- (232) a. Gliding below the clouds of Southern New England, moonlight from above enveloped some of them in a cool glow.
 b. Gliding below, moonlight from above enveloped some (of the) clouds of Southern New England in a cool glow.
- (233) a. Gliding below the clouds of Southern New England, moonlight from above didn't envelop any of them in a cool glow.
 b. Gliding below, moonlight from above didn't envelop any (of the) clouds of Southern New England in a cool glow.

It suffices for (230) (and for (232)) that the cluster bathe in a moonbeam as I glide below, although a fog darkens the way ahead and behind, to the left and to the right. All that is necessary is that the clouds of the local event, my glide below a cluster, be aglow for its duration. It then falsifies (230) if, instead, as I glide below every cluster, merely a small moonbeam or two pierces it and captures a small cloud or two while the expanse of the surrounding cluster is a dark shroud. Yet, (232) remains true, as surely *some* of the cluster's clouds are aglow. Correlatively, here when moonbeams pierce the clusters but do not envelop them, (231) is true; yet, (233) is false, since some clouds are captured. The contrast between (230) and (232) and between (231) and (233) is represented only if (230)-(231) contain full-throated definite descriptions restricted to the local event. That is to say that there is no equivocation in the meaning of *the*, sometimes universal and sometimes existential, when under negation—an illusion of the definite description's restriction to the local event.

4.0. *Quantifying into plural attitudes.* This usage is attested elsewhere, where the cumulative reference of the (in)definite description across several local *e* is uncontroversial. Suppose a federal investigation of underage gambling has launched several operations that over the course of the investigation flood the targeted casinos scattered across several states with undercover underage gamblers so that during the surveillance, the only casino patrons are the undercover agents. The casinos all neglect to check IDs and thus never know and never discover that any of their patrons are underage gamblers. Suppose also that the \$100 admission price includes \$95 in casino chips for games with a minimum stake of \$10 at which there is always a winner, and casino admission also includes a lottery ticket for a \$100,000 jackpot drawing a number that often does not draw a winner. Every patron who enters a casino exits a loser or winner of at least \$5. The casino operators seclude themselves in offices without the means to observe the patrons or the gaming floor, a task left to security. They thus entertain no singular thoughts about the patrons, only the general thoughts that:

- (234) a. The patrons with the winning lottery number will share the \$100,000 jackpot.
b. Whatever patrons there are if any who hold the winning lottery number will share the \$100,000 jackpot.

(235) The patrons (tonight) must some of them win and some of them lose.

Note that (235) is true only if the definite description is understood to describe *all* the session's patrons, as any fewer risks omitting the session's only winners. Anyone with knowledge of the federal investigation can endorse the following attitude reports (after Bricker 1989) that quantify a plural NP into a descriptive definite description in the attribution of general thoughts to the casino operators, in which the plural NP is not itself a component *de dicto* of the attributed thoughts:

- (236) The casino operators knew that the underage gamblers with the winning lottery number will share the \$100,000 jackpot.
(237) The casino operators knew that the undercover agents (then in the casino) must some of them win and some of them lose.

To underline that the plural NP is cumulative across the casinos, suppose that the total federal budget for the undercover agents was \$613,000:

- (238) The casino operators knew that the undercover agents paid \$613,000 who hold the winning lottery number will share the \$100,000 jackpot.
(239) The casino operators knew that the undercover agents paid \$613,000 then in the casino must some of them win and some of them lose.

These sentences are paraphrased:

- (240) Those underage gamblers that the feds sent in— the casino operators knew that those with the winning lottery number will share the \$100,000 jackpot.
(241) The undercover agents— the casino operators knew that those then in the casino must some of them win and some of them lose.
(242) The undercover agents paid \$613,000—the casino operators knew that those who hold the winning lottery number will share the \$100,000 jackpot.
(243) The undercover agents paid \$613,000— the casino operators knew that those then in the casino must some of them win and some of them lose.

Given what little the casino operators know or think about the patrons in their casinos, the thought attributed to them must include a descriptive definite description quantified into, as paraphrased. The casino operators' descriptive thought—"patrons" (whoever they may be) in (234)-(235)— is supplemented and replaced in the attitude reports with the reporter's knowledge of who the patrons are unknown to the casino operators:

(244) $[\neg E': \text{then}\&\text{there}(E')][\neg E: \text{Past}[E] \ \& \ \text{therein}[E, E']]$
 $[\exists X: \text{undercover agents paid } \$613,000[X] \ \& \ \text{there}[E', X]]$
 The casino operators knew $[E]$ & $[\forall e: Ee]$ knew (e) that
 $[\neg Y: [\forall y: Yy]Xy \ \& \ \text{with the winning number}[e, Y]] \ Y$ will share (e) the \$100,000.

(245) $[\neg E': \text{then}\&\text{there}(E')][\neg E: \text{Past}[E] \ \& \ \text{therein}[E, E']]$
 $[\exists X: \text{undercover agents paid } \$613,000[X] \ \& \ \text{there}[E', X]]$
 The casino operators knew $[E]$ & $[\forall e: Ee]$ knew (e) that
 $[\neg Y: [\forall y: Yy]Xy \ \& \ \text{then in the casino}[e, Y]] \ Y$ must [some $Z: Z$ of Y] Z win (e)

Just like the weather, the definite description exported refers to the undercover agents paid \$613,000 and scattered across the E' , while definite description within the scope of the attitude restricts reference to the local e of the individual casino operator, the individual operator's knowledge, the individual casino, its gaming floor and its \$100,000 jackpot and winning number. Like the clouds scattered across Southern New England, these sentences are about conditions scattered across the attitudes of those casino operators under investigation. The definite descriptions in (236)-(239) plainly combine description of the framing E and description of the local e . Once the modal nature of negation is recognized, so should it be recognized that (in)definite descriptions in the scope of negation deserve the same logical translation as they get elsewhere in analogous constructions. Note that, also like the weather sentences, once it is understood that (236)-(239) are about scattered, independent conditions, and that reference to the federal undercover agents is cumulative across these conditions, there is little temptation to imagine that the sentences attribute absurdly to the individual casino operator an attitude about the scattered agents at other casinos, even if the logical language can express as much by suppressing the relativization to the local e or by other means, resulting in a self-defeating assertion that what is non-local is local.²⁴

²⁴ In fact, the logical resources for trans-frame-of-reference reference argued for in the text strictly enlarge the expressive power of the logical language, which as the following example shows must be able to overcome relativization to the local event e to convey the usual meaning of quantifying-in *de re*.

Suppose Biblical law demands sworn testimony from (at least) two eyewitnesses for conviction of a capital crime or of conspiracy to commit one:

(i) Two eyewitnesses testified in succession that (the) twelve spies from the House of David conspired against Saul, resulting in the grand jury's indictment.

(ii) $\# [\neg E': \text{then}\&\text{there}(E')][\neg E: \text{Past}[E] \ \& \ \text{therein}[E, E']]$
 $[\exists X: 12(X) \ \& \ \text{spies from the House of David}[X] \ \& \ \text{there}[E', X]]$
 Two eyewitnesses testified $[E]$ & $[\forall e: Ee]$ testified (e) that
 $[\neg Y: [\forall y: Yy]Xy \ \& \ \text{there}[e, Y]] \ Y$ conspired against Saul.

(iii) $[\neg E': \text{then}\&\text{there}(E')][\neg E: \text{Past}[E] \ \& \ \text{therein}[E, E']]$
 $[\exists X: 12(X) \ \& \ \text{spies from the House of David}[X] \ \& \ \text{there}[E', X]]$
 Two eyewitnesses testified $[E]$ & $[\forall e: Ee]$ testified (e) that
 $[\neg Y: Y = X \ \& \ \text{there}[e, Y]] \ Y$ conspired against Saul.

A detail of syntax in the contrast between (246) and (247) corroborates quantifying-in a definite description relativized to the local parameter:

(246) The casino operators knew that the members of a crime family of 613 that held the winning number would share the \$100,000 jackpot.

(247) The casino operators knew that the 613 members of a crime family that held the winning number would share the \$100,000 jackpot.

Sentence (246), as above, allows that the crime family is scattered across the casinos and the casinos unaware of its gamblers' criminal background. In contrast, (247) implies that those at the individual casino holding the winning number are themselves 613, which comports with the observation (Schein 2006: §29.2.2; Schein 2016) that pre-nominal cardinals in definite descriptions are, in fact, appositive modifiers—*the members of a crime family that held the winning number, who were 613*. In the scope of negation, it has also been observed (Breheny 2005, Spector 2013) that a prenominal cardinal suffices to disrupt the implication of air turbulence underneath every cloud, even in the fully distributive condition where 20 nautical miles separate every cloud from every other, in what could be equinumerous events *then&there*:

(248) It wasn't calm/still/silent underneath the 6130 clouds across the Southern New England sky.

(249) It didn't calm (down)/become still/fall silent underneath the 6130 clouds across the Southern New England sky.

(250) There wasn't (a) calm/stillness/silence underneath the 6130 clouds across the Southern New England sky.

It suffices for (248)-(250) that the pilot encounter air turbulence somewhere on the flight path. Now, if the unspoken relativization to local e is literally something along the lines of

It does the prosecution no service if one eyewitness testified against six of the spies and the other eyewitness against the other six, as (ii) allows. The reporter intends it to be understood that each testimony was against all twelve, as in (iii).

As far as the logical syntax is concerned, it seems that there is a formal ambiguity in what the exportation of an (in)definite description may leave behind: either $[\uparrow: [\forall y: \mathcal{L}y]Xy \ \& \ \text{there}[e, \uparrow]]$ as argued for above or $[\uparrow: Y = X \ \& \ \text{there}[e, \uparrow]]$ as in (iii), which, equivalent in effect to a bare variable ' X ', effectively nullifies relativization to the local event e . The ambiguity is resolved subject to the following considerations. Note that in the attitude reports, the exported (in)definite descriptions, *the undercover agents paid \$613K* and *twelve spies from the House of David*, play no role in the individuation or segmentation of the thoughts or testimony, the frames of reference they quantify into. These are individuated by casino operator or eyewitness. If one is unaware of the formal ambiguity in understanding these sentences, some practical reasoning has intervened: why would one casino operator be held to know anything about who is gambling at other casinos beyond his ken, and what would be the point of two eyewitness reports that were not of the same suspects? In the weather sentences, uttered out-of-the-blue, *the clouds of Southern New England* frame the global E and individuate the events or states therein. It defies what is known about spatiotemporal perception itself to imagine that the landmarks delimiting a frame of reference E could then all be located at a small location e within it.

“the 6130 clouds across the Southern New England sky *that are here at e*”, then, as in (247), it is implied that the 6130 are at every *e*. This is absurd (again, the non-local squeezed local) unless the speaker intends that what is *then&there* be parsed despite the cloud scatter as a single event *e*, the entire flight itself. If so understood, it indeed suffices for (248)-(250) that some air turbulence disturb this single event *e* anywhere along it. This anomaly about cardinals in definite descriptions in the scope of negation is a spin-off of the internal syntax of definite descriptions and their implicit relativization to a frame of reference parameter.²⁵

It cannot be overestimated, the ease and glibness with which global definite descriptions accommodate the local frame of reference:

(251) The medieval dioceses married the peasants in the dioceses in the local parish church.

²⁵ For the contrast between (246) and (247) to be derived as explained in the text, the derivation of logical form must be revised. It is not, as first presented in the text, that Quantifier Raising displaces the entire DP definite description, which in turn quantifies into a silent definite description left behind *in situ* (v. (224)):

- (i) ..._[DP]The *X*: members of crime family [*X*] & there_[*E*,*X*]...
 (..._[*λ*]: [*∀y*: *Yy*]*Xy* & there_[*e*,*λ*]...)

Were it so, it isn't clear why QR wouldn't take along with it all the definite descriptions modifiers, appositive or not. Rather, it is another instance of quantifying in NP, into a structure in which the prenominal and appositive modifiers are peripheral to the NP and thus remain *in situ* with the effect on meaning noted in the text:

- (ii) ..._[NP] *X*: members of crime family [*X*] & there_[*E*,*X*]...
 (..._[DP]The *Y*: 613(*Y*) & [*∀y*: *Yy*]*Xy* & there_[*e*,*λ*]...)

Note that (iii), with an indefinite description, does not imply that each casino operator knew about 613:

- (iii) The casino operators knew that 613 members of a crime family that held the winning number would share the \$100,000 jackpot.

And, correlatively, (iv)-(vi), do imply, distributively (v. Breheny 2005), that there was turbulence beneath the clouds in each event of passing underneath, as numerous as 6130 when the clouds are separated at a long distance:

- (iv) It wasn't calm/still/silent underneath 6130 clouds across the Southern New England sky.
 (v) It didn't calm (down)/become still/fall silent underneath 6130 clouds across the Southern New England sky.
 (vi) There wasn't (a) calm/stillness/silence underneath 6130 clouds across the Southern New England sky.

It must be that the prenominal cardinal in an indefinite is not in appositive position and is not eligible to remain *in situ*:

- (vii) ..._[*∃X*]: 613(*X*) & members of crime family [*X*] & there_[*E*,*X*]...
 (..._[*λ*]: [*∀y*: *Yy*]*Xy* & there_[*e*,*λ*]...)

Sentence (251) obviously reports plural events E , marriages, not all in the same one church, but rather each of which is in the local parish:²⁶

(252) ...& $[\forall e: Ee][\text{The } x : \text{local}(e,x) \ \& \ \text{church}(x)] \text{ in}(e,x) \dots$

(253) The medieval dioceses married the peasants in the dioceses in their local parish church.

Whether the antecedent for *their* is *the medieval dioceses* or *the peasants in the dioceses*, there isn't the thought that the local parish church is local for all the dioceses or all the peasants:

(254) ...& $[\exists X: \text{their}(X)][\forall e: Ee]$
 $[\text{The } x : [\exists Y: [\forall y: Yy]Xy \ \& \ \text{there}[e,Y]]\text{Poss}(x,Y) \ \& \ \text{local}(e,x) \ \& \ \text{church}(x)] \text{ in}(e,x) \dots$

It suffices for (254) that the one church hosting a marriage is local to its diocese or to the parishioners then and therein married. As above, if *the nobles in the dioceses* is definite reference in the framing E spread across the ages and Christendom, quantifying into the scope of negation and its description of the local e restricts reference accordingly when denying that any a noble marriage is in the local parish:

(255) The medieval dioceses did not marry the nobles in the dioceses in their local parish church.

(256) $[\exists E: \text{then}\&\text{there}(E)][\exists E: \text{Past}[E] \ \& \ \text{therein}[E,E]] \dots$
 $[\text{The } X: \text{nobles in the dioceses}[X] \ \& \ \text{there}[E,X]]$
 $\neg[\exists e: Ee](\text{marry}(e) \ \& \ [\exists Y: [\forall y: Yy]Xy \ \& \ \text{there}[e,Y]]\text{Theme}(e,Y) \ \&$
 $[\text{The } x : [\exists Y: [\forall y: Yy]Xy \ \& \ \text{there}[e,Y]]\text{Poss}(x,Y) \ \& \ \text{local}(e,x) \ \& \ \text{church}(x)] \text{ in}(e,x))$

Of course, quantifying into the scope of negation does not preclude that the definite description itself falls within the scope of quantification quantifying into it:

(257) Every medieval diocese did not marry its nobles in their local parish church.

(258) $[\exists E: \text{then}\&\text{there}(E)][\exists E: \text{Past}[E] \ \& \ \text{therein}[E,E]] \dots$
 $[\text{every } z: \text{medieval diocese}(z)] \dots$
 $[\text{The } X: \text{Poss}(X,z) \ \& \ \text{nobles in the dioceses}[X] \ \& \ \text{there}[E,X]]$
 $\neg[\exists e: Ee](\text{marry}(e) \ \& \ [\exists Y: [\forall y: Yy]Xy \ \& \ \text{there}[e,Y]]\text{Theme}(e,Y) \ \&$
 $[\text{The } x : [\exists Y: [\forall y: Yy]Xy \ \& \ \text{there}[e,Y]]\text{Poss}(x,Y) \ \& \ \text{local}(e,x) \ \& \ \text{church}(x)] \text{ in}(e,x))$

In support of the proposal, the argument has strayed into casinos and the medieval Church in search of precedents elsewhere in natural language. The polemical exercise should not obscure a very general warrant. I pilot several hours one summer afternoon from Lawrence Municipal Airport to Westchester County Airport, logging my visual

²⁶ There is little to the Davidsonian design unless its foundation is plural quantification over events (Schein 1993: 107ff, 126ff; Schein 2002 §1.2).

observation of the weather conditions *en route*. In the pilot's lounge, I later review the satellite imagery of the cloud cover for my route, from which I learn much about the cloud scatter and infer that I must have flown underneath all the clouds in the Southern New England sky that afternoon. Out of that mix recalling direct observation *en route*, satellite imagery and inference, I report that:

- (259) Underneath the clouds of Southern New England, it was/wasn't calm.
- (260) Close to the clouds of Southern New England, it was/wasn't calm underneath (them).
- (261) The clouds of Southern New England were/weren't calm underneath (them).
- (262) It was/ wasn't calm underneath the clouds of Southern New England.

Given that the scale and perspective of the satellite imagery and the same for my visual observation *en route* are incommensurate, I have no singular *de re* thoughts to correlate cloud in the Southern New England sky with a moment in my flight path and visual observation thereof. I entertain only the general thoughts that whatever of the clouds of Southern New England that were then and there at any given moment of the flight, it was or wasn't observed to be calm underneath. Describing the framing conditions for my flight, definite reference in a global frame of reference to the clouds of Southern New England joins a point-wise description in the local frame of reference for the flight *en route*, for which the clouds have been waypoints along the way. It is an ordinary epistemic condition to find that one knows of a certain such-and-such that they are the participants scattered across certain events about each of which something can be said, without knowing which of the such-and-such it happens to, except to remark that it happens to those of the such-and-such then there. This is trans-frame-of-reference reference, in which global reference culls its referents across local frames of reference. Definite description and Quantifier Raising are designed to provide an economy of expression for reports issued under such epistemic conditions. So much characterizes the sentences (259)-(262) whether or not negation is included. What an essay on negation needs to point out is that given the canonical logical form (28), negation—any token of 'not'—as the adverb “noughtly” (29) is always occasion for trans-frame-of-reference reference between the frame of reference for the framing conditions *E* and the local frames of reference for the events *e*.

5. Definite description by abstraction trans-frame-of-reference.

Like Quantifier Raising out of attitude reports, abstraction in the formation of definite description also quantifies in trans-frame-of-reference. The definite descriptions (263) and (265) cull their referents from across the attitudes of many. Thus abstraction on '*X*' in the logical forms (264) and (266) relates it to a full definite description relativized to the local event *e*:

- (263) the undercover agents (paid \$613,000) that/of whom the casino operators knew that those who hold the winning lottery number will share the \$100,000 jackpot

- (264) $\lceil X$: undercover agents paid \$613,000 $\lceil X$ &
 $\exists E$ (The casino operators knew $\lceil E$ & $\lceil \forall e: Ee$ knew $\langle e$ that
 $\lceil Y$: $\lceil \forall y: Yy$ & with the winning number $\lceil e, Y$]] Y will share $\langle e$ the \$100K])
- (265) the undercover agents (paid \$613,000) that/of whom the casino operators knew that those then in the casino must some of them win and some of them lose
- (266) $\lceil X$: undercover agents paid \$613,000 $\lceil X$ &
 $\exists E$ (The casino operators knew $\lceil E$ & $\lceil \forall e: Ee$ knew $\langle e$ that
 $\lceil Y$: $\lceil \forall y: Yy$ & in the casino $\lceil e, Y$]] Y must [some ζ : ζ of Y] ζ win $\langle e$])

Casting a net wider than attitude reports, trans-frame-of-reference reference is also plain within the definite descriptions in (267)-(268), which cull handprints from kindergartners and papers from sealed envelopes:

- (267) John made a (six-foot) pile out of the papers that the students each turned in in a sealed envelope.
 John made a pile out of what(ever) papers each student turned in in a sealed envelope. (Schein 1993: 263)
- (268) The kindergarten teacher made a collage for National Brotherhood Week out of the unique handprints that each pupil inked onto a paper doily.

Examples of abstraction trans-frame-of-reference are pervasive, including descriptive anaphora (Schein 1993: 183-193; 206-214; 344ff.). Suppose farmers feed donkeys one-pound bags of oats as depicted in (269), verifying (270)-(271):

- | | | |
|-------|---|--|
| (269) | d_1 | d_3 |
| | $f_1 < > b_1$ --10 min (early am) | $f_2 < > b_3$ --10 min (late am) |
| | d_2 | d_1 |
| | f_1 -- d_3 -- b_2 --10 min (early pm) | f_2 -- d_4 -- b_4 --10 min (late pm) |

- (270) a. Exactly two farmers each fed two donkeys one bag of oats. The oats weighed two pounds, and the donkeys ate for twenty minutes.
 b. Exactly two farmers each fed two donkeys one bag of oats. They were two pounds of rolled grain, and they ate for twenty minutes.
- (271) a. Exactly two farmers each fed two donkeys one bag of oats, in 20 minutes.
 b. Exactly two farmers each fed two donkeys one bag of oats. It took 20 minutes.

Anaphoric reference to the events described by the antecedent sentence and to the farmers, donkeys and oats therein omits the last two, solitary events in (269). The descriptive anaphora in (270)-(271) are examples of trans-frame-of-reference reference that cull donkeys or bags of oats from across events of a farmer each giving two donkeys one bag of oats and from no other events:

(272) [$1Z$: bags of oats[Z] & [$1E$: then&there₍₂₆₉₎(E)] [Exactly $2x$: farmer(x)]
 [$\exists e$: Ee](Agent(e, x) & feed(e) & [$\exists Y$: 2 donkeys[Y]]To(e, Y) &
 [$1W$: [$\forall z$: Wz] Zz & there(e, W)] Theme(e, W))]

The anaphora in (270)-(271) referring to oats refers to the two bags **b₁** and **b₃**. Similarly, in interpreting the other descriptive anaphors in (270)-(271), it affords reference to just donkeys **d₁**, **d₂** and **d₃** and what they do in just the 20 minutes of the first two events.²⁷

5.0. *Definite descriptions of events.* Back to the weather, abstraction trans-frame-of-reference in (273)-(277) culls its reference from across Southern New England, referring to all and only the clouds (273) or all and only the airspace or flight time (274)-(277) (un)disturbed by turbulence—fewer than all the clouds and less than the airspace and total flight of two-hours but more than the clouds or the airspace and flight time of a single two-minute segment that was(‘nt) a calm:

- (273) the clouds of Southern New England that were(n’t) calm (underneath).
- (274) a. the airspace(s) where/ flight time(s) when the clouds of Southern New England were(n’t) calm (underneath).
 b. where/when(ever) the clouds of Southern New England were(n’t) calm (underneath).
- (275) a. the airspace(s) where/ flight time(s) when underneath the clouds of Southern New England it was(n’t) calm.
 b. where/when(ever) underneath the clouds of Southern New England it was(n’t) calm.
- (276) a. the airspace(s) where/ flight time(s) when close to the clouds across Southern New England, it was(n’t) calm underneath (them).
 b. where/when(ever) close to the clouds across Southern New England, it was(n’t) calm underneath (them).
- (277) a. the airspace(s) where/ flight time(s) when it was(n’t) calm underneath the clouds of Southern New England.
 b. where/when(ever) it was(n’t) calm underneath the clouds of Southern New England.

²⁷ Note that more casual descriptions fashioned from antecedent content, e.g., *the bags of oats that (the) farmers fed (the) donkeys, the donkeys that (the) farmers fed (the) bags of oats, etc.* fail either in being too inclusive, including the oats or donkeys fed anywhere in (269) or too restrictive if understood to require of the individual donkey or bag of oats that it relate to both farmers. *The bags of oats each of which a farmer fed two donkeys* refers as desired to just **b₁** and **b₃**, but without a principled derivation of its content from the antecedent sentence. In (1993), I defined recursively a semantic relation *render*, parallel to *satisfaction*, so that anaphoric reference to *the bags of oats* refers to the bags of oats Z in (269) that *render* ‘Exactly two farmers each fed two donkeys one bag of oats(Z)’.

As above in (264) and (266), the logical form for (273), referring to clouds scattered *then&there* across Southern New England, abstracts on ‘*X*’ and quantifies in a full definite description relativized to the local event *e*:

- (278) $[\iota X : [\iota E' : \text{then}\&\text{there}(E')]]([\text{NP SNE clouds}[X] \& \text{there}[E',X]] \& [\iota E'': \text{Theme}[E'',X] \& \text{there}[E'',E'']] [\iota E''': \text{Past}[E'''] \& \text{there}[E'',E''']])$
 $(\neg) [\exists e: Ee \& \text{there}[E''',E]](\text{calm}(e) \& [\iota \mathcal{Y}: [\forall y: \mathcal{Y}y]Xy \& \text{there}[e,\mathcal{Y}]] \text{under}(e,\mathcal{Y}))]$

In the logical forms for (274)-(277) abstraction is on ‘*E*’, culling events from across New England in which the clouds participate. Within these definite descriptions of events, the disposition of *the clouds of Southern New England* is exactly that found among the simple, tensed sentences of §4. Grounded in the frame of reference for the framing *E*, the global definite description finds position still inside the definite description and yet peripheral to the description of the framed *e*, which it quantifies into trans-frame-of-reference:

- (279) $[\iota E: [\iota E' : \text{then}\&\text{there}(E')]]$
 $[\text{The } X: \text{SNE clouds}[X] \& \text{there}[E',X]] [\iota E'': \text{Theme}[E'',X] \& \text{there}[E'',E'']]$
 $[\iota E''': \text{Past}[E'''] \& \text{there}[E'',E''']]$
 $(\neg) [\exists e: Ee \& \text{there}[E''',E]](\text{calm}(e) \& [\iota \mathcal{Y}: [\forall y: \mathcal{Y}y]Xy \& \text{there}[e,\mathcal{Y}]] \text{under}(e,\mathcal{Y}))]$
 “where/when the clouds of Southern New England were(n’t) calm (underneath).”

- (280) $[\iota E: [\iota E' : \text{then}\&\text{there}(E')]] [\text{The } X: \text{SNE clouds}[X] \& \text{there}[E',X]]$
 $[\iota E'': \text{under}[E'',X] \& \text{there}[E'',E'']]$
 $[\iota E''': \text{Past}[E'''] \& \text{there}[E'',E''']] (\neg) [\exists e: Ee \& \text{there}[E''',E]] \text{calm}(e)$
 “where/when underneath the clouds of Southern New England it was(n’t) calm.”

- (281) $[\iota E: [\iota E' : \text{then}\&\text{there}(E')]]$
 $[\text{The } X: \text{SNE clouds}[X] \& \text{there}[E',X]] [\iota E'': \text{close-to}[E'',X] \& \text{there}[E'',E'']]$
 $[\iota E''': \text{Past}[E'''] \& \text{there}[E'',E''']]$
 $(\neg) [\exists e: Ee \& \text{there}[E''',E]](\text{calm}(e) \& [\iota \mathcal{Y}: [\forall y: \mathcal{Y}y]Xy \& \text{there}[e,\mathcal{Y}]] \text{under}(e,\mathcal{Y}))]$
 “where/when close to the clouds of Southern New England it was(n’t) calm underneath (them).”

- (282) $[\iota E: [\iota E' : \text{then}\&\text{there}(E')]] [\text{The } X: \text{clouds of SNE}[X] \& \text{there}[E',X]]$
 $[\iota E'': \text{Past}[E'']] \& \text{there}[E'',E'']$
 $(\neg) [\exists e: Ee \& \text{there}[E'',E]](\text{calm}(e) \& [\iota \mathcal{Y}: [\forall y: \mathcal{Y}y]Xy \& \text{there}[e,\mathcal{Y}]] \text{under}(e,\mathcal{Y}))]$
 “where/when it was(n’t) calm underneath the clouds of Southern New England.”

The logical forms throughout this section, those among (263)-(282), are unremarkable given the canonical logical form (27)-(28) of tensed sentences and the logical syntax of (in)definite descriptions and quantifying-in (§4), to which is added only second-order abstraction. Whether the result refers to undercover agents, papers, handprints, farmers, donkeys, oats, clouds, airspace(s) or flight time(s), the meaning of the natural language definite descriptions is plain and widely attested. Yet, the semantics of the iota-operator

fails them without the amendment §6 proposes. Only then will definite description manage to cinch reference to just those clouds, airspace(s) or flight time(s) that witness turbulence or calm accordingly. Similarly, amendment is necessary if the earlier definite descriptions are to refer to just those undercover agents, *etc.* culled trans-frame-of-reference from events in which they participate as described. But, as the meaning of these definite descriptions is plain enough, §7 may inquire into their distribution independent of any amendment to the iota-operator.

5.1. *Event segmentation inside definite description.* As these definite descriptions contain tensed sentences, their interpretation is subject to all that has been said in §2.0 about how the arrangement of the clouds frames the segmentation of the times or places referred to. On any occasion of use it must be decided how the framing E segment time and space into the events or states e counting for current notice and judged calm or turbulent. In (279)-(282), *the clouds of Southern New England* occurs outside the description of the individual e , in some relation to the framing E . As in §2.0, uttered out-of-the-blue against a Southern New England sky that scatters the clouds no one any closer than 20 km to any other, the reference of the negated instances of (279)-(282) includes the airspace underneath a cloud or the flight time through its airspace only if some turbulence is encountered underneath that cloud. That is to say that one has explicitly understood the thoughts to be:

(283) $[\iota E : [\iota E' : \text{then}\&\text{there}(E')][\text{The } X : \text{clouds of SNE}[X] \& \text{there}[E', X]]$
 $[\iota E'' : \text{Theme}[E'', X] \& \text{there}[E', E'']]$
 $[\iota E''' : \sum [X, E'''] \& \text{Past}[E'''] \& \text{there}[E'', E''']]$
 $\neg[\exists e : Ee \& \text{there}[E''', E]](\text{calm}(e) \& [\iota Y : [\forall y : Yy]Xy \& \text{there}[e, Y]] \text{ under}(e, Y))]$

(284) $[\iota X : [\iota E' : \text{then}\&\text{there}(E')](\text{[NP SNE clouds}[X] \& \text{there}[E', X]] \&$
 $[\iota E'' : \text{Theme}[E'', X] \& \text{there}[E', E'']]$
 $[\iota E''' : \sum [X, E'''] \& \text{Past}[E'''] \& \text{there}[E'', E''']]$
 $\neg[\exists e : Ee \& \text{there}[E''', E]](\text{calm}(e) \& [\iota Y : [\forall y : Yy]Xy \& \text{there}[e, Y]] \text{ under}(e, Y)))]$

If instead the clouds are clustered into local weather systems, it suffices to encounter air turbulence in flight through such a weather system for its airspace or the flight time through it to be included in the reference of (279)-(282) despite the calm that may prevail under many a cloud within the cluster. Reference to the clouds themselves follows the same practice according to how the events they participate in are segmented. Similarly, if the mirrors or tiles are scattered, a mirror, its glass, a tile or its ceramic is included in the reference of the definite descriptions (285)-(288) only if it is flawed:

- (285) the mirrors that aren't smooth
- (286) the mirrors' glass that isn't smooth
- (287) the tiles that aren't flat
- (288) the ceramic that isn't flat

On the other hand, in telescopes or on bathroom walls, it suffices for mirror, glass, tile or ceramic to be included if there is a flaw or misalignment in the telescope or bathroom

wall it belongs to. Also, as in §2.0, description of the individual event or state e may itself cue segmentation into events or states fewer than the clouds, mirrors or tiles and larger than their individual surroundings:

- (289) when(ever) underneath the Southern New England clouds calm did not shroud the entire coastline in silence
- (290) # $[\uparrow E: [\uparrow E': \text{then} \& \text{there}(E')][\text{The } X: \text{SNE clouds}[X] \& \text{there}[E', X]][\uparrow E'': \text{under } [E'', X]] [\uparrow E''': \sum [X, E''']] \& \text{Past}[E''']] \& \text{there}[E'', E''']]$
 $\neg[\exists e: Ee \& \text{there}[E'', E]] \text{shroud the entire coastline in silence}[e]$
- (291) $[\uparrow E: [\uparrow E': \text{then} \& \text{there}(E')][\text{The } X: \text{SNE clouds}[X] \& \text{there}[E', X]][\uparrow E'': \text{under } [E'', X]] [\uparrow E''': \text{Past}[E''']] \& \text{there}[E'', E''']]$
 $\neg[\exists e: Ee \& \text{there}[E'', E]] \text{shroud the entire coastline in silence}[e]$
- (292) the mirrors that aren't smooth to the contour of a perfect parabola
- (293) the tiles that aren't flat end-to-end
- (294) # $[\uparrow X: [\uparrow E': \text{then} \& \text{there}(E')]([\text{NP tiles}[X] \& \text{there}[E', X]] \& [\uparrow E'': \text{Theme}[E'', X] \& \text{there}[E'', E'']] [\uparrow E''': \sum [X, E''']] \& \text{Present}[E''']] \& \text{there}[E'', E''']]$
 $\neg[\exists e: Ee \& \text{there}[E'', E]](\text{flat}(e) \& [\uparrow Y: [\forall y: Yy] Xy \& \text{there}[e, Y]] \text{Theme}(e, Y) \& \text{end-to-end}(e)))$
- (295) $[\uparrow X: [\uparrow E': \text{then} \& \text{there}(E')]([\text{NP tiles}[X] \& \text{there}[E', X]] \& [\uparrow E'': \text{Theme}[E'', X] \& \text{there}[E'', E'']] [\uparrow E''': \text{Present}[E''']] \& \text{there}[E'', E''']]$
 $\neg[\exists e: Ee \& \text{there}[E'', E]](\text{flat}(e) \& [\uparrow Y: [\forall y: Yy] Xy \& \text{there}[e, Y]] \text{Theme}(e, Y) \& \text{end-to-end}(e)))$

The logical form (294) is vacuous, given SCATTER (137): no event around a solitary tile can also be an event of tiles end-to-end. Instead, a single flatness is at issue and salient, that of the bathroom wall, for which a failure rate of one suffices for (295) to refer to all the tiles on the wall, with one misaligned. Similarly, the event description (290) is vacuous: no event confined to the airspace underneath the solitary cloud can possibly shroud the entire Southern New England coastline. Here too, given the scale of such a shroud, a single event is at issue. Provided that at any moment in flight, there is air turbulence anywhere along the coastline under any of its clouds, the definite description (289)/(291) refers to the entire flight time.²⁸

Examples (289)-(291) exemplify abstraction on the framing events. The logical forms shown fall under schema (296) dividing the lexical content between description of the framing E' Φ -ing and the framed e Ψ -ing. Trans-frame-of-reference anaphora to the NP from within Ψ is as in (297):

²⁸ Note that omitting *entire* from (289) affords construal of *the coastline* as “the coastline in view”, which in turn allows the shrouding e to be contained within the airspace beneath the solitary cloud and allows (279) minus *entire* to refer to just those flight segments flown through turbulence.

(296) $[\exists E: [\exists E': \text{then} \& \text{there}(E')]] [\text{The } X: \text{NP}[X] \& \text{there}[E', X]] \dots \Phi[E'] \dots$
 $[\exists E'': (\sum[X, E'']) \& \text{Tense}[E'']] \& \text{there}[\dots, E'']] [\text{No } e: Ee \& \text{there}[E'', E]] \Psi[e]$

(297) $\Psi = \dots [\Psi \dots [\exists Y: [\forall y: Yy] Xy \& \text{there}[e, Y]] \dots \Psi][e]$

The schema shows the fundamental relationship between Φ -ing and Ψ -ing, and therefore, between those phrases on the left edge parsed to describe the framing E and those to the right describing the framed e . As remarked in §2.0, for any given spatiotemporal region such as the airspace of Southern New England, the larger the e of Ψ -ing, the fewer the E Φ -ing. In the fully distributive condition ‘ $\sum[X, E'']$ ’, the events E are as numerous as the X that *the NP* refers to, which is incompatible with many a Φ describing events e too large for the confining neighborhood of a solitary x among the X . If not the fully distributive condition, how else to segment the events—how large and how many—is still informed by how Ψ describes them:

(298) when/where(ever) the clouds of Southern New England weren’t calm underneath after colliding.

The reference of (298) is contingent on the number of collisions (*v.* (184)-(185) above). In the semidistributive condition, there are many, and the reference of (298) is determined by the conditions underneath the colliding clouds at each collision. But, these—*fully distributive, semidistributive, singular collective*—just map the way in a fluid, continuous relationship between the Φ -ing E and the e among them that Ψ : the larger the grain that one infers from Ψ -ing, the fewer the E are.

Schema (296) also represents the fate of definite descriptions captured within definite description. Grounded in the global frame of reference, they migrate to a peripheral position from which they quantify-in trans-frame-of-reference into the description of the local e . This holds no matter where the definite description is overtly pronounced (*v.* (274)-(277)), in contrast to an indefinite description where interpretation *in situ* allows for the contrast between (299) and (300):

(299) whenever a pair of clouds of Southern New England weren’t calm underneath
(300) whenever it wasn’t calm underneath a pair of clouds of Southern New England

But, this is only to discover yet another syntactic context in natural language where definite descriptions move overtly or covertly to positions more peripheral than those reserved for indefinites, bare plurals or bare NPs. The interest of (296) is that there exists within the event definite description the peripheral position to which the contained *the NP* migrates to join description of the framing E rather than the framed e . None of this works—just to remind—unless the iota-operator itself is amended as in §6 to cinch reference to just that spatiotemporalia the event definite descriptions in fact describe.

What (296) represents now belongs to the semanticist’s tool kit, a device of event abstraction and definite description. It remains an empirical question what constructions

of natural language it best translates—where in natural language are found overtly or covertly these event definite descriptions. Perhaps it is the canonical structure for focus (cf. Herburger 2000) or for dependent cumulative quantification (Schein 1993: 255ff.) for (301) to be rendered along the lines of (302):

- (301) Few SCANDINAVIANS won the 613 Nobel Prizes of the early 20th century.
 (302) What winning there was of the 613 Nobel Prizes of the early 20th century, few Scandinavians were winners in it.

Recognizing that there are covert definite descriptions of events yet to be discovered resolves a puzzle related to the frame adverbials under discussion here. Spector (2013) reports the meaning of (303) and (304) as unclear or ambiguous:

- (303) Whenever my friends visit me, I'm happy.
 (304) Whenever my children play, they are happy.

Whenever is distributive. If the adverbial clause describes the individual e (v. (305)), the sentences concern an event e only if it is a visit from all my friends or an event of all my children at play:

- (305) [Whenever $e : \Phi[e]$] [$\exists e' : R(e,e')$] $\Psi [e']$
 (306) a. [Whenever $e : [\uparrow E : \Phi] Ee$] [$\exists e' : R(e,e')$] $\Psi [e']$; or,
 b. [$\uparrow E : \Phi$] [Whenever $e : Ee$] [$\exists e' : R(e,e')$] $\Psi [e']$

On the other hand, a definite description of events— what events there were of my friends' visits to me or what events there were of my children in play sessions (v. (306))—culls visits with any of my friends or play sessions with any of my children, and accordingly (303) and (304) are understood to find happiness in each of these. That is, *my friends visit me* and *my children play* may describe the framing E or the framed e , for which logical form must be rich enough to entertain both variables and to allow that all of the descriptive content of the adverbial phrases in (303) and (304) may in fact be embedded in a covert definite description of the E .

6. *Semantics for trans-frame-of-reference definite description.*

As pervasive as trans-frame-of-reference reference may be, I will continue to accept guidance from its uncontroversial instances, quantifying into attitude reports and across the attitudes of scattered casino operators. If Quantifier Raising and abstraction in definite descriptions, as argued, leave behind a full-blooded definite description, relativized to the local e , “those X that are at e ”, the syntax and semantics of Quantifier Raising and definite description themselves face revision.

Surely all the sentences about casinos are false, if a plural *de re* (in)definite description refers to 613, undercover agents or crime family members, and yet only a tenth of them

present themselves at the casinos, the others engaged in investigations or criminal activity elsewhere. Yet, the logical forms (244)-(245) and the like are true in that those among the 613 at each casino did as reported, although amounting to only a tenth of those allegedly involved. The logical forms are too weak as written to imply that the in-gathering of undercover agents or criminals from across the local frames of reference amounts to the 613 or those paid \$613,000 referred to in the global frame of reference. This worry especially concerns the logical form of definite descriptions that effect trans-frame-of-reference reference, accumulating their referents from across the attitudes of many. The logical forms for (263)-(265) alleged in (264)-(266) in fact fail as such. They still refer to the undercover agents paid \$613,000 even if only a tenth of them were at the casinos:²⁹

The failure of (264)-(266) is catastrophic, which is obscured with specific undercover agents in mind. If it turns out that certain agents were indeed those about whom the casino operators entertained their general thoughts about patrons, surely the definite descriptions in (307)-(308) refer to the same as do (263)-(265):

- (307) whoever/those of whom/the patrons that the casino operators knew that those who hold the winning lottery number will share the \$100,000 jackpot
 (308) whoever/those of whom/the patrons that the casino operators knew that those then in the casino must some of them win and some of them lose.

Omitting mention of the agents in (309)-(310) results rather in reference to all there is, as these agents are indeed those among all there is who are the subjects of the casino operators' attitudes:

- (309) $[\lambda X: \exists E(\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \text{ knew}(e) \text{ that } [\lambda Y: [\forall y: Yy]Xy \ \& \ \text{with the winning number}[e, Y]] \ Y \text{ will share}(e) \text{ the } \$100\text{K})]$
 (310) $[\lambda X: \exists E(\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \text{ knew}(e) \text{ that } [\lambda Y: [\forall y: Yy]Xy \ \& \ \text{in the casino}[e, Y]] \ Y \text{ must } [\text{some } Z: Z \text{ of } Y] \ Z \text{ win}(e)\dots])]$

Trans-frame-of-reference reference cannot be denied—the conclusion of §4—when quantifying into the attitude reports in (244)-(245) or within the definite descriptions (263)-(265), (267)-(268), (270)-(271) and (307)-(308). Yet, here too all are at risk and must avoid reference to more undercover agents, papers, handprints, oats, donkeys, times or places than those described. Thus some correction is to be made in what has been shown must be the logical form for definite description and Quantifier Raising. Quantifier Raising is shunted off to an appendix, with little import for the noughty bits at issue. Essential here is definite description by abstraction trans-frame-of-reference. What follows relies on the syntax and semantics of definite description in Schein 2016, which urges an amendment for an independent reason, in order to join under a common meaning nonsortal and sortal definite descriptions— nonsortal *the stained*, *the stained cotton*, *the stained part(s) of the sheet* and sortal *the stained sheet(s)*. The amendments to definite

²⁹ Definite description defined as in (319) (Sharvy 1980).

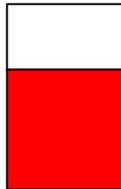
description are proven in application to the present problem, exploiting an analogy between nonsortal definite descriptions and trans-frame-of-reference definite description. Again, what explains a noughty bit of negation draws on resources attested and justified elsewhere.

6.1. *Amendment to definite description.* Fitted for trans-frame-of-reference reference, natural language definite descriptions exploit an amended definition of the iota-operator that is independently necessary for the semantics of nonsortal definite descriptions (Schein 2016).

The problem of nonsortal definite description is illustrated in the following. First, note that the sortal definite description *the sterile dental floss strings* refers to nothing if every string in a tangle of dental floss has a bacterium on it. In contrast, the nonsortal definite descriptions *the sterile dental floss string*, *the sterile parts of the dental floss*, *the sterile stretches of dental floss*, *what dental floss there is that is sterile* and *what is sterile* can refer to the floss where bacteria aren't, *i.e.*, to almost all of it, which might then be salvaged for personal use. The nonsortal definite descriptions manage to cinch reference to just what is sterile despite the fact that it, the tangle of dental floss, is itself not sterile.

For a more graphic example, consider a silk bandage, of which the lower two thirds is saturated in blood and the upper third sterile:

(311)



It is stained in virtue of the blood on *some* of it, and so is anything coincident with all of it:

- (312) The bandage (311) is stained.
The bandage's silk is stained.
The bandage's area is stained.
The bandage's threads are stained.
The bandage's thread is stained.

Yet, nonsortal definite descriptions that describe what is stained in (311) can shrink their reference to the stain itself:

- (313) What is stained doubles the area of what isn't.
(314) The stained area of the bandage is two-thirds of it.
(315) The stained silk is (a) square.
(316) The parts that are stained are two-thirds and the parts that aren't are one-third of the silk bandage.

(317) The thread that is stained is opposite the thread that isn't.

(318) F The threads that are stained are opposite those that aren't.

If anything is stained just in case some of it is, what nonsortal definite description accomplishes is reference to just that which is *sine qua non* for its stained condition, the stain itself—the witness to the existence of stain. Yet, its interpretation according to Sharvy's (1980) classic definition derives reference to only the whole of (311). Stained as it is ((312)), it must according to (319) be included in the reference of any of the definite descriptions (313)-(318).

$$(319) [\uparrow X : \Phi] \Psi \leftrightarrow_{\text{def}} [\exists X : \Phi \ \& \ \forall Y(\Phi[X/Y] \rightarrow \forall x(Yx \rightarrow Xx)) \ \& \ \forall Z(\forall Y(\Phi[X/Y] \rightarrow \forall x(Yx \rightarrow Zx)) \rightarrow \forall x(Xx \rightarrow Zx))] \Psi$$

Nonsortal definite description prompts then an amended definition (320)-(321) (Schein 2016), according to which *the stained* ((313)-(318)) refers to the least of (311) that overlaps any and all of (311) that is stained, *i.e.*, the stain itself:

$$(320) \text{Overlap}[Y, X] \leftrightarrow_{\text{def}} \exists x(Yx \vee Xx) \rightarrow \exists x(Yx \ \& \ Xx)$$

$$(321) [\uparrow X : \Phi] \Psi \leftrightarrow_{\text{def}} [\exists X : \Phi \ \& \ \forall Y(\Phi[X/Y] \rightarrow \text{Overlap}[Y, X]) \ \& \ \forall Z(\forall Y(\Phi[X/Y] \rightarrow \text{Overlap}[Y, Z]) \rightarrow \forall x(Xx \rightarrow Zx))] \Psi^{30}$$

³⁰ See Schein 2016 for justification that (320)-(321) is adequate for sortal and nonsortal definite descriptions alike. (321) is simplified from the definition in Schein 2016 which includes a clause so that for those conditions Φ where distinct X satisfy (321), the definite description refers to the largest such X .

Sharvy's original definition (319) and its amendment (321) agree that reference for *the* Φ be fixed by a universal sampling of what is Φ so that:

- (i) Anything Φ be part of the Φ (*v.* (319)); or,
- (ii) Anything Φ overlap the Φ (*v.* (321)).

In yet further amendment (Schein 2016), a perspectival turn moves from universal sampling to a universal scan or survey:

- (iii) Anywhere there be Φ , the Φ there overlap the Φ .

As before, definite reference is to the least such Φ overlapping what Φ there is in the given spatiotemporal context THERE:

- (iv) “The Φ THERE are some Φ THERE- X such that anywhere THERE there be Φ , the Φ there overlap X , and for any Z that also be such, the X be Z .”

- (v) Within $[V, \alpha] \leftrightarrow_{\text{def}} \forall v(Vv \rightarrow \text{within}(v, \alpha))$

$$\begin{aligned} [\text{Th}X : \Phi \text{ there}] \Psi &\leftrightarrow_{\text{def}} \\ [\exists X : [\exists \alpha : \text{there}(\alpha)] (\Phi \ \& \ \text{within}[X, \alpha]) \ \& \\ [\forall \alpha : \text{there}(\alpha)] \forall Y([\uparrow Z : \Phi[X/Z] \ \& \ \text{within}[Z, \alpha]) = Y \rightarrow \text{Overlap}[Y, X]) \ \& \\ \forall W([\forall \alpha : \text{there}(\alpha)] \forall Y([\uparrow Z : \Phi[X/Z] \ \& \ \text{within}[Z, \alpha]) = Y \rightarrow \text{Overlap}[Y, W]) \rightarrow \forall x(Xx \rightarrow Wx))] \Psi \end{aligned}$$

6.2. *The semantics of definite description trans-frame-of-reference.* As remarked above (§6), standard interpretation of a definite description in (§5) that abstracts trans-frame-reference misfires even if it is a sortal description. Interpreting (322) in context (269) according to Sharvy's unamended definite description (319) derives reference to the four bags of oats weighing 4 lbs., *contra* (323).

(322) [λz : bags of oats[λz] & [λE : *then&there*₍₂₆₉₎(E)] [Exactly $2x$: farmer(x)]
 $[\exists e: Ee](\text{Agent}(e,x) \ \& \ \text{feed}(e) \ \& \ [\exists Y: 2 \text{ donkeys}[Y]] \ \text{To}(e,Y) \ \& \ [\lambda W: [\forall z: Wz] \lambda z \ \& \ \text{there}(e,W)] \ \text{Theme}(e,W))$

(323) a. Exactly two farmers each fed two donkeys one bag of oats. The oats weighed two pounds, and the donkeys ate for twenty minutes.
 b. Exactly two farmers each fed two donkeys one bag of oats. They were two pounds of rolled grain, and they ate for twenty minutes.

(324) a. Exactly two farmers each fed two donkeys one bag of oats, in 20 minutes.
 b. Exactly two farmers each fed two donkeys one bag of oats. It took 20 minutes.

Interpreting (322) according to (320)-(321), the amendment prompted by nonsortal definite descriptions, derives instead the desired reference to the two bags **b₁** and **b₃**. Among these two bags of oats are all the oats fed in any event of a farmer feeding two donkeys, and these two bags are the fewest to both include all such oats and to overlap any other of the bags among which are all such oats. That is, the amended definite description affords reference to just the bags of oats that witness the existence condition. Similarly, in interpreting the other descriptive anaphors in (323)-(324), it affords reference to just donkeys **d₁**, **d₂** and **d₃** and what they do in just the 20 minutes of the first two events.

The definite descriptions (325)-(326) refer to only those undercover agents about whom the casino operators know something:

(325) those that the casino operators knew that those then in the casino must some of them win and some of them lose

In effect, definite description culls its referents not from a universal quantification over arbitrary samples of Φ but only over samples that are all the Φ that fill some spatiotemporal region or some region of the perceptual field. Natural language definite description is an act of reference with more to it than strict translation as the iota-operator in (319) or (321) would make it out to be. What is plain in the meaning of *this/these* and *that/those*, reference to a space or frame of reference, here with a metric to distinguish proximal and distal reference, is latent in the meaning of *the* and any other natural language definite description, where reference, like the cognitive act itself, is always perspectival. The further amendment in v) is immaterial to the discussion in the text except for the important endorsement that reference is always in a frame of reference even if latent.

(326) those that the casino operators knew that those who hold the winning lottery number will share the \$100,000 jackpot

As desired, the amended meaning of the iota-operator cinches reference to just the instantiating undercover agents:³¹

(327) $[\lrcorner X: \exists E(\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \text{ knew}(e) \text{ that}$
 $[\lrcorner Y: [\forall y: Yy]Xy \ \& \ \text{with the winning number}[e, I]] \ Y \text{ will share}(e) \ \text{the } \$100\text{K})]$

(328) $[\lrcorner X: \exists E(\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \text{ knew}(e) \text{ that}$
 $[\lrcorner Y: [\forall y: Yy]Xy \ \& \ \text{in the casino}[e, I]] \ Y \ \text{must} \ [\text{some } Z: Z \ \text{of } I] \ Z \ \text{win}(e)\dots])]$

The definite descriptions of events (§5.0) that refer to the airspace or the flighttime(s) or the where(ever) or when(ever) that there is(n't) calm combine both abstraction trans-frame-of-reference and nonsortal description. Their unspoken counterparts figure large in the logical syntax of decreasing quantification.

7. *In the scope of non-increasing quantification.*

The *pas de deux* (§§0-3) between negation and event segmentation and the eccentricity of definite description within the scope of negation (§4) carry over *mutatis mutandis* when decreasing quantification replaces negation. No moonlight between them tells apart (329)-(332) from (333)-(336):

(329) No liquid mercury smooths (over) the mirrors (under its spin).

(330) No liquid mercury perfects/calibrates the mirrors (under its spin).

(331) Under the spin of no liquid mercury are the mirrors smooth(ed over).

(332) Under the spin of no liquid mercury are the mirrors perfect/calibrated.

³¹ If the natural language definite description in (i) is translated as in (ii), it fails to imply that all those on the \$613,000 payroll are involved:

(i) the undercover agents paid \$613,000 that the casino operators knew that those then in the casino must some of the win and some of them lose

(ii) $[\lrcorner X: \text{undercover agents paid } \$613,000[X] \ \& \ \exists E(\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \text{ knew}(e) \text{ that}$
 $[\lrcorner Y: [\forall y: Yy]Xy \ \& \ \text{then in the casino}[e, I]] \ Y \ \text{must} \ [\text{some } Z: Z \ \text{of } I] \ Z \ \text{win}(e)\dots)]$

(iii) $[\lrcorner X: \text{undercover agents paid } \$613,000[X] \ \& \ [\lrcorner Z: [\forall z: Zz]Xz \ \& \ \exists E(\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \text{ knew}(e) \text{ that}$
 $[\lrcorner Y: [\forall y: Yy]Zy \ \& \ \text{then in the casino}[e, I]] \ Y \ \text{must} \ [\text{some } W: W \ \text{of } I] \ W \ \text{win}(e)\dots)]$
 $Y=X]$

A conclusion of (Schein 2016, 2006) is that the internal structure of natural language definite descriptions sometimes iterate the iota-operator so that (i) might very well translate as (iii), which does imply that any among the undercover agents on that payroll is the subject of at least one casino operator's attitude.

- (333) Liquid mercury doesn't smooth (over) the mirrors (under its spin).
(334) Liquid mercury doesn't perfect/calibrate the mirrors (under its spin).

- (335) Under the spin of liquid mercury, the mirrors aren't smooth(ed over).
(336) Under the spin of liquid mercury, the mirrors aren't perfect/calibrated.

Suppose for (329)-(336) that spinning liquid mercury surfaces all mirrors. As earlier, if, out-of-the-blue, a scatter of mirrors is referred to without a shared frame of reference, what counts for current notice are those events each coincident with a mirror for the period at issue and thus equinumerous with the mirrors themselves (the fully distributive condition ' $\sum[X,E]$ '). If so, (329)-(336) are true only if each mirror is flawed. If, instead, the mirrors are the components of a single reflector telescope (the fully collective condition), it suffices that any flaw disturb the reflector's parabolic perfection, including a misalignment at the seams of mirrors otherwise perfect. If, again, the mirrors are scattered among several reflector telescopes (the semidistributive condition), it becomes necessary for each telescope to have a flaw anywhere in or between its mirrors.

In the above examples, the description of the events said not to exist does not itself offer any cues for event segmentation, and it is left to observation of how the mirrors are arranged to grasp what events are intended for current notice. But, the description could otherwise indicate that larger events are at issue (Breheny 2005). The above presumed that the liquid mercury spins in a vortex centered on the individual mirror's center with a diameter equal to it. Imagine instead that different amounts of liquid mercury with a more chaotic dynamics cover arbitrary numbers of mirrors:

- (337) No liquid mercury smooths (over) the mirrors under its span.
(338) No liquid mercury perfects/calibrates the mirrors under its span.
(339) Under a span of no liquid mercury are the mirrors smooth(ed over).
(340) Under a span of no liquid mercury are the mirrors perfect/calibrated.
(341) Liquid mercury doesn't smooth (over) the mirrors under its span.
(342) Liquid mercury doesn't perfect/calibrate the mirrors under its span.
(343) Under a span of liquid mercury, the mirrors aren't smooth(ed over).
(344) Under a span of liquid mercury, the mirrors aren't perfect/calibrated.

A relevant event now coincides with a liquid mercury storm, and it suffices for (337)-(344) that none of these, chaotic as they are, manages to smooth over the mirrors under its span, for which it again suffices that under each such storm, there is a flaw anywhere in or between its mirrors. In the event that one large liquid mercury storm flows over all the mirrors, then a single imperfection will do to verify (337)-(344).

- (345) No liquid mercury smoothed (over) the mirrors until it reached 6130 rpm.
(346) The liquid mercury didn't smooth (over) the mirrors until it reached 6130 rpm.

- (347) No liquid mercury smoothed (over) the mirrors in 613 ms.
 (348) The liquid mercury didn't smooth (over) the mirrors in 613 ms.

Likewise, an event for (345)-(348) is a spin that starts and runs until it reaches 6130 rpm or 613ms. Such an event never reaches a smoothness, flawed by imperfection in or between any of its mirrors.

The logical resources deployed in earlier sections for negation and its *pas de deux* with event segmentation and definite description will carry over to decreasing quantification; but, it must not be carried so far that it undermines increasing quantification:

- (349) No liquid mercury smooths (over) the mirrors.
 (350) No liquid mercury vortex smooths (over) the mirrors.
 (351) Liquid mercury doesn't smooth (over) the mirrors.
 (352) Liquid mercury vortices don't smooth (over) the mirrors.
 (353) The liquid mercury smooths (over) the mirrors.
 (354) Every liquid mercury vortex smooths (over) the mirrors.
 (355) Liquid mercury smooths (over) the mirrors.
 (356) Liquid mercury vortices smooth (over) the mirrors.

Consider the fully distributive condition where the mirrors are scattered and none joins any other inside a refractor telescope. As above, (349)-(352) imply that none is smooth—that under any vortex of liquid mercury, it is not so that *some* of the mirrors are smooth. In contrast, it does not suffice for (353)-(356) that some of the mirrors are. It is implied that all are. Whatever is to be said about decreasing quantification that renders (350) equivalent to (357) (depleting the force of the definite description in its scope), it must leave (354)'s equivalence to (358) intact, without compromise as (359):^{32, 33}

- (357) [No x : liquid mercury vortex(x)] [∃ y : [∩ \mathcal{Y} : mirrors(\mathcal{Y})] \mathcal{Y}] ∃ E smooths(E, x, y)
 (358) [Every x : liquid mercury vortex(x)] [∩ \mathcal{Y} : mirrors(\mathcal{Y})] ∃ E smooths(E, x, \mathcal{Y})
 (359) *[Every x : liquid mercury vortex(x)] [∃ y : [∩ \mathcal{Y} : mirrors(\mathcal{Y})] \mathcal{Y}] ∃ E smooths(E, x, y)

Decreasing and increasing quantification are different.

7.0. *The logical syntax of increasing and decreasing quantification.* The literature on generalized quantifiers (e.g., Barwise 1979, Keenan 1987, Lindstrom 1966, Sher 1990, Westerståhl 1987) proposes various normal forms in the metalanguage for translation of natural language quantification. The syntax of quantification in the natural language object language may look like first-order, restricted quantification in (360); but, the metalanguage for the semantics translates it into second-order logic and reveals different

³² Obviously, with the mirrors all scattered in the fully distributive condition, no one vortex can smooth them all. (354) is false, asserting a physical impossibility.

³³ The contrast between (349)-(352) and (353)-(356) rehearses a staple of the literature on the Homogeneity Condition, *v.* citations in n. 11.

schemas for increasing, decreasing, and exact quantification, adapted and simplified from Westerståhl 1987:

(360) [DP Qv : NP(v)] [TP v are connected]

(361) (At least) two dots are connected.

$$\exists X \exists Y (2(X) \ \& \ X \subseteq (1Z)(\text{dots}(Z)) \ \& \ Y = (1Z)(\text{connected}(Z)) \ \& \ X \subseteq X \cap Y)$$

(362) No more than two dots are connected.

$$\exists X \exists Y (\leq 2(X) \ \& \ X \subseteq (1Z)(\text{dots}(Z)) \ \& \ Y = (1Z)(\text{connected}(Z)) \ \& \ X \cap Y \subseteq X)$$

(363) Exactly two dots are connected.

(364) $\exists X \exists Y (2(X) \ \& \ X \subseteq (1Z)(\text{dots}(Z)) \ \& \ Y = (1Z)(\text{connected}(Z)) \ \& \ X \subseteq X \cap Y \ \& \ X \cap Y \subseteq X)$

Increasing quantification asserts a lower bound on the extension of the matrix predicate, decreasing quantification, an upper bound, and exact quantification lower and upper bound. If the logical form of natural language is identified with its translation into a normal form, classification is reflected in the logical syntax itself as shown in (361)-(364). Alternatively, if the classification is held to be strictly lexical (*v.*, *e.g.*, Larson & Segal 1995), such equivalences as (361)-(364) are derived from a lexicon (365)-(367) that conceals the classification underneath a logical syntax that concedes no distinction between increasing and decreasing quantification:

(365) (at-least-)two(X, Y) $\leftrightarrow_{\text{def}} \geq 2(X \cap Y)$

(366) no-more-than-two(X, Y) $\leftrightarrow_{\text{def}} \leq 2(X \cap Y)$

(367) exactly two(X, Y) $\leftrightarrow_{\text{def}} 2(X \cap Y)$

The extent to which the classification finds reflection in the logical syntax is an empirical question. It is not as if different quantifiers do not correlate with different syntactic positions (Szabolcsi 1997, 2010) or that such differences of syntax cannot be writ large across the clausal structure. In English declarative sentences, Subject-Aux Inversion requires in first position a phrase containing a decreasing quantifier interpreted with scope over the entire sentence (Lieberman 1974):

(368) With no neighbor nearby, a drummer is a welcome guest.

(369) With no neighbor nearby is a drummer a welcome guest.

(370) With neighbors nearby, a drummer is an unwelcome guest.

(371) *With neighbors nearby is a drummer an unwelcome guest.

With inversion, (369) is unambiguous that no neighbor's being nearby is occasion to welcome a drummer; without inversion, (368) means only that the absence of neighbors is the occasion for drummer guests. Absent decreasing quantification, the inversion in (371) is ungrammatical. Plainly, decreasing quantification may have a syntax different from that of increasing quantification.

Relevant presently is the contrast between decreasing and increasing quantification in supplying antecedents for descriptive anaphora:³⁴

(372) A few men came to the office today. They tried to sell encyclopedias. Perhaps there were even others who did the same.

(373) # Few men came to the office today. They tried to sell encyclopedias. Perhaps there were even others who did the same.

If descriptive anaphora depends for its descriptive content on the antecedent clauses in (372)-(373), then the nonmaximal reference afforded the one in (372) and denied the other in (373) fingers more than an article *a(n)* inserted between decreasing and increasing quantification. If nonmaximal reference in (372) derives from a selective perspective as paraphrased in (374) (Schein *op cit.* n. 34), something thwarts it in (373):

(374) A few men *now en scene* came to the office today. They [= *the few men now en scene who came to the office today*] tried to sell encyclopedias. Perhaps there were even others who did the same.

As in the *pas de deux* between negation and spatiotemporal quantification, a selective perspective threatens to trivialize decreasing quantification, as there is always some scene at the office narrow or brief enough to be bereft of men selling encyclopedias. On these grounds, one might suggest that by rule of grammar or pragmatic inference, *now en scene* and any other perspectival vocabulary is never tokened within the scope of decreasing quantification:

(375) # Few men *now en scene* came to the office today. They [= *the few men now en scene who came to the office today*] tried to sell encyclopedias. Perhaps there were even others who did the same.

Yet, if there is a vocabulary for tacit reference to the current scene, can't the speaker be taken to have in mind definite reference to a current scene large enough to be worthy of current notice for comment about the encyclopedia trade that does or does not occur within it? If so, nonmaximal reference will be mistakenly derived for (373), provided the speaker has in mind a scene large enough for current notice but small enough not to observe *all* the men coming to the office today. Something else must enforce the contrast between (372) and (373).

In imposing an upper bound, decreasing quantification, in contrast to increasing quantification, refers to all that which must be comprehended and submitted to an upper bound—to *whatever if anything* there was of men coming to the office today— of which it is said that few men were in any of it. Moreover, it is a definite description with a certain counterfactual flavor—or, to coin a more accurate term, a counter-haecceitic flavor— *whatever if anything there is now en scene and beyond* of men coming to the office today. It may very well include tacit reference to the current scene in order to be explicit that it widens

³⁴ v. Schein (1993) Chapter 10 pp. 215-237 and references cited therein; Schein (forthcoming) Chapter 9, Appendix 1.

the purview of reference to include what is outside it. In a language rich enough for navigational guidance and spatial orientation,³⁵ some narration is concurrent report of the visual scene and *scene analysis*, i.e., the inverse projection of the streaming incoming scene onto an egocentric frame of reference for the ambient environment. Other narration reports the result of *path integration*, the translation of the egocentric frame of reference and features perceived therein to allocentric frames of reference, in which transient observations end in a map of the environment that is invariant to perspective and the conditions of observation.³⁶ In a language explicit about such parameters, one could enrich the gloss as *whatever eventery if any there be now en scene or beyond in the frame of reference to which the scene now en scene is path-integrated* of men coming to the office today. The first sentence of (373) means that what is going on throughout the frame of reference to which this narration and the scenes it narrates are integrated scene-by-scene involves few men coming to the office today.^{37,38} These remarks point to a broader justification for the basic formal point about logical syntax at issue here. The insight that decreasing quantification imposes an upper bound, which increasing quantification does not, is not consigned to the lexicon. It is cashed out in a logical syntax in which the logical form of decreasing quantification includes a definite description of events, which the logical form of increasing quantification does not. The argument could rest here, alongside (368)-(371), with an empirical finding of yet something else that distinguishes increasing and decreasing quantification. Yet, §7.1 will offer some remarks on derivation of the contrastive logical syntax. Here let us continue with what the distinction in logical syntax purchases.

Suppressing the perspectival vocabulary, increasing quantification in the first sentence of (372) has the skeletal logical form in (376):

- (376) [A(n) X: few(X) & men[X]][1E: Past[E] & then&there(E)]
 [∃E': there[E',E'']] (Theme[E',X]) & come to the office[E']
 “A few men are such that for some past events then and there, they participated in these comings to the office.”

³⁵ Schein (forthcoming) Chapter 9 Cinerama Semantics.

³⁶ “The reader may have had the experience of emerging from a subway station or movie theater in a grid city like Manhattan 180° misoriented. One walks with this unwitting misorientation until one fails to find some expected building or street at the spot one takes oneself to have arrived at. There follows a hard-to-describe sense of something rotating inside one’s head to produce the proper alignment between the perceived city and one’s cognitive map.” (Gallistel 1990: 193).

³⁷ That is, a global frame of reference for the path-integration of the current scene and its sequels should not be omitted. The first sentence of (373) is only about anywhere *at the office* anytime *today*. One should allow for as much even if, as in *Few men came. They tried to sell encyclopedias*, office and today are not mentioned and yet the sentence is not understood to number the men who came anywhere anytime in the past.

³⁸ (Aloimonos 1997, Gallistel 1990, Golledge 1999, Redish 1999) Loomis *et al.* (1999) remark that “*path integration* is the inclusive term referring to the updating of position on the basis of velocity and acceleration information, i.e., without position-fixing. Authors broaden path integration to include navigation with restricted ‘viewpoint’ as when navigating medieval alleys.... To generalize, path integration is the process of navigation by which the traveler’s local translations and rotations, whether continuous or discrete, are integrated to provide a current estimate of position and orientation with a larger spatial framework. Gallistel (1990) path integration allows the traveler to gradually integrate the isolated perspective views encountered into an internal representation (cognitive map) suitable for subsequent piloting.”

But, the decreasing quantification in (373) introduces a definite description of whatever comings to the office there were:

- (377) $[\exists X: \text{few}(X) \ \& \ \text{men}[X]]$
 $[\uparrow E: [\uparrow E': \text{then} \& \text{there}(E') \ \& \ \text{Past}[E']][\exists e: Ee \ \& \ \text{there}[E', E]] \text{come to the office}[e]]$
 Theme $[E, X]$
 “Some few men are such that whatever if any past events then & there there were of comings to the office, these events’ participants were them.”

Now, if the quantification includes within its scope a definite description, *the publisher’s titles* in (378)-(379), in the scope of decreasing quantification, the definite description finds itself inside an unspoken definite description of events—*whatever there was of the publisher’s titles being discounted*— in (381):

(378) A few booksellers discounted the publisher’s titles.

(379) Few booksellers discounted the publisher’s titles.

- (380) $[\text{A}(n) X: \text{few}(X) \ \& \ \text{booksellers}[X]]$
 $[\uparrow E: \text{Past}[E] \ \& \ \text{then} \& \ \text{there}(E)]$
 $[\exists E': \text{there}[E, E']](\text{Agent}[E', X]) \ \& \ \text{discount}[E'] \ \&$
 $[\text{The } Y: \text{publisher’s titles}[Y] \ \& \ \text{there}[E, Y]] \text{Patient}[E', Y]$
 “A few men are such that for some past events then and there, they were these events’ agents, these events were discountings, and the publisher’s titles were the discounted in these events.”

- (381) $[\exists X: \text{few}(X) \ \& \ \text{booksellers}[X]]$
 $[\uparrow E: [\uparrow E': \text{then} \& \ \text{there}(E') \ \& \ \text{Past}[E']][\text{The } Y: \text{publisher’s titles}[Y] \ \& \ \text{there}[E', Y]]$
 $[\exists e: Ee \ \& \ \text{there}[E', E]](\text{discount}(e) \ \& \ [\uparrow Z: [\forall z: Zz] Yz \ \& \ \text{there}[e, Z]] \text{Patient}(e, Z))$
 Agent $[E, X]$
 “Some few booksellers are such that whatever there was of the publisher’s titles being discounted, the discounting agents were them.”

Like the definite descriptions (§5.0) *where/when(ever) it was calm underneath the clouds of Southern New England* and *the airspace(s) where it was calm*, culling the calm airspace from anywhere underneath the clouds it may be found, the definite description in (381) cinched reference to whatever discounting there was of any of the publisher’s titles, jointly or severally, whether or not all the titles are discounted. True to the meaning of (379), (381) in turn entails that few are the booksellers who discount *any* of the publisher’s titles. In contrast, under increasing quantification, (378) and (380), *the publisher’s titles* is not embedded inside a definite description of events. Absent the syntax and semantics of trans-frame-of-reference reference, the ‘flat’ logical form (380) does entail, as (380) requires, that the publisher’s titles are all discounted, and their discounters are a few booksellers.

Concerning the interpretation of a definite description such as *the publisher's titles* within the scope of increasing and decreasing quantification, the contrast between them, (378) *vs.* (379), reduces to logical syntax and scope—to the distribution of tacit definite descriptions of events within which *the publisher's titles* occupies a position from which it quantifies in trans-frame-of-reference, as in (381). Note that the account leaves the definite description at issue within the scope of the decreasing or increasing quantifier, as it must for those dependent on a distributive quantifier (Breheny 2005):

(382) Every bookseller discounted its titles.

(383) No bookseller discounted its titles.

The logical form of (383) is (384) or (384), adapting (381) to the distributive quantification:

(384) [No x : bookseller(x)]

[$\exists E$: [$\exists E$: *then&there*(E) & Past[E]]][The I : x 's titles[I] & there[E , I]]

[$\exists e$: Ee & there[E , E]](discount(e) & [$\exists z$: [$\forall z$: z z] Iz & there[e , z]]Patient(e , z))

[$\exists e$: Ee]Agent(e , x)

“No bookseller is such that whatever there was of its titles being discounted, it was the agent in any of it.”^{39, 40}

³⁹ Distributive quantification is concurrent event quantification over those events or parts of events in which the solitary participant participates solo (Schein 1993). Hence, ‘[$\exists e$: Ee]Agent(e , x)’ in (384)-(384), where I imagine that the VP raises to form the definite description quantifying-in ‘ E ’: ‘...[$\exists E$: VP][$\exists e$: Ee]Agent(e , x)’. But, this is proxy for a family of logical forms contingent on the basic clausal structure assumed—the number of thematic relations that a DP-argument may control or raise through, the inventory of aspectual relations and of relations between events such as ‘Cause(e , e)’, *etc.* For any such clausal structure, e.g., Tense-Aspect-Participant- (*Qua*-)Agent-Cause-Participant-(*Qua*-)Theme-V, it is an empirical question whether, say, AspectP, AgentP, CauseP, or VP, is the phrase forming the definite description of events argued for in the text. In (384)-(384), for the sake of brevity, I assume that the fronted phrase is a VP omitting ‘Agent’. It could be a larger phrase that includes it, leaving behind a copy in ‘[$\exists e$: Ee]Agent(e , x)’ or, instead, quantifying into a ‘higher’ thematic relation, ‘[$\exists e$: Ee]Participate(e , x)’. See Schein (forthcoming).

⁴⁰ Natural language that falls under (i) and (ii) exemplifies a covariation between the reference of the plural definite description and the antecedent quantifier:

(i) Every bookseller _{i} ... its _{i} titles...

(ii) No bookseller _{i} ... its _{i} titles...

Whatever is its correct treatment, the argument in the text is that it may be imported as-is into the current proposal, illustrated in (384)-(384) in the common coin, an antecedent quantifier that is distributive, singular and first-order, ‘[No x : bookseller(x)]’, *cf.* ‘[Every x : bookseller(x)]’. The proper representation of distributivity and the co-variation it induces in definite descriptions might be otherwise. The question is how closely the distributive and decreasing *few booksellers* and the plural (in)definites *a few booksellers*, *the few booksellers* ought to resemble each other offering logical forms in which the same morpheme *few* occurs with the same meaning, which is addressed §7.1. (Similarly, for the distributive *many booksellers* and the plural (in)definites *some many booksellers* and *the many booksellers*.) With this in mind, I chose to translate *a few booksellers* and *few booksellers* in (378)-(379) as ‘[A(n) X : few(X) & booksellers[X]]’ and ‘[$\exists X$: few(X) & booksellers[X]]’ respectively in (380) and (381) rather than as ‘[A(n) X : few(X) & booksellers[X]]’ and ‘[few x : bookseller(x)]’, which forfeits what a distributive, first-order quantifier *few* could have in common with the cardinal adjective *few*. Conveniently, (378)-(379) did not contain a co-variant definite description, unlike (1)-(2):

7.1. *Remarks on derivation of the logical syntax.* I have heard a clamor⁴¹ for some guidance as to how the contrastive logical syntax might emerge from *a few men vs. few men* (v. also (53)-(56), (67)-(68)), where, with the same *few* in place, combination with a spoken article or not appears to make all the difference between increasing and decreasing quantification.

Collected (from Schein (forthcoming) chapter 1§6.4; chapter 13 §1) are some further observations distinguishing the zero article in bare [DP∅ NP] from [DP *a(n)/some/the* NP] and elaborating its counter-haecceitic flavor. These join remarks that assimilate *few* to adjectives such as *scattered* or *intermittent*, which are transparently about distributions. These adjectives are also privative, in contrast to *clustered* or *frequent*. As such, when embedded in bare [DP∅ *scattered* NP] or [DP∅ *intermittent* NP], they manage to emulate decreasing quantification without a decreasing quantifier. Instead, the logical syntax at issue satisfies the lexical and semantic requirements for zero article and adjective and derives the effect of decreasing quantification, an effect that dissipates in the presence of spoken articles, [DP *a/some/the scattered* NP], [DP *an/some/the intermittent* NP]. The question is again how the presence or absence of a spoken article makes all the difference between increasing and decreasing quantification. There is little comfort in declaring *a-/some-/the-scattered* a lexical, increasing quantifier and *scattered* a lexical, decreasing quantifier. There is little else to do but engage the logical syntax that surrounds article, zero or spoken, and adjective. As much as this is necessary and already in place for

-
- (1) A few booksellers discounted their titles.
 (2) Few booksellers discounted their titles.

If, in (2), ‘ $\exists X$: *few*(X) & booksellers[X]]’ rather than ‘[*few* x : bookseller(x)]’ were the antecedent, *their titles* could not be ‘ x ’s titles’ with a bare, singular variable ‘ x ’ as the translation of the pronoun *their*. This pronoun would itself be descriptive, assimilating the pronoun to transparently descriptive counterparts such (3)-(8):

- (3) A few booksellers discounted the local celebrity author’s titles.
 (4) Few booksellers discounted the local celebrity author’s titles.
 (5) A few booksellers discounted the (local) discounter’s titles.
 (6) Few booksellers discounted the (local) discounter’s titles.
 (7) A few booksellers discounted the (local) Agent’s titles.
 (8) Few booksellers discounted the (local) Agent’s titles.

For these examples, suppose that the booksellers are scattered across several locales so that singular reference to the local celebrity author, the local discounter, or the local Agent is good only within the individual locale. The analysis should duplicate that of *the local parish church* in (251) discussed in §3.1, p. 37ff. For more about (semi-)distributivity and about *few booksellers vs. a few booksellers/the few booksellers and many booksellers vs. some many booksellers/the many booksellers*, v. Schein (forthcoming) Chapter 12 §3; Chapter 13, and references cited therein. Similarly, *no booksellers* ‘ $\exists X$: no(X) & booksellers[X]]’ and *no bookseller* ‘ $\exists X$: no(X) & $[\forall x: Xx]$ bookseller.SG[x]]’. Recall that booksellers[X] $\leftrightarrow [\forall x: Xx]$ and existence is not implied: booksellers[X] $\neq \exists x Xx$.

⁴¹ I thank the anonymous reviewer who opened this door.

scattered and *intermittent*, so goes (a) *few*, with little left for the pretense of a lexical classification (365)-(367) that would escape distinction in the logical syntax.

The zero article, implies an imperfective, scanning measurement, consonant with an incremental accumulation by the hundreds, in contrast to the perfective measurement an overt article implies:

- (385) Baseball legends by the hundreds were Jews.
- (386) #Some/the baseball legends by the hundreds were Jews.

Moreover, the scan appears counter-haecetic to cut across scattered scenes or frames of reference, so that it is inconsistent with any predicate that for reasons of singular reference (387) or intrinsic topology (389), implies that the scatter not be scatter but fall under a singular scene or frame of reference:

- (387) a. # Baseball legends were a Jewish Hall of Fame.
 - b. # Many baseball legends were a Jewish Hall of Fame.
 - c. # Few baseball legends were a Jewish Hall of Fame.
- (388) a. Some/the baseball legends were a Jewish Hall of Fame.
 - b. Some/the many baseball legends were a Jewish Hall of Fame.
 - c. A/the few baseball legends were a Jewish Hall of Fame.
- (389) a. # Sudden deaths were a cluster near the chemical factory.
 - b. # Many sudden deaths were a cluster near the chemical factory.
 - c. # Few sudden deaths were a cluster near the chemical factory.
- (390) a. Some/the sudden deaths were a cluster near the chemical factory.
 - b. Some/the many sudden deaths were a cluster near the chemical factory.
 - c. Some/the few sudden deaths were a cluster near the chemical factory.

If the baseball legends are scattered across plural frames of reference but a Jewish Hall of fame is a single venue inside a single frame of reference large enough for it, the baseball legends are not all gathered there. Reconciling singular reference to plural reference, the sentences are rather understood distributively to say of each of the scattered frames of reference that it hosts a Jewish Hall of Fame, implying that a baseball legend is a Jewish Hall of Fame all to himself.⁴²

Temporally imperfective and spatially scattered, the counter-haecetic conditions for reference to X are abbreviated as ‘PASSIM[E, X]’ and the haecetic conditions as

⁴² The contrasts elicited in (387)-(390) and again in (i)-(ii) rely on *genuine collective predicates*, improperly so-called, often with arithmetic or geometric content (Dowty 1987; Higginbotham & Schein 1989; Taub 1989; Brisson 1997, 1998, 2003; Winter 1998, 2002; Hackl 2001ab, 2002). For further discussion, see Schein (forthcoming) chapter 13 §1.

- (i) The (many) tiles are 6130 highly polished hexagons.
- (ii) #(Many) tiles are 6130 highly polished hexagons.

‘THERE[*E,X*’]. Translate the forms without a spoken article, *baseball legends* and *many/few baseball legends*, as in (391) and those with, *some/the baseball legends* and *a/some/the many/few baseball legends*, as in (392):

(391) [$\exists X: \exists E \text{ PASSIM}[E,X]$ & (many/few) baseball legends[*X*]]
(many/few) baseball legends

(392) [*A(n)/Some/The X: \exists E THERE[E,X]* & (many/few) baseball legends[*X*]]
some/the baseball legends, a/some/the many/few baseball legends

The meaning of *few* as it occurs in both (391) and (392) compares to *intermittent* and *scattered* in their occurrence in [_{DP} *intermittent/scattered NP*] and [_{DP} *a(n)/some/the intermittent/scattered NP*]. Note that (393) are true in that the prime numbers are scattered *among the natural numbers*, and (394) are true in that the meteorites, which are the meteors that impact Earth, are rare among the frequent meteors that do not.

(393) a. (Some/the) prime numbers greater than 9007 are scattered.
 b. Some/the scattered prime numbers are greater than 9007.

(394) a. The meteorites that impact Earth are intermittent.
 b. The intermittent meteorites all impact Earth.

(395) F Scattered prime numbers are greater than 9007.

(396) F Intermittent meteorites impact Earth.

Internal to a bare NP, however, scattered prime numbers are said to be a scattering *among prime numbers*, and so (395) is false. Similarly, as all meteorites impact earth, they are not intermittent *among meteorites*, falsifying (396). It is uncontroversial that what is scattered or intermittent is so only in virtue of its distribution relative to a given space, whether that space is as abstract as the natural numbers or astronomical. Moreover, what is scattered or intermittent is so only if the things scattered or intermittent are far enough apart as determined by their distances from each other in the given space. Absent explicit mention of a space (“among the NP”), it remains that (393)-(396) do not express a determinate thought unless one is supplied. If speaker and hearer were free to draw on their experience, it is unclear why implicit reference to such a space should induce contrast between (395)-(396) and (393)-(394), as the only sensible thing for (395)-(396) is that the speaker has in mind the same spaces of natural numbers for (395) and meteor events for (396) that she has in mind for (393)-(394). There is however no reason to suppose that every implicit anaphor is free to make demonstrative reference to any space or time (or possible world) within reach or to freely quantify over such. That is reserved for Tense (Partee 1973, 1984; Stone 1999) and in the nominal domain for overt determiners or articles (Schein *loc. cit.*). The anaphors that occur tacitly with tokens of *scattered* and *intermittent* seek local, linguistic antecedents. In (394), it falls within the scope of Tense, and in (393), within the scope of an overt determiner or article, and is thus as far-ranging in its reference to a space as these elements allow. In contrast, in (395)-(396), there is no license for independent reference to *there_i* within the impoverished syntax of a

bare NP. The tacit anaphor's only antecedent is the NP itself that *scattered* and *intermittent* are in construction with:

- (397) $[\exists X: \exists E \text{ PASSIM}[E, X] \ \& \ [\uparrow: \text{prime numbers}_i[\uparrow]] \exists e \text{ scattered-among}[e, X, \uparrow] \ \& \ \text{prime numbers}_i[X]]]$
 (398) $[\exists X: \exists E \text{ PASSIM}[E, X] \ \& \ [\uparrow: \text{meteorites}_i[\uparrow]] \exists e \text{ intermittent-among}[e, X, \uparrow] \ \& \ \text{meteorites}_i[X]]]$

Hence, in (395)-(396), scattered prime numbers are scattered among the prime numbers, and intermittent meteorites are intermittent among the meteorites. In (393)b. and (394)b., in contrast, *some* scattered prime numbers are scattered *there*, *i.e.*, among the salient-in-context natural numbers, and *the* intermittent meteorites are intermittent *there*, among the meteors:⁴³

- (399) $[\text{Some } X: [\exists \Sigma: \text{there}_i[\Sigma]] (\exists E \text{ THERE}[E, X] \ \& \ [\uparrow: \text{there}_i[\Sigma]] \exists e \text{ scattered-among}[e, X, \Sigma] \ \& \ \text{prime numbers}_i[X])]$
 (400) $[\text{The } X: [\exists \Sigma: \text{there}_i[\Sigma]] (\exists E \text{ THERE}[E, X] \ \& \ [\uparrow: \text{there}_i[\Sigma]] \exists e \text{ intermittent-among}[e, X, \uparrow] \ \& \ \text{meteorites}_i[X])]$

So much addresses the contrast that zero and spoken article induce in reference to the space where the scatter is, and likewise for reference to where the intermittence is. The articles also induce contrast in reference to the scatter itself (and, likewise to the intermittence), exemplified in (401) and (402):

- (401) Scattered leaves are red.
 (402) Some scattered leaves are red.

In the first condition, a plush expanse of fallen leaves covers without interruption the ground underneath a forest of oak and scattered maples, a yellow blanket with ruby red flecks, of which both (401) and (402) are true. In the second condition, a forest of maple stands above solid ruby-red. In this condition, (402) is a wry but true understatement, as is the remark that some leaves or twenty leaves are red, in the obvious presence of many more. In contrast, (401) is defective in that the red leaves are not a scatter among the leaves but a dense cluster. Unless it is invited that a cluster is a dense plenitude of scatter, there isn't scatter where there is cluster. Lingering over (401), perhaps the speaker has in mind some unexpressed descriptive condition—scattered leaves *from untapped maples*—and the thought is that the red leaves from untapped maples are a scattering among the leaves. But, (402) doesn't impress such an expectation.

Between article and adjective in (401) and (402), the difference can only be in how what is scattered is referred to. If pronominal definite description is the device favored for cross-reference and for reference to a modifier's arguments (Schein 2012, forthcoming),⁴⁴ one

⁴³ (399) and (400) are simplified, suppressing the apparatus for scenes, frames of reference, and events therein (Schein *loc. cit.*).

⁴⁴ Also in Schein 2006 §1.3.0, the argument to the plural morpheme in *some fires* is as in (i) rather than (ii):

intervenes to refer to the scattered X in both (397) and (399). Haecceitic *some scattered leaves* glosses as “Some leaves somewhere *there_i* where the leaves are scattered *there_i*, gesturing twice to the forest ahead:

- (403) [Some X : $\exists E$ THERE[E, X] &
 $[\exists \Sigma$: *there_i*[Σ]]
 $((\text{leaves}[X] \& \text{at}[\Sigma, X]_{\circ}) \& [\uparrow X$: Φ][$\uparrow \Sigma$: *there_i*[Σ]] $\exists e$ scattered-among[e, X, Σ]]
 $\exists E^{\circ}$...red[E°, X]...⁴⁵
 “Some leaves somewhere *there_i* where the leaves *there_i* are scattered *there_i* are red.”

But, such gestures are denied the counter-haecceitic *scattered leaves*, which now faces a dilemma. Unqualified reference to the leaves results in an analytically vacuous description, since the leaves are not scattered among the leaves. Similarly, for any other privative distribution—the meteorites are not intermittent among the meteorites:

- (404) [$\exists X$: $\exists E$ PASSIM[E, X] &
 $(\text{leaves}[X]_{\circ}) \& [\uparrow X$: Φ][$\uparrow Y$: leaves[Y]] $\exists e$ scattered-among[e, X, Y]]
 $\exists E^{\circ}$...red[E°, X]...
 # “Some leaves where the leaves are scattered among the leaves are red.”

If all is not lost, the context must afford some other definite description that comports with the counter-haecceitic reference the zero article imposes. If the zero article precludes reference to what is *now en scene*, as it does in (373), in contrast to (372), there remains counter-haecceitic reference to *whatever if anything there is now en scene or beyond in the frame of reference to which the scene now en scene is path-integrated* there be of being red. Given the zero article, *scattered leaves* in the context of (401) is glossed in short as “some leaves anywhere there is red such that the leaves anywhere there is red are scattered among the leaves”:

- (405) [$\exists X$: $\exists E$ PASSIM[E, X] &
 $[\uparrow E$: [E° : *then there*(E°)] [$\uparrow E^{\circ}$: Pres[E°]] & there[E°, E°]] [$\exists e$: Ee & there[E°, E]] red(e)
 $(\text{leaves}[X]_{\circ} \& \text{at}[E, X]_{\circ}) \& [\uparrow X$: Φ][$\uparrow Y$: leaves[Y]] $\exists e$ scattered-among[e, X, Y]]
 ...red...[E, X]
 “Some leaves anywhere there is red such that the leaves anywhere there is red are scattered among the leaves— are red.”

-
- (i) [*some* X : *fire*[X] & [$\uparrow X$: *fire*[X]] PL[X]]
 (ii) * [*some* X : *fire*[X] & PL[X]]

⁴⁵ The antecedent for the pronoun ‘ $[\uparrow X$: Φ]’ in (403) is the noun *leaves*[X] at Σ , which the pronoun contains an exact copy of, copying the alphabetic identity of the variable X . This constraint on variables precludes quantifying-in:

- (i) * [Some X : ... [$\exists \Sigma$: *there_i*[Σ]] (($\text{leaves}[X]$ & $\text{at}[\Sigma, X]_{\circ}$) & [$\uparrow Y$: $Y=X$ & $\Phi[X]$]]...

In (i), the content of the definite description fails to be strictly that of its antecedent in all and only the same variables.

Internal to *scattered leaves*, the second line of (405) tokens a definite description of events, the one that would be derived by event abstraction trans-frame-of-reference from the scope of a decreasing quantifier, so-called—*what events there are of being red*. It occurs here to reconcile the semantic requirements of the zero article and *scattered*, an adjective of privative distribution. The counter-haecceitic zero article blocks demonstrative reference to a distribution space—*scattered leaves* are scattered not *there* but among the leaves themselves (as scattered prime numbers are scattered among the prime numbers). In turn, the counter-haecceitic zero article again blocks demonstrative reference to leaves so scattered. Instead, a general, counter-haecceitic description, clutched from the salient linguistic material, steps in to rescue *scattered leaves* from what would be an absurd privative distribution, the leaves scattered among the leaves, so that, in effect, *scattered leaves* are some leaves in red where the leaves in red are scattered among the leaves. But, if scattered leaves are here and there, PASSIM, in counter-haecceitic scenes or locations, it is odd to find them in action now *en scene* (as odd as it is for what is scattered across plural possible worlds to be presumed gathered into the actual one). There is rather semantic agreement (*adverbialization* in Schein 2012, forthcoming) between the events, scenes or frames of reference for what the subject refers to and the events, scenes or frames of reference for the events the sentence reports. Never # *Some leaves wherever the red scatter wherever— are here red*, but *Some leaves wherever the red scatter wherever— are wherever they are red*:

- (406) $[\exists X: \exists E \text{ PASSIM}[E, X] \ \& \ [\uparrow E: [\uparrow E': \text{then}\mathcal{E}\text{there}(E')][\uparrow E'': \text{Pres}[E'']] \ \& \ \text{there}[E', E'']] [\exists e: Ee \ \& \ \text{there}[E'', E]] \text{red}(e)]$
 $(\text{leaves}[X] \ \& \ \text{at}[E, X]) \ \& \ [\uparrow X: \Phi][\uparrow Y: \text{leaves}[Y]] \exists e \text{ scattered-among}[e, X, Y]]$
 $[\uparrow E: [\uparrow E': \text{then}\mathcal{E}\text{there}(E')][\uparrow E'': \text{Pres}[E'']] \ \& \ \text{there}[E', E'']] [\exists e: Ee \ \& \ \text{there}[E'', E]] \text{red}(e)]$
 Theme $[E, X]$
 “Some *leaves* in red where the leaves in red are *scattered* among the leaves are such that whatever there be *red*, these events’ Themes are them.”

- (407) $[\text{DP} \exists X: \exists E \text{ PASSIM}[E, X] \ \& \ [\uparrow E: \text{TP}_i[E]] \text{NP}[E, X]]$
 $[\uparrow E: [\text{TP} \text{Pres-be-red}][E]] \text{Theme}[E, X]$

As in schema (407), the counter-haecceitic descriptive pronoun of events that the internal semantics of the subject NP demands to frame the events it describes finds its antecedent in the counter-haecceitic definite description of events formed when TP is fronted to frame the events the sentence describes.⁴⁶

⁴⁶ A variant imagines that the fronted TP, *whenever* TP, leaves behind distributive event quantification and the description of the events framed:

- (i) $[\exists X: \exists E \text{ PASSIM}[E, X] \ \& \ [\uparrow E: [\uparrow E': \text{then}\mathcal{E}\text{there}(E')][\uparrow E'': \text{Pres}[E'']] \ \& \ \text{there}[E', E'']] [\exists e: Ee \ \& \ \text{there}[E'', E]] \text{red}(e)]$
 $(\text{leaves}[X] \ \& \ \text{at}[E, X]) \ \& \ [\uparrow X: \Phi][\uparrow Y: \text{leaves}[Y]] \exists e \text{ scattered-among}[e, X, Y]]$
 $[\uparrow E: [\uparrow E': \text{then}\mathcal{E}\text{there}(E')][\uparrow E'': \text{Pres}[E'']] \ \& \ \text{there}[E', E'']] [\exists e: Ee \ \& \ \text{there}[E'', E]] \text{red}(e)]$
 (Theme $[E, X]$ & $[\forall e: Ee] \text{red}(e)$)
- (ii) $[\exists X: \exists E \text{ PASSIM}[E, X] \ \& \ [\uparrow E: \text{TP}_i[E]] \text{leaves-scattered-among-leaves}[E, X]]$
 $[\uparrow E: [\text{TP} \text{Pres-be-red}][E]] (\text{Theme}[E, X] \ \& \ [\forall e: Ee] \text{VP}(e))$

Here then in summary is how increasing and decreasing quantification, so-called, emerges with a difference in their logical syntax from *a few leaves vs. few leaves*, where the same lexical item, *few*, is in combination with either a spoken or zero article. Recognize that *few* is among *scattered, intermittent, occasional, rare, random*, adjectives, unmistakable for quantifiers, that describe privative distributions. All these occur in DPs, *some scattered leaves vs. scattered leaves*, that contrast with an apparent force as if increasing or decreasing quantification. How does it emerge from the alternation in articles? Zero articles are counter-haecetic, and spoken ones are haecetic. The former precludes demonstrative reference to events, scenes or frames of reference, with two consequences for the DP. First, the implicit anaphor referring to the distribution space where the scatter is scattered, if not itself demonstrative, seeks a local, linguistic antecedent, the modified NP itself—scattered leaves are scattered *among the leaves that be*. Second, reference to what is scattered can also not be secured demonstratively, and yet what is described or referred to here cannot be the same as the distribution space in any privative distribution—the *Fs* are not scattered among the *Fs*. So a general, counter-haecetic definite description is crafted from what linguistic content is salient: *leaves where the leaves wherever red are scattered among the leaves that be*. Finally, semantic agreement (*adverbialization* Schein *loc. cit.*) is the bridge between the logical syntax that the zero article induces internal to the DP and the external logical syntax within the DP's scope. So it happens, as in the fourth line of (406) and the second line of (407), that a definite description of events made only from content external to the DP occurs in its scope prompted by a zero article within it, a simulation of decreasing quantification that refers to and imposes an upper bound on the events the definite description refers to. This is just the logical syntax promised (§7.0) decreasing quantification, *few leaves* and *scattered leaves*. In contrast, increasing quantification does not prefix the scope of its DP with this definite description that abstracts on TP, *v.* (407). The spoken articles in *a few leaves* and *some scattered leaves* are haecetic, and so semantic agreement precludes their co-occurrence with this counter-haecetic description of events. Stipulating that the silent operator abstracting on TP is hard-wired counter-haecetic⁴⁷ denies increasing quantification its own haecetic definite description of events abstracted on TP, completing the essential contrast in logical syntax.

7.2. *In the scope of exact quantification.* The pronoun *they* in (408) refers unequivocally to two and no more than two:

(408) Two men came to the office today. They tried to sell encyclopedias.

(409) Two men *now en scene* came to the office today. They [= *the two men now en scene who came to the office today*] tried to sell encyclopedias.

There are no others *now en scene*. As the second clauses of (410)-(411) are informative, they do not assert what is already known, *viz.*, that there are no others in the current scene:

⁴⁷ Something like [*whatever eventy E now en scene or beyond in the global frame of reference [i.e., then&there] to which scenery is being path-integrated* : TP[E]]

- (410) Two men came to the office today, and no others.
(411) Two men came to the office today, and no others did.

(412) Two men came to the office today, and no other men came to the office today.

Rather, (410)-(411) are interpreted like (412) and all other decreasing quantification to say something about the events described by a counter-haecceitc definite description, *whatever if anything there was now en scene and outside it of men coming to the office today*. But, if so, the anaphoric relation found in (410)-(411) between the predicate of the second sentence and that of the first is ‘sloppy’, neglecting to impose a strict morpheme-by-morpheme identity. The anaphora is to antecedent lexical content out of which the second clause constructs from the borrowed content the structures canonical for decreasing quantification. So it happens that (413)-(414) are synonymous with (415):⁴⁸

- (413) Two booksellers discounted the publisher’s titles, and no others.
(414) Two booksellers discounted the publisher’s titles, and no others did.

(415) Two booksellers discounted the publisher’s titles, and no other booksellers discounted the publisher’s titles.

The first clauses of all of (413)-(415) imply that all the publisher’s titles are discounted, and the second clauses, that no other bookseller discounts any of them, as expected for definite descriptions variously in the scope of increasing and decreasing quantification. But, such is also the meaning of (416)-(417):⁴⁹

- (416) Two and no other booksellers discounted the publisher’s titles.
(417) Two and no more than two booksellers discounted the publisher’s titles.

Under sentential *and* and ellipsis (Schein 2006, 2012, forthcoming), I assume the predicative anaphora in (416)-(417) is as ‘sloppy’ so that the backwards anaphor in the first conjunct, in the place of what is elided, is freely interpreted as it would be within the scope of increasing quantification, anaphoric or not, while its antecedent content in the second clause submits to decreasing quantification:

⁴⁸ Similarly for (i)-(iii),

- (i) Two booksellers discounted their titles, and no others.
(ii) Two booksellers discounted their titles, and no others did.
(iii) Two booksellers discounted their titles, and no other booksellers discounted their titles.

⁴⁹ Similarly,

- (i) Two and no other booksellers discounted their titles.
(ii) Two and no more than two booksellers discounted their titles.

(418) ~~Two booksellers discounted the publisher's titles~~ and no more than two booksellers discounted the publisher's titles.

Less transparent are observations (Magri 2013, Spector 2013) that the most *natural* [*sic*] interpretations of (419)-(420) are also equivalent to (415):

(419) Exactly two booksellers discounted the publisher's titles.

(420) Only two booksellers discounted the publisher's titles.

The less natural interpretations, I suppose, would include those that imposed their upper and lower bounds on the very same predicate or event description, equivalent to (421) or (422):

(421) Two booksellers each discounted the publisher's titles, and no other bookseller each discounted the publisher's titles.

(422) Two booksellers each discounted some of the publisher's titles, and no other booksellers discounted any of them.

The adverbs *exactly* and *only* in (419)-(420) join those in (423)-(429)—intentional, epistemic adverbs that comment on the accuracy of their prejacent and seem thus to be interest- and scalar-dependent and focus-affected, which is to say, altogether above my pay grade:

(423) Precisely (—as of this moment—), two booksellers discounted the publisher's titles.

(424) Approximately, (—according to the best current estimate—), two booksellers discounted the publisher's titles.

(425) Minimally (—...—), two booksellers discounted the publisher's titles.

(426) Maximally (—...—), two booksellers discounted the publisher's titles.

(427) Minimally and maximally (—...—), two booksellers discounted the publisher's titles.

(428) At best (—...—), two booksellers discounted the publisher's titles.

(429) At worst(—...—), two booksellers discounted the publisher's titles.

So a few desultory prospective remarks. In (425), *minimally* entails that the publisher's titles were all discounted. In contrast, *maximally* in (426) readily admits the interpretation that imposes an upper bound on whatever discounting there was of any of the publisher's titles, leaving it open that the two might have discounted only some of them. As above, (427) is interpreted as if it were the conjunction of (425) and (426), each adverb interpreting the shared prejacent according to its druthers. Note further that (430) is ambiguous and dependent on focus to sort out whether its upper bound is imposed on *whatever discounting two booksellers did* or on *what discounting of twenty of the publisher's titles was done* (v. Herburger 2000):

(430) Maximally (—...—), two booksellers discounted twenty of the publisher's titles.

These observations carry over to (431)-(432), where the tokens of *so* have the same antecedent and yet interpreted as fits increasing or decreasing quantification:

- (431) Two booksellers discounted the publisher's titles, so (it was) and no more so.
 (432) Two booksellers discounted the publisher's titles, so (it was) exactly.

A further ambiguity arises in (433) with an *each* at what could be the left edge of an event description, disambiguated when such is overtly fronted in (434)-(435):

- (433) Two booksellers each discounted the publisher's titles, so (it was) and no more so.
 (434) (As for) each discounting the publisher's titles, two booksellers did so and no more so.
 (435) (As for) discounting the publisher's titles, two booksellers each did so and no more so.

Sentence (434) imposes an upper bound only on what there was of the solitary bookseller discounting all the publisher's titles. In contrast, (435) imposes on whatever discounting there was of any of the publisher's titles, and says of the only two involved that they each discounted those titles. To the extent that *exactly two booksellers* in (419) is distributive, surely its distributivity does not incorporate with the predicate phrase. In this respect, (419) resembles (435) rather than (434). At loose ends is how *exactly so* comes to mean *minimally so and maximally so*. If the lexical semantics for such an adverb constructs and lists from the prejacent what it asserts and what it presupposes, then as much may be stipulated with the proviso that the prejacent *so* is interpreted variously, in the scope of increasing *minimally* and in the scope of decreasing *maximally*.

8. Conclusion

When negation dances with spatiotemporal quantification, it is about the existence of zones that are asserted to be sterile of what is described in the scope of negation:

- (436) $[\lceil E \rceil: \text{then}\&\text{there}[E^{\circ}]][\lceil E: \Phi[E] \& \text{Tense}[E] \& \text{therein}[E, E^{\circ}]][\text{No } e: Ee] \Psi(e)$

If the logical form of negation, even at its briefest, distinguishes the *e* that isn't so-and-so from the *E* wherein it isn't, it is then a matter of syntax which phrases in a negated sentence describe *e* and which *E*, provided that logical form offers both, as in (436).

Impersonal sentences (§2) demonstrate as much in deriving truth-conditional variation from whether the same phrase describes the framing *E* or the framed *e*.

Reference to a spatiotemporal zone and to times, spaces, events and states therein never escapes an implicit standard for what is to count for current notice—for how to parse *then&there* into times, places, events and states therein. In distinguishing the framed *e* that isn't so-and-so from the framing *E* wherein it isn't, logical form sets up a counterpoint between description $\lceil \Psi \rceil$ of the framed *e* and description $\lceil \Phi \rceil$ of the framing *E*. For any given spatiotemporal zone, the larger the events *e* that $\lceil \Psi \rceil$ presupposes there to be, the

fewer the E there that $\lceil\Phi\rceil$ describes. Out of the blue and upon the void, with little else to go on other than the participants scattered *then&there*—clouds, mirrors or tiles— they are often taken to be the landmarks for equinumerous E , the fully distributive condition ($\lceil\sum[X,E]\rceil$ (137)); but, then any $\lceil\Psi\rceil$ is infelicitous that presupposes events e larger than what they participate in alone. Negation in (436) is about not- Ψ -ing—at a certain rate of Ψ -failure, as many failures to Ψ as there are framing E . In the fully distributive condition, the failures are as numerous as the participants at large. But, if the content of $\lceil\Psi\rceil$ precludes it or the salient framing events are fewer, the failure rate that (436) implies decreases accordingly. In the limit—the mirrors lining a single reflector telescope or the tiles on a bathroom wall—a solitary defect suffices for the failure of the only event at issue, the smoothness e ($\lceil\text{smooth}(e)\rceil$) of the reflector’s surface or of the bathroom wall, even as every individual participant, mirror or tile, is itself smooth to perfection (§3).

If sentences so often divide their phrases between description of the framing E and description of the framed e , it is an ordinary epistemic condition to find that one knows that the such-and-such are scattered across the framing events E without knowing for any one such-and-such which framed e it is in, except to remark that in e are those of the such-and-such that are in it. This is trans-frame-of-reference reference, in which global reference culls its referents across local frames of reference, pervasive in natural language in sentences with and without negation. The syntax and semantics for definite descriptions and Quantifier Raising is designed to provide an economy of expression for assertions under such epistemic conditions (§§4-6).

What the canonical logical form (436) for negation discovers is that any token of ‘not’ is occasion for trans-frame-of-reference reference between the frame of reference for the framing events E *then&there* and the local frames of reference for the events e that are therein. In this respect, negated sentences join attitude reports and the internal structure of definite descriptions, all of which divide their content between description of the global framing E and the local framed e . What is observed in all these contexts is that a definite description *the* NP understood to be definite and grounded in the frame of reference for the framing E occurs with the content that describes the framing E and quantifies-in into the description of the framed e (§6), from which it follows, given the syntax & semantics for trans-frame-of-reference reference, that only some of the NP need be involved in any one of the local e .

Almost all of what goes on in sentences with negation carries over *mutatis mutandis* to decreasing quantification (§7) and distinguishes it from increasing quantification:

(437) No bookseller discounted the discontinued titles on its shelves.

(438) Every bookseller discounted the discontinued titles on its shelves.

Decreasing quantification, it turns out, is a context for trans-frame-of-reference reference with all that derives from it, and increasing quantification is not. As decreasing quantification imposes an upper bound on whatever its scope describes, its logical form includes a definite description of whatever is so described:

- (439) No bookseller, in whatever events there were of the discontinued titles on its shelves being discounted, was the discounter in any of them.
- (440) Every bookseller, in some events, was the discounter in them and the discontinued titles on its shelves were discounted in them.

The logical form for (437) includes, as it were, the definite description *whatever events there were of the discontinued titles on its shelves being discounted*. It is the syntax and semantics *internal* to this event definite description (§6) that is context for reference trans-frame-of-reference. In contrast, the logical form for increasing quantification in (438) just says that there were some events in which the bookseller and its titles participate, without reference to any other such events let alone reference to them all. Thus, whatever derives from reference trans-frame-of-reference under decreasing quantification is absent under increasing quantification, deriving the contrasts canvassed in §7 between (437) and (438).

What an essay on negation has remarked upon is that there is a *pas de deux* between negation and spatiotemporal quantification recognized since Partee 1973 and Burge 1974 in which consideration for the density of space and time requires the canonical logical form for negation to be that in (436). And, to explain what joins negation and decreasing quantification, it must also be recognized that natural language contains tacit nonsortal definite descriptions of events that abstract trans-frame-of-reference, the distribution of which distinguishes decreasing from increasing quantification. Whatever noughtiness then ensues derives only from these two aspects of logical form special to it, from their interaction with the syntax and semantics of definite description and trans-frame-of-reference reference, justified elsewhere, and from practical knowledge about spatiotemporal reference and event segmentation, without which there is nary a thought.

Since Fodor 1970,⁵⁰ negation has worn a Homogeneity Condition custom made for it to the effect that homogeneous predicates (*e.g.*, (441), (442)) denote pluralities and masses homogeneously—all (441) or nothing (442)—to characterize the meaning of (441)-(442) when uttered out-of-the blue, in contrast to (443)-(444):

- (441) The mirrors are smooth.
The mirrors' glass is smooth.
- (442) The mirrors are not smooth.
The mirrors' glass is not smooth.
- (443) The mirrors circle the telescope's reflector.
The mirrors' glass circles the telescope's reflector.
- (444) The mirrors do not circle the telescope's reflector.
The mirrors' glass does not circle the telescope's reflector.

⁵⁰ *v.*, *e.g.*, Breheny 2005, von Stechow 1997, Fodor 1970, Gajewski 2005, Higginbotham 1994, Krifka 1996, Löbner 1985, 2000, Lønning 1987, Magri 2013, Roeper 1983, Schwarzschild 1993, Spector 2013, Szabolcsi & Haddican 2004, Winsor 1956: Chapter 30, Yoon 1996.

What a problem it is for philosophical logic and for the semantics of natural language that (445)-(446) could and do defy the Principle of Excluded Middle and mysteriously (447)-(448) do not!—

(445) Smooth(m)

(446) \neg Smooth(m)

(447) Circle(m)

(448) \neg Circle(m)

The unquestioned presumption that (445)-(448) distills (441)-(444) has been occasion for a history—Boolean algebra, lexical presuppositions, Strongest Meaning Hypothesis, trivalence, supervaluation, double strengthening, *etc.*—ingenious in its evasion of the syntax and semantics of natural language.

Appendix: Quantifier Raising

A.0. *The syntax & semantics of Quantifier Raising.* The amended meaning (320)-(321) for the iota-operator invites an alternative construal for Quantifier Raising. Quantifier Raising (453) (or, (454)) is rather more like the clefting in (449)-(452) (*cf.* (240)-(243)) to be thought of as introducing a covert definite description abstracted on the scope of the raised quantifier (*cf.* Herburger 2000 and references cited therein):⁵¹

(449) It was some/those underage gamblers working for the feds that the casino operators knew that those of them with the winning lottery number will share the \$100,000 jackpot.

(450) It was some/the undercover agents that the casino operators knew that those then in the casino must some of them win and some of them lose.

(451) It was some/the undercover agents paid \$613,000 that the casino operators knew that those who hold the winning lottery number will share the \$100,000 jackpot.

(452) It was some/the undercover agents paid \$613,000 then that the casino operators knew that those then in the casino must some of them win and some of them lose.

That is, Quantifier Raising in (453)-(454) raises out of Φ and abstracts from Φ a definite description $[\iota Z : \Phi]$ within which the variable left behind is itself a description restricted to the local e , as argued for above §4:

⁵¹ There are many variations and no commitment here that (264)-(266) are the best logical form for clefting or that the logical form derived by Quantifier Raising is identical to that for any overt cleft-construction. The paraphrases in 0-(452) are just meant to smooth the way for the suggestion that Quantifier Raising introduces a covert definite description one way or another.

(453) (DP-Quantifier Raising) $[\Phi \dots [\forall e: E''e](\dots [\text{DP some/the } X : \text{NP}] \dots) \dots \Phi] \Rightarrow$
 $[\text{DP some/the } X : \text{NP}]$
 $[\iota \zeta : [\forall z: \zeta z]Xz \ \& \ [\Phi \dots [\forall e: E''e](\dots [\iota Y: [\forall y: Yy]\zeta y \ \& \ \text{there}[e, Y]] \dots) \dots \Phi]] \ X=\zeta$

(454) (NP-Quantifier Raising)⁵² $[\Phi \dots [\forall e: E''e](\dots [\text{DP some/the } X : \text{NP}] \dots) \dots \Phi] \Rightarrow$
 $[\iota X : \text{NP}]$
 $[\iota \zeta : [\forall z: \zeta z]Xz \ \& \ [\Phi \dots [\forall e: E''e](\dots [\text{DP some/the } Y: [\forall y: Yy]\zeta y \ \& \ \text{there}[e, Y]] \dots) \dots \Phi]] \ X=\zeta$

Note that abstraction on the scope of Quantifier Raising derives a definite description $[\iota \zeta : \Phi]$ that refers just like (325)-(326) above to only those undercover agents about whom the casino operators know something:

(455) $[\iota X: \exists E(\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that}$
 $[\iota Y: [\forall y: Yy]Xy \ \& \ \text{with the winning number}[e, Y]] \ Y \ \text{will share}(e) \ \text{the } \$100\text{K})]$

(456) $[\iota X: \exists E(\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that}$
 $[\iota Y: [\forall y: Yy]Xy \ \& \ \text{in the casino}[e, Y]] \ Y \ \text{must [some } \zeta: \zeta \ \text{of } Y] \ \zeta \ \text{win}(e) \dots)]]$

But, note that nothing in the meaning of the abstracted definite description itself says that these include all the agents paid a total of \$613,000 rather than some fewer among them. The identity between those that $[\iota \zeta : \Phi]$ describes and the undercover agents paid \$613,000 is the burden of the clefting structure of Quantifier Raising in (453)-(454). The logical syntax of Quantifier Raising is thus in two parts: abstraction of a definite description over its scope, and an identity between the reference of this definite description and what the raised quantifier quantifies over.

If trans-frame-of-reference quantifying in requires a definite description restricted to the local frame of reference as in (457), the cumulative, global reference to just those culled from the local frames of reference has required some further intervention to exclude spurious referents:

(457) $[\exists e: Ee] \dots [\iota Y: [\forall y: Yy]Xy \ \& \ \text{there}[e, Y]] \dots$

It suffices to accept the amended iota-operator (Schein 2016) for spurious referents to be excluded and then to suppose that Quantifier Raising derives a clefting structure—an identity statement one term of which is the amended definite description derived by abstraction on the scope of Quantifier Raising.

A.1. *QR via successive cyclic movement to functional projections expressing relations to frames of reference.* An alternative to the treatment of Quantifier Raising suggested in §A.0. As

⁵² v. n. 25. Note that the clefting, the introduction of the covert-definite description ‘ $[\iota \zeta : \dots]$ ’, abstracting over the entire sentence, allows a wide-scope or specific indefinite to leave its determiner *some in situ*, exporting only its NP-restriction, as urged in n. 25.

remarked above, the received syntax and semantics for Quantifier Raising and definite description is too weak in the interpretation of (244)-(245), repeated (i)-(ii), to entail that the casino operators' attitudes include attitudes about all the undercover agents referred to filling a payroll of \$613,000:

- (i) $[\uparrow E: \text{then} \& \text{there}(E^*)][\uparrow E: \text{Past}[E] \& \text{therein}[E, E^*]]$
 $[\exists X: \text{undercover agents paid } \$613,000[X] \& \text{there}[E^*, X]]$
 The casino operators knew that
 $[\uparrow Y: [\forall y: Yy]Xy \& \text{with the winning number}[e, Y]] Y \text{ will share}(e) \text{ the } \$100,000.$
- (ii) $[\uparrow E: \text{then} \& \text{there}(E^*)][\uparrow E: \text{Past}[E] \& \text{therein}[E, E^*]]$
 $[\exists X: \text{undercover agents paid } \$613,000[X] \& \text{there}[E^*, X]]$
 The casino operators knew that
 $[\uparrow Y: [\forall y: Yy]Xy \& \text{then in the casino}[e, Y]] Y \text{ must [some } \zeta: \zeta \text{ of } Y] \zeta \text{ win}(e) \dots$

Likewise, the same defect undermines the definite descriptions below when paired with the logical forms shown:

- (iii) the undercover agents (paid \$613,000) that/of whom the casino operators knew that those who hold the winning lottery number will share the \$100,000 jackpot
- (iv) $[\uparrow X: \text{undercover agents paid } \$613,000[X] \&$
 $\exists E(\text{The casino operators knew}[E] \& [\forall e: Ee] \text{ knew}(e) \text{ that}$
 $[\uparrow Y: [\forall y: Yy]Xy \& \text{with the winning number}[e, Y]] Y \text{ will share}(e) \text{ the } \$100K)]$
- (v) the undercover agents (paid \$613,000) that/of whom the casino operators knew that those then in the casino must some of them win and some of them lose.
- (vi) $[\uparrow X: \text{undercover agents paid } \$613,000[X] \&$
 $\exists E(\text{The casino operators knew}[E] \& [\forall e: Ee] \text{ knew}(e) \text{ that}$
 $[\uparrow Y: [\forall y: Yy]Xy \& \text{in the casino}[e, Y]] Y \text{ must [some } \zeta: \zeta \text{ of } Y] \zeta \text{ win}(e) \dots)]$
- (vii) whoever/those of whom/the patrons that the casino operators knew that those who hold the winning lottery number will share the \$100,000 jackpot
- (viii) $[\uparrow X: \exists E(\text{The casino operators knew}[E] \& [\forall e: Ee] \text{ knew}(e) \text{ that}$
 $[\uparrow Y: [\forall y: Yy]Xy \& \text{with the winning number}[e, Y]] Y \text{ will share}(e) \text{ the } \$100K)]$
- (ix) whoever/those of whom/the patrons that the casino operators knew that those then in the casino must some of them win and some of them lose.
- (x) $[\uparrow X: \exists E(\text{The casino operators knew}[E] \& [\forall e: Ee] \text{ knew}(e) \text{ that}$
 $[\uparrow Y: [\forall y: Yy]Xy \& \text{in the casino}[e, Y]] Y \text{ must [some } \zeta: \zeta \text{ of } Y] \zeta \text{ win}(e) \dots)]$

Starting with the definite descriptions, instead of (viii) and (x), let the logical forms for (vii) and (ix) be something like (xi)-(xii), in which I have in mind to exploit the idiom *to know of them that they...*:

- (xi) $[1X: \exists E([\text{The } \mathcal{Z}: \text{casino operators}[\mathcal{Z}]]\text{Agents}[E, \mathcal{Z}] \ \& \ \text{knew}[E] \ \& \ \text{Of}[E, X] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that}$
 $[1Y: [\forall y: Yy]Xy \ \& \ \text{with the winning number}[e, \mathcal{Y}]] \ Y \ \text{will share}(e) \ \text{the } \$100\text{K}])]$
- (xii) $[1X: \exists E([\text{The } \mathcal{Z}: \text{casino operators}[\mathcal{Z}]]\text{Agents}[E, \mathcal{Z}] \ \& \ \text{knew}[E] \ \& \ \text{Of}[E, X] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that}$
 $[1Y: [\forall y: Yy]Xy \ \& \ \text{in the casino}[e, \mathcal{Y}]] \ Y \ \text{must} \ [\text{some } \mathcal{Z}: \mathcal{Z} \ \text{of } \mathcal{Y}] \ \mathcal{Z} \ \text{win}(e)\dots])]$

The inclusion of the relation ‘Of[E,X]’ excludes spurious reference to things that do not enter into the casino operators’ attitudes. More generally, the logical syntax of quantifying in demands some relation to all the frames of reference quantified past so that what is quantified in to a local frame of reference is always and only of that established and referred to in the global frame of reference from which one zooms in:⁵³

- (xiii) $[1X: \exists E(\mathbf{there}[E, X] \ \& \ [\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that}$
 $[1Y: [\forall y: Yy]Xy \ \& \ \text{with the winning number}[e, \mathcal{Y}]] \ Y \ \text{will share}(e) \ \text{the } \$100\text{K}])]$
- (xiv) $[1X: \exists E(\mathbf{there}[E, X] \ \& \ \text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that}$
 $[1Y: [\forall y: Yy]Xy \ \& \ \text{in the casino}[e, \mathcal{Y}]] \ Y \ \text{must} \ [\text{some } \mathcal{Z}: \mathcal{Z} \ \text{of } \mathcal{Y}] \ \mathcal{Z} \ \text{win}(e)\dots])]$

Whether the translation of the definite description is emended to include either ‘Of[E,X]’ or ‘there[E,X]’, the result refers snugly to just those whom the casino operators know about, and they are in turn the undercover agents paid \$613,000 if one says as much:

- (xv) $[1X: \text{undercover agents paid } \$613,000[X] \ \& \ \exists E(\mathbf{there}[E, X] \ \& \ [\text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that}$
 $[1Y: [\forall y: Yy]Xy \ \& \ \text{with the winning number}[e, \mathcal{Y}]] \ Y \ \text{will share}(e) \ \text{the } \$100\text{K}])]$

⁵³ The problem and its repair recall the interaction of thematic separation and distributive quantification (Schein 1993):

- (i) 613 fabric swatches covered over two sewing tables each with two quilts.
(ii) $*\exists E([\exists X: \text{fabric swatches}[X]]\text{Theme}[E, X] \ \& \ \text{covered}[E] \ \& \ [\exists Y: \text{two sewing tables}[Y]][\text{each } y: Yy][\exists e: Ee](\text{over}(e, y) \ \& \ \text{with two quilts}[e])]$
(iii) $\exists E([\exists X: \text{fabric swatches}[X]]\text{Theme}[E, X] \ \& \ \text{covered}[E] \ \& \ [\exists Y: \text{two sewing tables}[Y]]\mathbf{over}[E, Y] \ \& \ [\text{each } y: Yy][\exists e: Ee](\text{over}(e, y) \ \& \ \text{with two quilts}[e])]$

Suppose 613 fabric swatches scattered among the many sewing tables on the factory floor have been cut and sewn into many quilts. The two quilts covering any two sewing tables are fabric cut from far fewer than the 613 swatches of the entire production, so that (i) is false. In representing only the distributivity condition, what happens to each sewing table, (ii) is mistakenly true. To represent (i) as false, it requires the explicit relation in (iii) of two sewing tables to the plural events E.

- (xvi) $[\exists X: \text{undercover agents paid } \$613,000[X] \ \& \ \exists E(\text{there}[E,X] \ \& \ \text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that} \ [\exists Y: [\forall y: Yy]Xy \ \& \ \text{in the casino}[e,Y]] \ Y \ \text{must} \ [\text{some } Z: Z \ \text{of } Y] \ Z \ \text{win}(e)\dots)]$

Similarly, quantifying in a NP *de re* into an attitude report (v. (236)-(243)) demands a relation between the NP and intervening *E*:

- (xvii) $[\exists E: \text{then}\&\text{there}(E)][\exists E: \text{Past}[E] \ \& \ \text{therein}[E,E]]$
 $[\exists X: \text{undercover agents paid } \$613,000[X] \ \& \ \text{there}[E',X]]$
 $\exists E(\text{there}[E,X] \ \& \ \text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that} \ [\exists Y: [\forall y: Yy]Xy \ \& \ \text{with the winning number}[e,Y]] \ Y \ \text{will share}(e) \ \text{the } \$100,000).$

- (xviii) $[\exists E: \text{then}\&\text{there}(E)][\exists E: \text{Past}[E] \ \& \ \text{therein}[E,E]]$
 $[\exists X: \text{undercover agents paid } \$613,000[X] \ \& \ \text{there}[E',X]]$
 $\exists E(\text{there}[E,X] \ \& \ \text{The casino operators knew}[E] \ \& \ [\forall e: Ee] \ \text{knew}(e) \ \text{that} \ [\exists Y: [\forall y: Yy]Xy \ \& \ \text{then in the casino}[e,Y]] \ Y \ \text{must} \ [\text{some } Z: Z \ \text{of } Y] \ Z \ \text{win}(e)\dots).$

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