

## Only the Strong: Restricting Situation Variables

**Keywords:** Semantics, Situation Variables, Modality, Tense. (General Session)

**Problem and Previous Data** Recent work has shown that although world/time variables must be represented explicitly in syntax (Cresswell 1990, Percus 2000, Kusumoto 2005), the uses of these variables are constrained to an extent not predicted by current theories. Percus (2000) shows that a VP must be interpreted de dicto: (1) cannot mean that there is some Canadian whom Mary thinks is my brother. Musan (1997) shows that only strong DPs may be evaluated at a time different from their main predicate. So, *many fugitives* as a strong DP in (2) can be evaluated at a different time than its main predicate *in jail*; but as a weak DP (forced by the existential there construction), *many fugitives* must be at the same time as *in jail*, yielding a contradiction. Musan’s generalization extends to possible worlds: in (3), the first, strong DP version of *someone in this room* may be interpreted de re, but not the weak DP version.

**New Data and Unified Generalization** I present data suggesting that an NP and its sisters in the same DP may not be evaluated at different times/worlds. The DPs in (4) are out because they yield contradictions when their subparts are evaluated at the same world and time. I propose one unified generalization, in (5), which subsumes the generalizations above: Percus shows VPs are evaluated locally in the CP; Musan shows weak DPs are evaluated locally in the VP, but strong DPs can be evaluated non-locally; I show that DP constituents are evaluated locally in the DP.

**Proposal** I derive (5) from a change in the semantic type system such that nothing denotes a truth value; instead a new simple type  $p$  signifies propositions, represented as sets of situations in the meta-language (Cresswell 1973, Kratzer 1991) – see (6) and (7). Weak quantifiers (type  $\langle e, p \rangle$ ) combine with their main predicates via predicate modification before existential closure applies (Milsark 1974, Heim 1982, Diesing 1992). There is simply no way to add an explicit situation variable to a weak quantifier or its predicate, since items of type  $p$  are not functions and hence take no arguments. This derives Musan’s generalization that these two items occur at the same time/world. Similarly, the NP and its modifier inside the strong DP combine via predicate modification and cannot support an explicit situation variable. Last, the VP itself cannot take a situation variable argument, deriving Percus’s generalization above since the embedded clause must get its situation argument directly from its embedding verb.

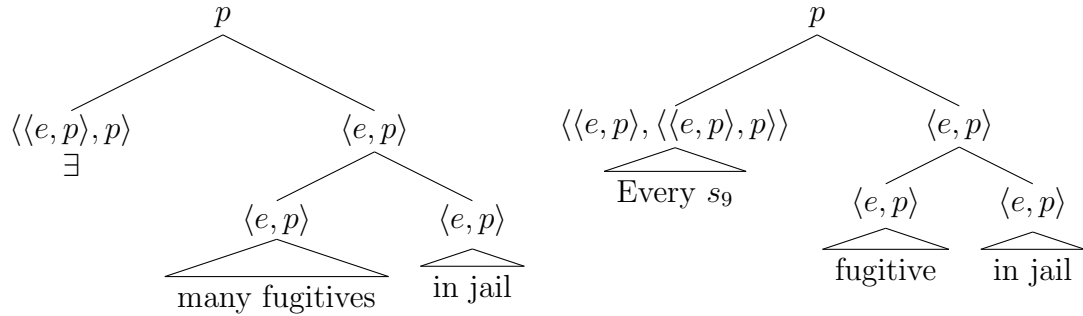
In contrast, strong determiners (type  $\langle s, \langle \langle e, p \rangle, \langle \langle e, p \rangle, p \rangle \rangle \rangle$ ) take a situation variable, which gets applied to their restrictive clause via the type-shifting operators  $\cup$  and  $\cap$ , defined in (8) (cf. Chierchia 1984). These operators are only available in the meta-language and are tied to the definitions of a limited number of lexical items. A situation variable argument to a strong DP may be bound by a situation binder prefix (Büring 2005, Schueler 2007), yielding either a local or non-local interpretation of the DP – see (10).

**Advantages** Percus’s concerns arise because each of his predicates has a situation variable. My analysis explains both Percus’s facts and Musan’s by limiting such variables, but retains an advantage of Percus’s system: the ability to bind situation variables. Beyond de re and de dicto, this binding explains intermediate readings: (11) has a reading where *someone in this room* is in Mary’s belief worlds, but not in her husband’s or in the real world. This is hard for Musan’s proposal, which does not have explicit situation variables to be bound.

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- (1) Mary thinks my brother is Canadian.
- (2) Many fugitives are in jail.  
#There are many fugitives in jail.
- (3) Mary thinks someone in this room is outside.  
#Mary thinks there's someone in this room who's outside.
- (4) a. # Mary thinks everyone in this room who's outside ...  
b. # Mary thinks every fugitive who's in jail ...
- (5) Only strong DPs may be interpreted de re (i.e., at a non-local world or time); VPs, weak DPs, and DP constituents are always de dicto (at the local world and time).
- (6) Simple types:  $e, s, p$ ; Derived types:  $\langle \alpha, \beta \rangle$  where  $\alpha$  and  $\beta$  are types.
- (7)



- (8) For any  $P \in D_p (= \mathcal{P}(D_s))$ ,  ${}^{\cup}P \leftrightarrow [\lambda s . s \in P]$   
(converts a set of situations into that set's characteristic function)  
For any  $f \in D_s^{D_t}$ ,  ${}^{\cap}f \leftrightarrow \{s : f(s) = 1\}$   
(converts a function from situations to truth values into a set of situations)
- (9) **every** =  $\lambda s . \lambda P_{\langle e, p \rangle} . \lambda Q_{\langle e, p \rangle} . {}^{\cap}[\lambda s' . \forall x . {}^{\cup}[P(x)](s) \rightarrow {}^{\cup}[Q(x)](s')]$
- (10)  $[\beta_i \mathbf{X}]^g = {}^{\cap}[\lambda s . {}^{\cup}[\mathbf{X}]^g[i \rightarrow s](s)]$   
(binds coindexed variables to the same argument as its sister's open argument slot)
  - a. de re:  $\beta_2$  Mary thinks [every  $s_2$  boy is outside].
  - b. de dicto: Mary thinks  $\beta_2$  [every  $s_2$  boy is outside].
- (11) Mary thinks her husband believes someone in this room has a crush on their daughter.

### Selected References

- Milsark: 1974, *Existential Sentences in English*, MIT.  
Musn: 1997, *On the temporal interpretation of noun phrases*, Garland.  
Percus: 2000, Constraints on Some Other Variables in Syntax, *NLS* 8(3).  
Schueler: 2007, World Variable Binding and Beta-Binding, *NELS* 38.