Who and what do *who* and *what* range over cross-linguistically?

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Dayal (1996) and others analyze English *who* as number neutral. We show that Dayal's analysis cannot be maintained, and that *who* must be analyzed as ranging over generalized quantifiers (see also Spector 2007, 2008). Our main argument comes from the observation that even in languages such as Spanish that morphologically distinguish between *who*.SG and *who*.PL, *who*.SG like in English is compatible with plural answers. Dayal's account is empirically untenable for such languages. Furthermore we argue in the presentation that if Dayal's number neutrality were correct for English, we would expect systems such as the Spanish one to be unlearnable.

Background on the UP: In English, singular *which*-questions carry a *Uniqueness Presupposition* (UP) (1), unlike *who*-questions (2).

(1) Which philosopher voted for Trump?
  a. Harry voted for Trump.
  b. # Harry and Sally voted for Trump.

(2) Who voted for Trump?
  a. Harry voted for Trump.
  b. Harry and Sally voted for Trump.

Dayal (1996) treats the UP as a reflex of the *Maximal Informativity Principle* (MIP): a question presupposes the existence of a unique, maximally-informative true answer. Furthermore, Dayal assumes that singular *which*-phrases range only over atomic individuals. Simplex, *wh*-expressions on the other hand, despite being morphosyntactically singular, range over both atomic and sum individuals. Assuming a Hamblin/Karttunen question semantics, if in w_1 both Harry and Sally voted for Trump, (1) has as true members of its denotation the propositions in $[\![(1)]\!]^{w_1}$, and (2) the propositions in $[\![(2)]\!]^{w_1}$. Only the answer set $[\![(2)]\!]^{w_1}$ satisfies the MIP.

$$[\![(1)]\!]^{w_1} = \left\{ \begin{array}{l} \text{H voted for Trump,} \\ \text{S voted for Trump} \\ \end{array} \right\} \qquad [\![(2)]\!]^{w_1} = \left\{ \begin{array}{l} \text{H voted for Trump,} \\ \text{S voted for Trump,} \\ \text{H} \oplus \text{S voted for Trump} \end{array} \right\}$$

Semantics of number: Sauerland, Anderssen & Yatsushiro (2005) argue that the feature SING is presuppositional, whereas PLUR is semantically vacuous (we assume here that D_e contains both atomic and sum individuals), in order to account for inclusive readings of plurals in DE contexts. The anti-singleton presupposition associated with plurals is derived via Heim's (1991) *Maximize Presupposition!* (MP!) principle.

$$[\![\text{SING}]\!]^{w} = \lambda x_e : \text{ATOM}_w(x).x \qquad [\![\text{PLUR}]\!]^{w} = \lambda x_e.x$$

According to the weak theory of plurality, then, *who* is semantically plural. It carries no implicated anti-singleton presupposition since it has no singular alternative (unlike a plural *which* phrase).

Simplex *wh*-expressions cross-linguistically: Dayal's account of the UP and the weak theory of plurality make a straightforward prediction: in languages which distinguish between singular and plural *who*, a singular *who* question should carry a UP, and a plural *who* question should carry an implicated anti-singleton presupposition. We show that the first prediction but not the latter is false, here with data from Spanish and Hungarian. In both languages, *which* questions have the same presuppositional properties as those in English (data suppressed). Our informants judge that questions with *who*.SG in both Spanish (3) and Hungarian (5) carry neither a UP nor an anti-singleton inference. Questions with *who*.PL on the other hand, in both Spanish (4) and Hungarian (6) are judged as carrying an anti-singleton inference.

(3) *Quién se fue pronto?*
  Who.SG REFL left early?

(4) *Quiénes se fueron pronto?*
  Who.PL REFL left early?

(5) *Ki* *énekel?*
who.SG sing.3SG

(6) *Ki-k* *énekel-nek?*
who.PL sing.3PL

Analysis: We claim that this can be reconciled with the MIP *and* the weak theory of plurality if simplex *wh*-expression, but not *which*-phrases, can range over higher-order semantic objects, rather than just members of D_e (Spector 2007, 2008). We derive this without lexical ambiguity by claiming that *who* spells out the structure in (9). We assume that the restrictor of *who* is the domain of an arbitrary type σ. Features are defined recursively as in (8). When σ is e, SING ensures that *who* ranges over atomic individuals. When σ is ⟨et, t⟩, SING ensures that *who* ranges over sets of sets of atomic individuals (we assume the same treatment for animacy; details suppressed). Q_{wh}, which we take to be Cable's (2010) Q, is a type-flexible operator which takes a predicate and delivers a Cresti (1995) style *wh*-phrase denotation (Q_{wh} is essentially a type-flexible version of Cresti's 1995 and Heim's 1994 entries for *which*).

(7) $[\![Q_{wh}]\!] = \lambda X_{\sigma t}.\lambda f_{\langle\sigma,\langle st,t\rangle\rangle}.\lambda p_{st}.\exists x_\sigma[X(x) \wedge f(x)(p)]$ For any type σ

(8) **Recursive definition for features:** for any type σ

a. $[\![\textsc{sing}]\!](P_{et}) = \lambda x : \textsc{atom}(x).P(x)$

b. $[\![\textsc{sing}]\!](Q_{\sigma t}) = \lambda a_\sigma : \forall b_\sigma[Q(b) \to [\![\textsc{sing}]\!](b)].Q(a)$

(9)
$$\left[\!\!\left[\begin{array}{l} ①\ \sigma = e \\ ②\ \sigma = \langle et, t\rangle \\ [\ Q_{wh}\ [\ \ldots\ [\ \textsc{sing}\ \ D_\sigma\ ]\ ]\ ] \end{array}\right]\!\!\right] = \begin{cases} ①\ \lambda f_{\langle e,\langle st,t\rangle\rangle}.\lambda p_{st}.\exists x_e[\\ \quad [\lambda x' : \textsc{atom}(x').x' \in D_e](x) \wedge f(x)(p)] \\ ②\ \lambda f_{\langle\langle et,t\rangle,\langle st,t\rangle\rangle}.\lambda p_{st}.\exists Q_{\langle et,t\rangle}[\\ \quad [\lambda Q' : \forall P[Q'(P) \to \forall x'[P(x') \to [\textsc{atom}(x')]]]. \\ \quad Q' \in D_{\langle et,t\rangle}](Q) \wedge f(Q)(p)] \end{cases}$$

(10) $[\![\text{who.SG left?}]\!] = \begin{cases} ①\ \lambda p.\exists x[p = \lambda w : \textsc{atom}(x).\text{left}_w(x)] \\ ②\ \lambda p.\exists Q[p = \lambda w : \forall P[Q(P) \to \forall x'[P(x') \to [\textsc{atom}(x')]]].Q(\text{left}_w)] \end{cases}$

In a world w_1, where Harry and Sally left, but Bill didn't (and the domain of atoms consists of Harry, Sally and Bill), the denotation of (10-②) contains the following true members. Observe that each member of the answer set is a proposition of the form *that* Q *left*, where Q is a set of sets of atomic individuals.

$[\![(10\text{-}②)]\!]^{w_1} = \{\ \lambda w.\text{leave}_w \in \{\{H, S\}, \{H\}, \{S\}\}, \lambda w.\mathbf{leave}_w \in \{\{\mathbf{H, S}\}\}, \ldots\ \}$

The MIP is satisfied by the highlighted proposition, correctly predicting that *Harry and Sally* left is a felicitous answer to *who.*SG *left?*. The UP does not arise, since *who.*SG can quantify over members of $D_{\langle et,t\rangle}$. It is still, however, *semantically singular*, since features apply recursively to domains of a higher type. We maintain Sauerland, Anderssen & Yatsushiro's (2005) MP! account of the anti-singleton presupposition for *who.PL*, by assuming that *who.PL* competes with the presuppositionally strongest meaning of *who.SG*, which we obtain when *who.*SG quantifies over members of D_e.

Conclusion: we account for an apparently problematic datapoint for both the weak theory of plurality, and the MIP, by proposing a new, decompositional account of simplex *wh*-expressions. In the presentation, we discuss further advantages of our account, e.g., it accounts for the lack of an existential presupposition with simplex *wh*-questions but not *which*-questions.

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