

Framing events in the logic of verbal modification*

Alexis Wellwood
University of Southern California

Abstract I ask what a small set of modification data requires of clausal event semantics. Classic Davidsonian semantics posits that modifiers like *in the hallway* express properties of events, and so expects that iterations of such modifiers should simply contribute additional conjuncts at logical form. The data I consider challenges this view and others cast in the Davidsonian spirit, at least so long as we hope to preserve an important and plausible semantic principle, Role Exhaustion (Williams 2015). As I show, preserving the principle and accounting for the facts can be accomplished by adopting two independently-motivated sets of claims: first, that verbs introduce existential closure over their event argument, and modifiers take verb meanings as semantic arguments (Champollion 2015); second, that simple clauses have two layers of event description, ‘framing’ and ‘framed’ (Schein 2016). In the end, I sketch two possible extensions of the approach, towards the interpretation of temporal modification and negative perceptual reports.

Keywords: events, modification, quantificational event semantics, framing, spatial modifiers, temporal modifiers, negative perceptual reports

1 A principle and three facts

How many events is a sentence about? This paper brings together recent developments in event semantics to argue for an idea advanced by e.g. Schein (2016), that simple clauses divide their description between at least two layers of events, high “framing” and low “framed”, and endorses two proposals advocated for by Champollion (2015): that verbs introduce their own event argument’s \exists -closure, and that modifiers and theta-marked predicates take such interpretations as arguments. It does so based on consideration of iterated spatial modification in relation to an important semantic principle, Role Exhaustion (RE).

Classic event semantics (e.g., Davidson 1967, Castaneda 1967, Parsons 1990) holds that modifiers like *in the hallway* express simple conjunctive predicates of events. Without saying more, this foundational assumption incorrectly predicts that (1a) should mean the same as (1b) (call the fact of this difference NON-EQUIVALENCE). Indeed, (1a) invites thought of two distinct events while (1b)

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doesn't (NUMEROSITY). Comparing (1a) with (1c) gives a sense of the nature of the difference: (1c) suggests that the carpark is contained within the hallway, as if lower modifiers must be interpreted dependent upon higher modifiers (SCOPE).

- (1) a. Denzel ran in the hallway and in the carpark.
 b. Denzel ran in the hallway, in the carpark.
 c. ?? In the hallway, Denzel ran in the carpark.

At the same time, the classic analysis applied to (1b) and (1c) challenge RE, which says that any syntactic dependent assigned a semantic relation to an event *e* identifies all and only the entities in that relation to *e* (see Williams 2015 for the many precursors and alternatives to this principle). Given classic assumptions about the compositional potency of such modifiers, one might reasonably be led to expect that the only difference between (1a) and (1b) is that *and* indicates predicate conjunction explicitly in the former, but that rule is implicit in the latter. If so, both would violate RE, indicating as they do multiple **in**-relations between the running event *e* and a location *l*.

Preserving RE requires us to go beyond classic event semantics, but simply shifting to a plausible alternative event-semantic framework won't do it. An event semantics á la Champollion can account for NON-EQUIVALENCE and NUMEROSITY, but, like classic event semantics, the results threaten RE. Williams' (2015) tentative solution to (1b) preserves RE but threatens its generalizability, and none of these accounts predict SCOPE. In this paper, I show how integrating Schein's logic of "framing" vs "framed" events with a compositional process like that of Champollion's can account for the facts without compromising the principle.

The resulting analysis has a number of promising features. First, the account is primed to extend to parallel cases with temporal modifiers. Second, it provides interesting new possibilities in the explanation of negative perceptual reports (cf. Schein 2020) without added machinery. That is, availing oneself of "framing" vs "framed" events in non-finite clauses, one can analyze sentences like *Keisha saw Denzel not run* as involving Keisha's seeing some (relevant) framing events, none of which was a running by Denzel. Successfully extending the account, however, will require ensuring that its flexibility is appropriately constrained to predict the data.

1.1 Role Exhaustion

Preserving RE should be a central goal within event semantics, so let us briefly review it. I will follow Williams' (2015) discussion and data closely; his book should be studied for details of the development of the general principle.

RE says that each syntactic dependent – regardless of whether it is a theta-marked syntactic argument, or a modifier that indicates a thematic relation headed by

a preposition or other element – specifies all and only the entities bearing a particular thematic role to an event. If RE is plausible, it motivates the widely-adopted view that thematic relations are *functions*: they input an event and identify the participant(s) in the relevant thematic relation to that event.¹ Furthermore, if RE is successful, it can replace a number of distinct syntactic and semantic mechanisms that have been proposed to account for a wide variety of data pertaining to the distribution of thematic relations.

Let us consider its three relevant aspects: exhaustivity, uniqueness, and its claim to be properly semantic.

To say that RE holds is to say that no single syntactic dependent can specify some but not all of the entities bearing that role: role assignment must be exhaustive. So in the general case, a sentence like **Lee yelled Mo* can't mean 'Lee and Mo yelled', where the subject and object offer parts of the plurality that satisfies the Agent role. Similarly, *Tony and Geezer lifted the amp and the organ* doesn't entail *Tony lifted the amp*. Understood as a principle of linguistic competence, RE can explain the failed entailment by saying: the former sentence tells us Tom and Geezer performed a particular role exhaustively, which doesn't license the latter sentence which would tell us that Tony performed that same role exhaustively.

To say that RE holds is to say that no two distinct dependents can express the same thematic role to the event: role assignment must be unique. So *Lee yelled Mo* meaning 'Lee and Mo yelled' is doubly bad by RE's lights: distinct phrases can't partially specify participation (exhaustivity), nor can they specify the same role (uniqueness). In general, the effects of uniqueness can be seen by examining the potential for iterating arguments. **Nik smacked the wall the floor* is bad, and certainly can't mean that Nik smacked the wall and he smacked the floor. That interpretation would require non-unique assignment of the Patient role to both *the wall* and *the floor*. Structurally three-place predicates that assign distinct roles to their objects are fine, of course (e.g. *Mary bought Susan a cake* invokes Agent, Patient, and Theme).

Finally, to say that RE is semantic is to say that it accounts for a range of facts that are beyond any obvious syntactic explanation. Often, syntactic accounts of thematic assignment are restricted to the assignment of roles by verbs, which leaves out account of the fact that the restrictions hold equally well for adjuncts (e.g. with the Beneficiary role as in *?Al cooked this for his wife for his son*). Worse, the restrictions appear to hold across clauses: according to RE, when one says *Kay killed Mo*, one says that all and only Kay was the killer. Following-up with *Lee also killed Mo* only makes sense if it is intended to correct an earlier misstep.

RE is desirable, so let us consider whether existing accounts run afoul of it.

¹ In order to not pre-judge the matter, I use the merely relational notation in what follows.

2 Challenges

A central motivation of classic event semantics (CES) is capturing systematic, intuitively-valid inference patterns from a sentence S with n modifiers (Davidson 1967) or arguments (Castaneda 1967) to instances of S with $n - 1$, as a matter of logical form. For example, consider that a sentence like (2a) entails all of the corresponding (2b), (2c), and (2d), and (2b) and (2c) also entail (2d), but none of these entailments hold in reverse.

- (2) a. Denzel ran in the carpark with a backpack.
 b. Denzel ran in the carpark.
 c. Denzel ran with a backpack.
 d. Denzel ran.

Davidson’s explanation of such patterns is that simple action sentences express existential generalizations about events, with modifiers (generally) expressing properties of events. Continuing the example, one guarantees the “downward” inference pattern and blocks the “upward” inference pattern as a matter of Conjunction Reduction: given the translation in (3), the applicability of this rule is evident.

- (3) a. $(\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, c) \ \& \ \mathbf{with}(e, b))$
 b. $(\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, c))$
 c. $(\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{with}(e, b))$
 d. $(\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e))$

On the face of it, then, examples like (1b) (repeated as (4a)) in CES are challenging for RE (Williams 2015): a translation into classic (neo-Davidsonian) event semantics would look as in (4b).² Here, the prepositional phrase is interpreted as a locative thematic relation between the event e and two distinct locations. Without saying more, this clearly violates RE since each of the prepositional phrases attempts to individually specify the location of e .

- (4) a. Denzel ran in the hallway, in the carpark.
 b. $(\exists e)(\mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \& \ \mathbf{in}(e, c) \ \dots)$

At a minimum, the classic account needs to be supplemented with some mechanism that ensures that the interpretation of (4b)’s implicit conjunction differs from (1b)’s (repeated as (5a)) explicit conjunction. At least at first, shifting to Champollion’s “quantificational event semantics” (QES) looks like it can help. QES would

² Williams’ discussion also includes talk of temporal modifiers, for which parallel data is easy enough to construct. I have chosen to set aside talk of such modification until the current analysis is in place.

assign to (5a) the critical interpretive pieces indicated in (5b), with two instances of event quantification that, contrasted with (4b), can capture NON-EQUIVALENCE and NUMEROSITY.

- (5) a. Denzel ran in the hallway and in the carpark.
 b. $(\exists e)(\mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \dots) \ \& \ (\exists e)(\mathbf{run}(e) \ \& \ \mathbf{in}(e, c) \ \dots)$

However, Champollion's account will assign the same RE-violating interpretation to (4a) as CES, plausibly because it was carefully designed to guarantee the same diamond-shaped patterns of inferences as CES.

Williams (2015) proposes an alternative interpretation for (4a) that skirts the RE violation by positing that the verbal complex involves something that maps the verb's event argument e to a location variable l , and that the l variable gets doubly-modified; e.g., (6). This possibility is conceptually plausible and preserves RE, as Williams notes.

- (6) $(\exists e)(\mathbf{run}(e) \ \& \ (\exists l)(\mathbf{loc}(e, l) \ \& \ \mathbf{in}(l, h) \ \& \ \mathbf{in}(l, c)) \ \dots)$

Yet, there are potentially serious costs to such an alternative. First, it precludes what may ultimately be a desirable generalization of RE – namely, a principle determining that any thematic-like relation be exhaustive and unique. As it is, RE only constrains relations to events. Suppose for the moment that *a book by Tolstoy* involves an Author relation between an individual and an object; if so, it isn't yet clear why *a book by X by Y* should be odd. Second, bifurcating the class of prepositions into those which relate to e (functional), and those which don't (merely relational) potentially runs afoul of cross-linguistic patterns of conflation in their expression. For example, French uses the same form for Owner and Location roles, e.g. *Le livre est à Harry* (Owner) and *Harry est à Camden* (Location; Jackendoff 1995).

As it stands, none of the accounts so far on the table predict SCOPE. Given the general expectation in Davidsonian event semantics that modifiers express conjunctive properties of events, there is no reason to expect that the order in which those properties are expressed should make a difference. And yet, it does; (4a) suggests something about the hallway being located in the carpark, but that isn't true for (5a).

Schein's (2016) account is focused on negation, but generally concludes that sentences divide their description between at least two layers of events. Some of the evidence he cites in this connection includes asymmetries like that he observes between (7a) and (7b). These examples feature the same spatial and locative modifiers in different orders, and the sentences are plainly not equivalent. (7a) says of a certain region of space, for a duration of two hours, that there was calmness within it lasting two minutes. The odd (7b) says of that same region, for the shorter duration of two minutes, that there was calmness within it lasting 2 hours – nonsense.

Framing events

- (7) a. Under the Southern New England sky for 2hrs, it was calm for 2min.
b. ?? Under the Southern New England sky for 2min, it was calm for 2hrs.

For Schein, data like (7) suggest that higher adverbials modify ‘framing’ events (sometimes demonstrated; cf. Partee 1973, Burge 1974), and the main clause event is asserted to be among those framed. Roughly, coherence depends on the frames being large enough to contain what is framed. We may represent his account schematically as follows: let ϕ stand for the interpretation of a relevant modifier and ψ for that of the main clause, and let us ignore the contribution of tense, etc. (8a), then, can be read, ‘the events E_ϕ are such that they_E have at least one event e_ψ among them_E’, and (8b) as, ‘the demonstrated events E are such that they_E have at least one event $e_{\phi \cap \psi}$ among them_E.’

- (8) a. $(\iota E : \phi(E))(\exists e : E(e))\psi(e)$
b. $(\iota E : \mathbf{then\&there}(E))(\exists e : E(e))(\psi(e) \ \& \ \phi(e))$

Such an account can provide a promising route for the account of SCOPE: higher adverbials situate the main clause talk with respect to a certain location (and time), and lower adverbials specify that talk.

As yet, this account is not spelled out compositionally. I will propose a way to do this, in a manner responsive to our three facts while preserving RE. But first, I present the pieces I should like to adopt from CES and QES.

3 CES and QES ingredients

Elements of classical neo-Davidsonian semantics (CES) and Champollion’s quantificational event semantics (QES) are needed for the eventual account. From CES, I preserve the core event/thematic analysis, and from QES I incorporate (i) verbs introduce their own \exists -closure, and (ii) adjuncts and theta-marked expressions take verb meanings as semantic arguments.

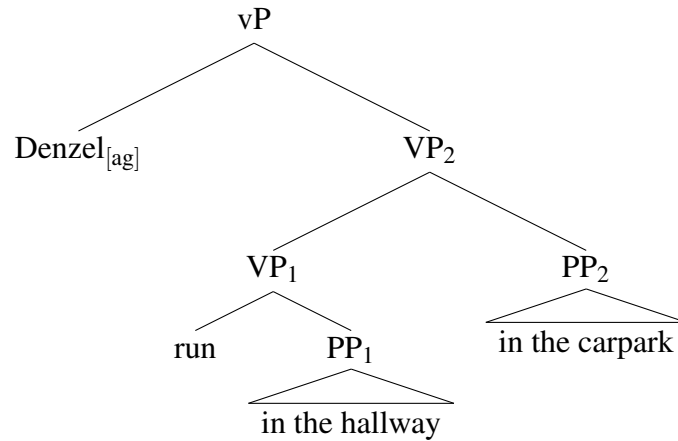
We begin with (1a), repeated as in (9).

- (9) Denzel ran in the hallway, in the carpark.

Plausibly, the modifiers in (9) are VP adjuncts as represented in (10).³

³ My diagrams abstract away from the specific question of how theta-marking is realized syntactically, simply indicating that phrases are so-marked using a subscript like ‘[ag]’. The semantic effect of these tags will, as we’ll see, be just like that of a preposition like *in* which introduces thematic-roles.

(10)



We can assign simple compositional interpretations in CES as follows. The verb contributes a property of events (type $\langle v, t \rangle$), (11a), and the preposition *in* expresses a relation between individuals and events (type $\langle e, \langle v, t \rangle \rangle$), (11b).⁴ Saturating (11b) with an individual argument delivers a simple property of events, (12a), in the same vein as the theta-marked subject, (12b).⁵ VP₂ expresses a simple predicate of events, (13a), as does vP, shown composed with its satellites in (13b).

- (11) a. $\llbracket \text{run} \rrbracket_{\text{CES}} = \lambda e_v. \mathbf{run}(e)$
 b. $\llbracket \text{in} \rrbracket_{\text{CES}} = \lambda x_e. \lambda e_v. \mathbf{in}(e, x)$
- (12) a. $\llbracket \text{PP}_1 \rrbracket_{\text{CES}} = \lambda e_v. \mathbf{in}(e, h)$
 b. $\llbracket \text{Denzel}_{[\text{ag}]} \rrbracket_{\text{CES}} = \lambda e_v. \mathbf{ag}(e, d)$
- (13) a. $\llbracket \text{VP}_1 \rrbracket_{\text{CES}} = \lambda e_v. \mathbf{run}(e) \ \& \ \mathbf{in}(e, h)$
 b. $\llbracket \text{vP} \rrbracket_{\text{CES}} = \lambda e_v. \mathbf{ag}(e) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \& \ \mathbf{in}(e, c)$

Given the assumption that theta-marking involves relating an individual to a property of events, we do not here avail ourselves of Functional Application (Heim & Kratzer 1998) to combine the subject with the verbal predicate. Instead, the two combine by (eventive) Predicate Modification.

Of course, we only derive a truth-evaluable sentence once the event argument has been existentially closed. This role is often thought to be performed by Aspect, which relates the event of the verb to the matrix time (e.g., Kratzer 1998, Hacquard

4 I make use of the $\llbracket \cdot \rrbracket$ notation to indicate the interpretation function, as is standard, but I should like to remain neutral as to whether we should understand it foundationally as providing semantic *values* – usually understood as *extensions*, in which case I would be read as saying that the semantic value of a sentence in English is a formula of a logical language – as opposed to semantic *translation* into an intermediary logical language.

5 Since their interpretations are not at issue, I assume throughout that names and definite descriptions are directly referential and translate them using individual constants.

2009). I skip over these details here; what is important for present purposes is that any sufficient closure mechanism will deliver the interpretation for (9)/(10) as in (14), which violates RE with its two instances of **in** related to the same e .

$$(14) \quad \llbracket (10) \rrbracket = (\exists e)(\mathbf{ag}(e) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \& \ \mathbf{in}(e, c))$$

On its own, CES gives us no reason to suppose that the interpretation of (1b) with explicit *and*, repeated as in (15), would be any different: why not think that *and* just lexicalizes (an appropriately generalized) Predicate Modification? The fact of NUMEROSITY challenges any such supposition: (15) implies there was more than one distinct event, whereas (9) doesn't.

(15) Denzel ran in the hallway and in the carpark.

We can implement two helpful ingredients from QES to capture the difference between (9) and (15). The first is the idea that intransitive verbs like *run* are interpreted in a higher type: whereas in CES they have type $\langle v, t \rangle$ (a function from events to truth values), in QES they have type $\langle vt, t \rangle$ (a function from $\langle v, t \rangle$ functions to truth values), as in (16).⁶ The inclusion of the continuation variable g (cf. Barker & Shan 2014) provides a pivot by which modifier meanings can be inserted inside the scope of the event quantifier.

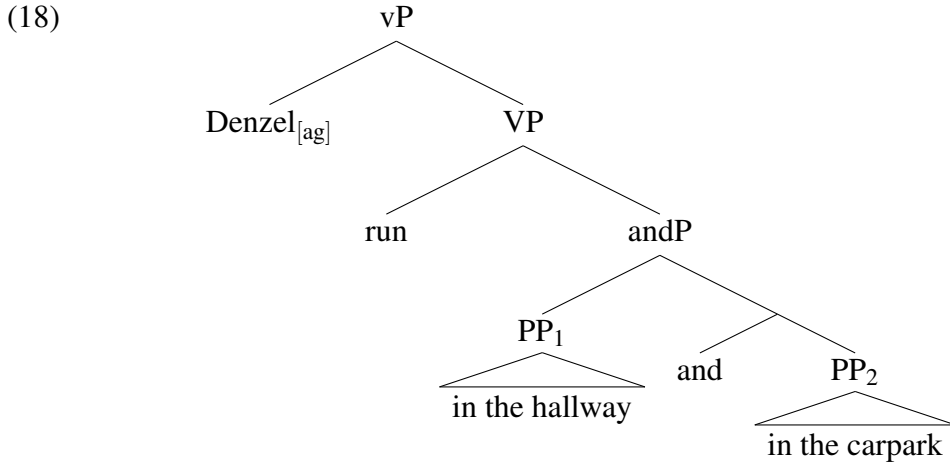
$$(16) \quad \llbracket \mathbf{run} \rrbracket_{\text{QES}} = \lambda g_{vt}. (\exists e)(\mathbf{run}(e) \ \& \ g(e))$$

The second ingredient is the idea that PP adjuncts and theta-marked arguments themselves take such functions as arguments; they have type $\langle \langle vt, t \rangle, \langle vt, t \rangle \rangle$, as in (17a). Here, a verb combines with such expressions by Functional Application rather than by Predicate Modification, (17b), and the result of their combination is a function of continuations of the event description.

$$(17) \quad \begin{aligned} \text{a. } & \llbracket \mathbf{in \ the \ hallway} \rrbracket_{\text{QES}} = \lambda V_{\langle vt, t \rangle}. \lambda f_{vt}. V(\lambda e'. \mathbf{in}(e', h) \ \& \ f(e')) \\ \text{b. } & \llbracket \mathbf{run \ in \ the \ hallway} \rrbracket_{\text{QES}} \\ & = [\lambda V_{\langle vt, t \rangle}. \lambda f_{vt}. V(\lambda e'. \mathbf{in}(e', h) \ \& \ f(e'))](\lambda g_{vt}. (\exists e)(\mathbf{run}(e) \ \& \ g(e))) \\ & = \lambda f_{vt}. [\lambda g_{vt}. (\exists e)(\mathbf{run}(e) \ \& \ g(e))](\lambda e'. \mathbf{in}(e', h) \ \& \ f(e')) \\ & = \lambda f_{vt}. (\exists e)(\mathbf{run}(e) \ \& \ [\lambda e'. \mathbf{in}(e', h) \ \& \ f(e')](e)) \\ & = \lambda f_{vt}. (\exists e)(\mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \& \ f(e)) \end{aligned}$$

Alongside these pieces, we need an appropriate interpretation for *and* that allows for conjunctions of other than sentence-level constituents. That is, I assume (15) has a structure like that in (18), where the two modifiers are contained within an andP which itself modifies VP.

⁶ Champollion has broad motivations for this move, aiming to resolve tensions between event semantics and quantification, negation, and coordination. See his paper and other work for details.



Building on Partee & Rooth (1983), Champollion posits that *and* effectively expresses generalized intersection. He formulates this as in (19), where π_1 and π_2 range over any types.⁷ Any such sufficient rule for *and* will ensure that the conjunction of two sentences is true when both of its conjuncts are true, and the conjunction of non-sentential constituents (i.e., non *t*-type) denotes their intersection.

(19)

$$\sqcap_{\langle \tau, \tau \tau \rangle} =_{def} \begin{cases} \&_{\langle \tau, \tau \tau \rangle} & \text{if } \tau = t, \\ \lambda X_{\tau} \lambda Y_{\tau} \lambda Z_{\pi_1} \cdot X(Z) \sqcap_{\langle \pi_2, \pi_2 \pi_2 \rangle} Y(Z) & \text{if } \tau = \langle \pi_1, \pi_2 \rangle. \end{cases}$$

For the case at hand, applying this rule to modifiers and theta-marked expressions will look as in (20).

$$(20) \quad [\lambda V_{\langle vt, t \rangle} \lambda f_{vt} \cdot V(\lambda e \cdot F_{vt}(e) \& f(e))] \sqcap [\lambda V_{\langle vt, t \rangle} \lambda f_{vt} \cdot V(\lambda e \cdot G_{vt}(e) \& f(e))] \\ = [\lambda V_{\langle vt, t \rangle} \lambda f_{vt} \cdot V(\lambda e \cdot F_{vt}(e) \& f(e)) \& V(\lambda e \cdot G_{vt}(e) \& f(e))]$$

Given these assumptions, the result of interpreting andP in (18) is as in (21a): it is a function from verb denotations like that in (16) to its continuations. Combined with the verb meaning, any such continuation will simultaneously elaborate two distinct event descriptions, as in (21b). The interpretation of the theta-marked subject, given in (22a), composes with the VP just as the modifier does (cf. (17b)), thereby ensuring that the Agent information occurs in each quantified conjunct, (22b).

$$(21) \quad \text{a. } \llbracket \text{andP} \rrbracket = \llbracket \text{in the hallway} \rrbracket \sqcap \llbracket \text{in the carpark} \rrbracket \\ = \lambda V_{\langle vt, t \rangle} \lambda f_{vt} \cdot V(\lambda e \cdot \mathbf{in}(e, h) \& f(e)) \& V(\lambda e \cdot \mathbf{in}(e, c) \& f(e)) \\ \text{b. } \llbracket \text{VP} \rrbracket = \lambda f_{vt} \cdot (\exists e)(\mathbf{run}(e) \& \mathbf{in}(e, h) \& f(e)) \& (\exists e)(\mathbf{run}(e) \& \mathbf{in}(e, c) \& f(e))$$

⁷ I have replaced his occurrence of \wedge with $\&$, and his σ for my π .

Framing events

- (22) a. $\llbracket \text{Denzel}_{[\text{ag}]} \rrbracket = \lambda V_{\langle \text{vt}, t \rangle} . \lambda f_{\text{vt}} . V(\lambda e . \mathbf{ag}(e, d))$
 b. $\llbracket \text{vP} \rrbracket =$
 $\lambda f_{\text{vt}} . (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{r}(e) \ \& \ \mathbf{i}(e, h) \ \& \ f(e)) \ \& \ (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{r}(e) \ \& \ \mathbf{i}(e, c) \ \& \ f(e))$

In Champollion’s QES, then, the vP leaves a continuation variable open, rather than the same event variable introduced by the verb. Continuing to ignore any contributions of tense and aspect, we may follow Champollion and posit that eventive sentences become truth-evaluable by applying the function $\lceil \lambda e . \mathbf{true} \rceil$ to that vP, as in (23).⁸ (23), then, derives the sentential interpretation of (15).

- (23) $\llbracket (15) \rrbracket = \llbracket \text{vP} \rrbracket(\lambda e . \mathbf{true})$
 $= \lambda f_{\text{vt}} . (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{r}(e) \ \& \ \mathbf{i}(e, h) \ \& \ f(e)) \ \& \ (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{r}(e) \ \& \ \mathbf{i}(e, c) \ \& \ f(e))(\lambda e . \mathbf{true})$
 $= (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{r}(e) \ \& \ \mathbf{i}(e, h) \ \& \ [\lambda e . \mathbf{true}](e)) \ \& \ (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{r}(e) \ \& \ \mathbf{i}(e, c) \ \& \ [\lambda e . \mathbf{true}](e))$
 $= (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{r}(e) \ \& \ \mathbf{i}(e, h) \ \& \ \mathbf{true}) \ \& \ (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{r}(e) \ \& \ \mathbf{i}(e, c) \ \& \ \mathbf{true})$
 $= (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h)) \ \& \ (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, c))$

In this way, we can capture NON-EQUIVALENCE and NUMEROSITY. QES ultimately delivers the same interpretation as CES for (9)/(10) shown in (14), and that interpretation is distinct from what we derive for (15)/(18) in (23) – capturing NON-EQUIVALENCE. While it could be that the events witnessing the quantified statements in (14) and (23) are the same, that needn’t be so according to the logical forms – capturing NUMEROSITY. However, while RE is satisfied in (23), it is not in (14). And we still have the matter of SCOPE to contend with.

4 New compositional details

The combination of CES and QES alone falters on preserving RE and accounting for SCOPE. Here I show the sorts of logical forms that Schein’s framing/framed semantics (FFS) would assign to our puzzle cases, and lay out a possible compositional implementation. In the next section, I show how this account can capture our target facts while preserving RE.

We first target the analysis of (1b), repeated as in (24).

- (24) Denzel ran in the hallway, in the carpark.

In §2, I presented a simplified schematic version of Schein’s two layers of event description. In the same vein, the schematic applied to (24) would look at least as rich as the logical form in (25). This says that ‘the plurality of events E in the carpark are such that there is at least one event e among them $_E$ which is a running by

⁸ According to Champollion, this function “check[s] whether the set of all events whatsoever... has the property denoted by the verb [phrase]” (Champollion 2015: 39).

Denzel in the hallway’.⁹ As a schematic, this gets us pretty close to what we want for the account of SCOPE: for the lower e to be among the E s is for e to be located among the location(s) of E ; if the E s are (wholly) located in c , and e is located in h , then it must be that h is in c .

$$(25) \quad (\iota E : \mathbf{in}(E, c))(\exists e : E(e))(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h))$$

To derive such an interpretation compositionally, I first establish the relevant pieces with a simpler example. Schematically, the sentence in (26) would be assigned an interpretation like that in (27a) in Schein’s system. Here, the framing events E are demonstrated (‘those events then and there’), and the rest of the clause specifies what did (or didn’t) happen there.¹⁰ To simplify our work somewhat, we should like to derive at least a form like that in (27b), where definite descriptions have been replaced with existential quantifiers, and the quantifier restrictions have been moved to the bodies of their description.¹¹

(26) Denzel ran in the hallway.

$$(27) \quad \begin{array}{l} \text{a. } (\iota E : \mathbf{then\&there}(E))(\exists e : E(e))(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h)) \\ \text{b. } (\exists E)(\mathbf{then\&there}(E) \ \& \ (\exists e)(E(e) \ \& \ \mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h))) \end{array}$$

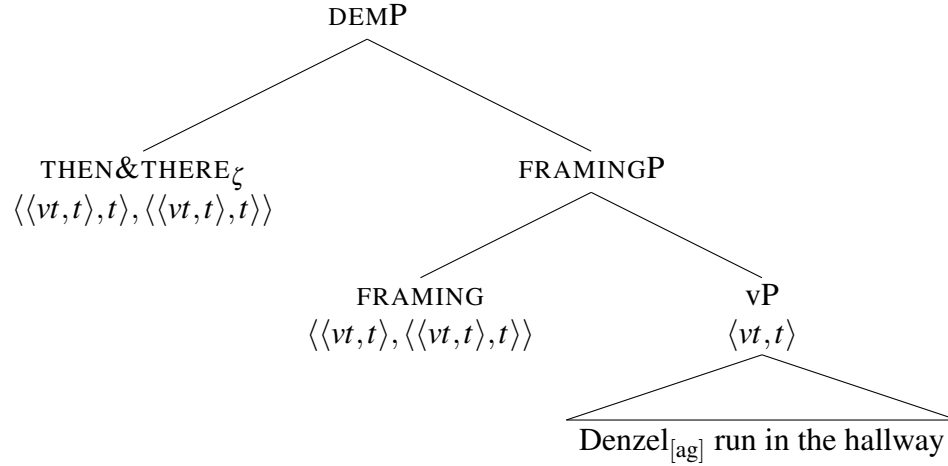
At least at a first pass, to do this compositionally we need only reverse engineer a logical form like that in (27b). In this spirit, we may posit the schematic structure in (28). Here, two syntactic heads will perform the now needed functions: FRAMING introduces a framing event layer, and THEN&THERE $_{\zeta}$ introduces a spatiotemporal demonstration. I use $\ulcorner \zeta \urcorner$ as a dedicated index, so the interpretation of THEN&THERE $_{\zeta}$ will just be $\sigma(\zeta)$, for any assignment of values to variables σ , just as HE $_i$ is interpreted as $\sigma(i)$.

⁹ Champollion and Schein understand plurals differently, and any marriage of their proposals will need to resolve these differences. In the text I preserve Schein’s second-order understanding. Either way, the possibility that e.g. PPs and theta-marked phrases can relate both to singular and plural predicates raises technical questions. See footnote 13.

¹⁰ Schein’s analysis of sentences like *It didn’t rain* is one of the central motivations for the FFS account in his 2016 paper, wherein such a sentence says, simplifying: ‘the unique events E then and there are such that there is no event of raining among them $_E$ ’. Here, the negation applies to the framed events, not the framing events. And, the demonstrative element “may be explicitly disavowed as such” by the inclusion of a higher modifier, e.g. Schein’s *Once upon an unknown time and place in darkest rainforest, it didn’t rain* (p462).

¹¹ It is very likely that something closer to the definite descriptions will be needed here, especially when negative perceptual reports are considered. Additionally, Schein, like Hohaus 2015, supposes that “frame-setters” have a presupposition-like nature, which is not well-represented by having their interpretations occur in the scope of the existential quantifiers as I have it here.

(28)



As anticipated, the interpretation I assign to vP is as in (29), continuing to assume the QES interpretations of verbs and modifiers/theta-marked expressions. The two additional pieces are given in (30). FRAMING in (30a) maps a vP-type meaning to a function from properties of pluralities of events, and, as we will see, plugs the content ‘*e* is among the *Es*’ into the scope of the framed events’ \exists -quantifier. THEN&THERE $_{\zeta}$ in (30b) inserts a demonstrative property into the framing events’ \exists -quantifier.

$$(29) \quad \llbracket \text{vP} \rrbracket^{\sigma} = \lambda f_{vt}. (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \& \ f(e))$$

$$(30) \quad \text{a. } \llbracket \text{FRAMING} \rrbracket^{\sigma} = \lambda V_{\langle vt, t \rangle}. \lambda g_{\langle vt, t \rangle}. (\exists E)(V(\lambda e.E(e)) \ \& \ g(E))$$

$$\text{b. } \llbracket \text{THEN\&THERE}_{\zeta} \rrbracket^{\sigma} = \lambda V_{\langle vt, t \rangle}. \lambda g_{\langle vt, t \rangle}. V(\lambda E. \sigma(\zeta)(E) \ \& \ g(E))$$

The composition of the simpler sentence, then, proceeds as expected. In (31a), FRAMING applies to vP and delivers a property of continuations of the plural event description; such pluralities are said to exist, and to have a hallway-running by Denzel among them. In (32a), that property is fed to the demonstrative modifier, delivering a function of continuations of the plural event description, otherwise demonstrated and having among them at least one hallway-running by Denzel.

$$(31) \quad \text{a. } \llbracket \text{FRAMINGP} \rrbracket^{\sigma} = \llbracket \text{FRAMING} \rrbracket^{\sigma}(\llbracket \text{vP} \rrbracket^{\sigma}) \\
= [\lambda V_{\langle vt, t \rangle}. \lambda g_{\langle vt, t \rangle}. (\exists E)(V(\lambda e'.E(e')) \ \& \ g(E))](\llbracket \text{vP} \rrbracket^{\sigma}) \\
= \lambda g_{\langle vt, t \rangle}. (\exists E)(\llbracket \text{vP} \rrbracket^{\sigma}(\lambda e'.E(e')) \ \& \ g(E)) \\
= \lambda g_{\langle vt, t \rangle}. (\exists E)([\lambda f_{vt}. (\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \& \ f(e))](\lambda e'.E(e')) \ \& \ g(E)) \\
= \lambda g_{\langle vt, t \rangle}. (\exists E)((\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \& \ [\lambda e'.E(e')](e)) \ \& \ g(E)) \\
= \lambda g_{\langle vt, t \rangle}. (\exists E)((\exists e)(\mathbf{ag}(e, d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e, h) \ \& \ E(e)) \ \& \ g(E))$$

$$(32) \quad \text{a. } \llbracket \text{DEMP} \rrbracket^{\sigma} = \llbracket \text{THEN\&THERE}_{\zeta} \rrbracket^{\sigma}(\llbracket \text{FRAMINGP} \rrbracket^{\sigma}) \\
= [\lambda V_{\langle vt, t \rangle}. \lambda g_{\langle vt, t \rangle}. V(\lambda E'. \sigma(\zeta)(E') \ \& \ g(E'))](\llbracket \text{FRAMINGP} \rrbracket^{\sigma}) \\
= \lambda g_{\langle vt, t \rangle}. \llbracket \text{FRAMINGP} \rrbracket^{\sigma}(\lambda E'. \sigma(\zeta)(E') \ \& \ g(E'))$$

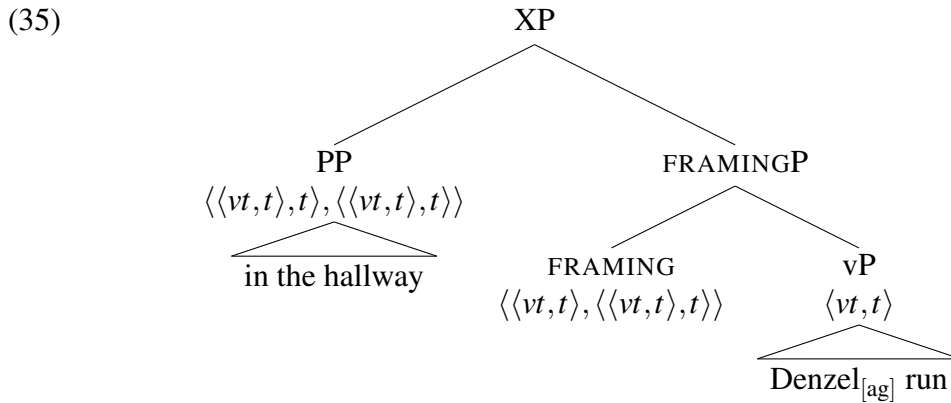
$$\begin{aligned}
&= \lambda g_{\langle vt,t \rangle} \cdot [\lambda f_{\langle vt,t \rangle} \cdot (\exists E)((\exists e)(\mathbf{ag}(e,d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ f(E))](\lambda E' \cdot \sigma(\zeta)(E') \ \& \ g(E')) \\
&= \lambda g_{\langle vt,t \rangle} \cdot (\exists E)((\exists e)(\mathbf{ag}(e,d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ \sigma(\zeta)(E) \ \& \ g(E))
\end{aligned}$$

To render the sentence in (26) truth-evaluable, we need a different closure predicate. In the simple QES system, that predicate was $\lceil \lambda e.\mathbf{true} \rceil$. Assuming the FFS framework, we need $\lceil \lambda E.\mathbf{true} \rceil$.¹² Assuming the latter, we derive the interpretation in (33). This says that there is a demonstrated plurality of events with, among them, at least one hallway-running by Denzel.

$$\begin{aligned}
(33) \quad \llbracket (26) \rrbracket^\sigma &= \llbracket \text{DEMP} \rrbracket^\sigma (\lambda E'.\mathbf{true}) \\
&= [\lambda g_{\langle vt,t \rangle} \cdot (\exists E)((\exists e)(\mathbf{ag}(e,d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ \sigma(\zeta)(E) \ \& \ g(E))](\lambda E'.\mathbf{true}) \\
&= (\exists E)((\exists e)(\mathbf{ag}(e,d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ \sigma(\zeta)(E) \ \& \ [\lambda E'.\mathbf{true}](E)) \\
&= (\exists E)((\exists e)(\mathbf{ag}(e,d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ \sigma(\zeta)(E) \ \& \ \mathbf{true}) \\
&= (\exists E)((\exists e)(\mathbf{ag}(e,d) \ \& \ \mathbf{run}(e) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ \sigma(\zeta)(E))
\end{aligned}$$

To illustrate what happens when the modifier occurs higher, modifying the framing E rather than framed e , we can look at a variant of (26) in (34). I will assume that (34) has the structure in (35).¹³

(34) In the hallway, Denzel ran.



12 If we assume that every clause must have a framing/framed event structure, then we need only the E -level closure predicate. If we assume that clauses can occur without a framing layer, we would need multiple or a generalized closure predicate.

13 To allow for a variant quite as simple as this, we need to assume that prepositional phrases (above interpreted as type $\langle \langle vt,t \rangle, \langle vt,t \rangle \rangle$, applying to e) can also have a higher type (applying to E). This needn't mean positing an ambiguity: it could be implemented in terms of polymorphic functions (i.e., those whose specific interpretation depend on the specific type of their input), type shifters, or some additional structure that performs a lifting-type function. In the text, I assume something like a polymorphic implementation, indicating the appropriate type for the present context in (35). To extend the present account to cases of high iterated modification, similar questions will need to be raised; that is, in order to iterate multiple *frames*, multiple instances of FRAMING will be needed, any but the lowest of which would need to apply to properties of pluralities of events.

As indicated by the structure, here I assume that the vP includes only the subject and the verb: (36a) expresses a property of continuations of a singular event description otherwise specified as runnings by Denzel. Applying the FRAMING head to this vP, we derive (36b): a property of continuations of a plural event description otherwise specified as having a running by Denzel among them. (36c) (assuming that the PP applies to pluralities of events) adds that the framing events are located in the hallway.

$$\begin{aligned}
(36) \quad & \text{a. } \llbracket \text{vP} \rrbracket^\sigma = \llbracket \text{Denzel}_{[\text{ag}]} \rrbracket^\sigma (\llbracket \text{run} \rrbracket^\sigma) \\
& = [\lambda V_{\langle \langle \text{vt}, t \rangle, \langle \text{vt}, t \rangle \rangle} \cdot \lambda f_{\langle \text{vt}, t \rangle} \cdot V(\lambda e'. \mathbf{ag}(e', d) \ \& \ f(e'))](\llbracket \text{run} \rrbracket^\sigma) \\
& = \lambda f_{\langle \text{vt}, t \rangle} \cdot \llbracket \text{run} \rrbracket^\sigma (\lambda e'. \mathbf{ag}(e', d) \ \& \ f(e')) \\
& = \lambda f_{\langle \text{vt}, t \rangle} \cdot [\lambda g_{\text{vt}} \cdot (\exists e)(\mathbf{run}(e) \ \& \ g(e))](\lambda e'. \mathbf{ag}(e', d) \ \& \ f(e')) \\
& = \lambda f_{\langle \text{vt}, t \rangle} \cdot (\exists e)(\mathbf{run}(e) \ \& \ [\lambda e'. \mathbf{ag}(e', d) \ \& \ f(e')](e)) \\
& = \lambda f_{\langle \text{vt}, t \rangle} \cdot (\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e, d) \ \& \ f(e)) \\
& \text{b. } \llbracket \text{FRAMINGP} \rrbracket^\sigma = \llbracket \text{FRAMING} \rrbracket^\sigma (\llbracket \text{vP} \rrbracket^\sigma) \\
& = [\lambda V_{\langle \text{vt}, t \rangle} \cdot \lambda g_{\langle \text{vt}, t \rangle} \cdot (\exists E)(V(\lambda e'. E(e')) \ \& \ g(E))](\llbracket \text{vP} \rrbracket^\sigma) \\
& = \lambda g_{\langle \text{vt}, t \rangle} \cdot (\exists E)(\llbracket \text{vP} \rrbracket^\sigma (\lambda e'. E(e')) \ \& \ g(E)) \\
& = \lambda g_{\langle \text{vt}, t \rangle} \cdot (\exists E)([\lambda f_{\langle \text{vt}, t \rangle} \cdot (\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e, d) \ \& \ f(e))](\lambda e'. E(e')) \ \& \ g(E)) \\
& = \lambda g_{\langle \text{vt}, t \rangle} \cdot (\exists E)((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e, d) \ \& \ [\lambda e'. E(e')](e)) \ \& \ g(E)) \\
& = \lambda g_{\langle \text{vt}, t \rangle} \cdot (\exists E)((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e, d) \ \& \ E(e)) \ \& \ g(E)) \\
& \text{c. } \llbracket \text{XP} \rrbracket^\sigma = \llbracket \text{PP} \rrbracket^\sigma (\llbracket \text{FRAMINGP} \rrbracket^\sigma) \\
& = [\lambda V_{\langle \langle \text{vt}, t \rangle, \langle \text{vt}, t \rangle \rangle} \cdot \lambda f_{\langle \text{vt}, t \rangle} \cdot V(\lambda E'. \mathbf{in}(E', h) \ \& \ f(E'))](\llbracket \text{FRAMINGP} \rrbracket^\sigma) \\
& = \lambda f_{\langle \text{vt}, t \rangle} \cdot \llbracket \text{FRAMINGP} \rrbracket^\sigma (\lambda E'. \mathbf{in}(E', h) \ \& \ f(E')) \\
& = \lambda f_{\langle \text{vt}, t \rangle} \cdot [\lambda g_{\langle \text{vt}, t \rangle} \cdot (\exists E)((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e, d) \ \& \ E(e)) \ \& \ g(E))](\lambda E'. \mathbf{in}(E', h) \ \& \ f(E')) \\
& = \lambda f_{\langle \text{vt}, t \rangle} \cdot (\exists E)((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e, d) \ \& \ E(e)) \ \& \ [\lambda E'. \mathbf{in}(E', h) \ \& \ f(E')](E)) \\
& = \lambda f_{\langle \text{vt}, t \rangle} \cdot (\exists E)((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e, d) \ \& \ E(e)) \ \& \ \mathbf{in}(E, h) \ \& \ f(E))
\end{aligned}$$

Given these assumptions, the closure of (34) (details not shown) delivers an interpretation equivalent to that in (37). This says that the sentence is true just in case there is a plurality of events in the hallway, among which is a running by Denzel.

$$(37) \quad \llbracket (34) \rrbracket^\sigma = (\exists E)((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e, d) \ \& \ E(e)) \ \& \ \mathbf{in}(E, h))$$

5 Accounting for the facts while preserving the principle

Between those pieces of the analysis retained from CES and QES and those newly added for FFS, we have everything we need.

Our target cases in (1a)-(1c) are repeated in (38a)-(38c).

- (38) a. Denzel ran in the hallway and in the carpark.
b. Denzel ran in the hallway, in the carpark.
c. ?? In the hallway, Denzel ran in the carpark.

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$$\begin{aligned}
 & (\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e,d) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \\
 & \quad \& \ (\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e,d) \ \& \ \mathbf{in}(e,c) \ \& \ E(e)) \\
 & \quad \& \ g(E))
 \end{aligned}$$

$$\begin{aligned}
 (42) \quad & \llbracket (1a)/(38a) \rrbracket^\sigma \\
 & = (\exists E)(\sigma(\zeta)(E) \ \& \\
 & \quad (\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e,d) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ (\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e,d) \ \& \ \mathbf{in}(e,c) \ \& \ E(e)))
 \end{aligned}$$

(43) sketches the derivation of (38b). The result in (44) says that there is a plurality of events located in the carpark, among which is a hallway-running by Denzel. Per the kind of reasoning previously spelled out, this implies that the hallway is located within the carpark.

$$\begin{aligned}
 (43) \quad & \text{a. } \llbracket \text{FRAMINGP} \rrbracket^\sigma = \llbracket \text{FRAMING} \rrbracket^\sigma (\llbracket \text{VP} \rrbracket^\sigma) \\
 & \quad = \lambda g_{\langle v,t \rangle}. (\exists E) ((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e,d) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ g(E)) \\
 & \quad \text{b. } \llbracket \text{XP} \rrbracket^\sigma = \llbracket \text{PP} \rrbracket^\sigma (\llbracket \text{FRAMINGP} \rrbracket^\sigma) \\
 & \quad = \lambda g_{\langle v,t \rangle}. (\exists E) ((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e,d) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ \underline{\mathbf{in}(E,c)} \ \& \ g(E)) \\
 (44) \quad & \llbracket (1b)/(38b) \rrbracket^\sigma \\
 & = (\exists E) ((\exists e)(\mathbf{run}(e) \ \& \ \mathbf{ag}(e,d) \ \& \ \mathbf{in}(e,h) \ \& \ E(e)) \ \& \ \mathbf{in}(E,c))
 \end{aligned}$$

With these logical forms, we can see how to account for the facts while preserving the principle. Plainly, neither in (42) nor in (44) does **in** apply to the same event variable (or plural event variable); so at least for these cases we have ensured there is no RE violation. And plainly NON-EQUIVALENCE obtains: the truth of (42) is independent from that of (44) – the two coincide only when (roughly) the hallway is part of the carpark. And NUMEROSITY obtains: (42) has two ‘framed’ event descriptions, supporting multiple distinct events, while (44) doesn’t. Most importantly, SCOPE obtains: given our syntactic and FFS assumptions, height of attachment determines whether framing *E* or framed *e* is modified.

On this account, spatial modification of framing events proceeds much as it does for framed events in Champollion’s QES. With no overt frame modifiers, we assume default demonstration following Schein’s FFS. The possibility of modifying framing vs framed events provides the flexibility needed to account for the facts, and the distinctness of the relevant event variables helps to escape RE violation.

6 Notes towards extensions

Two areas stand out as ripe for applying this type of compositional account: iterated temporal modification and negative perceptual reports.

As noted by Williams (2015) (cf. Pratt & Francez 2001, Beaver & Condoravdi 2007), the potential for RE-violating modification holds just as well for temporal as for spatial modifiers. Consider (45). Glossing over some details, a flat-footed CES

(or QES) interpretation would look as in the RE-violating (45a). A straightforward application of the FFS system proposed here, would look as in (45b): this says, without disturbing RE, that some events occurred in 2022 and at least one of them was a raining in July.

- (45) In 2022, it rained in July.
- a. $(\exists e)(\mathbf{rain}(e) \ \& \ \mathbf{in}(e, \mathbf{2022}) \ \& \ \mathbf{in}(e, \mathbf{july}))$
 - b. $(\exists E)(\mathbf{in}(E, \mathbf{2022}) \ \& \ (\exists e)(E(e) \ \& \ \mathbf{rain}(e) \ \& \ \mathbf{in}(e, \mathbf{july})))$

This looks promising. Properly advancing the idea will require detailed comparison with Champollion 2015 (itself arguing against the non-event-based analysis of Beaver & Condoravdi 2007). However, some points of comparison are worth noting now. Champollion’s (2015) basic account of temporal modification invokes dynamic semantics, identity functions with side effects, as well as new composition rules and closure operations. All else equal, we might prefer a simpler system if it can capture the relevant data just as well.

With respect to negative perceptual reports, there can be little surprise that Schein’s system would be useful here, developed as it was, in part, to offer a new account of the interpretation of negative marking. In general, accounts of sentences like (46) can falter on one or more difficulties (cf. Higginbotham 1983a, Krifka 1989, Varzi 2007, Bernard & Champollion 2018): compositionally, they can be too weak (Higginbotham 1983b); conceptually, they might make the odd assertion that non-events or “negative events” exist (Przepiórkowski 1999); or they might insist that the negative descriptions are made true by linguistically unspecified “positive events” (cf. Schubert 2000; cp. Bernard & Champollion 2018).

- (46) Keisha saw Denzel not run in the hallway.

The FFS framework can be used to predict a number of possible readings of sentences like (46) without any of these apparent challenges, if we minimally assume that the framing/framed layers occur in non-finite embedded clauses. It isn’t obvious to me at this point whether any of these readings should be ruled out, nor whether any would impose implausible commitments on the background syntactic theory.

Consider (47), all of which assume that a Theme relation obtains between the matrix seeing event and events in the embedded clause (cf. Higginbotham 1983b). They also reinstate Schein’s definite quantification for the embedded framing events.¹⁴ The possibility in (47a) assumes that the embedded framing layer contains a second layer of event demonstration, and means that Keisha saw the relevant events, but none were Denzel’s running. That in (47b) assumes modification of the

¹⁴ The alternative of sticking with \exists here is plainly too weak.

framing layer by the PP, and means that she saw the events in the hallway, and Denzel’s running didn’t happen there. That in (47c) assumes that the embedded subject raises to modify the framing layer (cf. Schein 2016: 475), and says that she saw Denzel’s doings, and none was a running in the hallway.

- (47) $(\exists E')(\sigma(\zeta')(E') \& (\exists e')(E(e') \& \mathbf{exp}(e',k) \& \mathbf{see}(e')) \& \dots$
 ‘There were some ζ' -events $_{E'}$ with a seeing $_{e'}$ by Keisha among them $_{E'}$, and ...’
- a. ... $(\mathbf{1}E)(\mathbf{th}(E, e') \& \sigma(\zeta)(E) \& \neg(\exists e)(E(e) \& \mathbf{ag}(e,d) \& \mathbf{run}(e)) \& \mathbf{in}(e,h)) \dots$
 ‘... the E s seen $_{e'}$ had no running by Denzel in the hallway among them $_E$ ’
- b. ... $(\mathbf{1}E)(\mathbf{th}(E, e') \& \mathbf{in}(E, h) \& \neg(\exists e)(E(e) \& \mathbf{ag}(e,d) \& \mathbf{run}(e)) \dots$
 ‘... the E s in the hallway seen $_{e'}$ had no running by Denzel among them $_E$ ’
- c. ... $(\mathbf{1}E)(\mathbf{th}(E, e') \& \mathbf{ag}(E, d) \& \neg(\exists e)(E(e) \& \mathbf{run}(e)) \& \mathbf{in}(e, h)) \dots$
 ‘... the E s performed by D were seen $_{e'}$ and none $_E$ were a running in the hallway’

It will be interesting both for syntactic and semantic theory to see whether such a picture can be supported.

7 Conclusion

In this paper, I aimed to specify how the interpretive composition of multiply-iterated spatial prepositional phrases could be accomplished without compromising the plausible and important semantic principle, Role Exhaustion. I was able to do this through a novel combination of Champollion’s QES with Schein’s (what I have called) FFS. Future research will bear out whether the interesting potential extensions of this account that I have noted will bear fruit.

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Alexis Wellwood
Mudd Hall of Philosophy, MHP 113
3709 Trousdale Parkway
Los Angeles, CA 90089
wellwood@usc.edu