

## Number Inflection, Spanish Bare Interrogatives, and Higher-Order Quantification.

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**1. Intro.** In Spanish *who* inflects for number (*quién* (who.SG), *quiénes* (who.PL)). Assuming [DI]'s ANS operator, [Md] argues that *quién(es)* challenge [SI05]'s theory of number, where the plural is weak (semantically vacuous) and the singular strong (presupposes atomicity). [Md] takes *quiénes* to be a strong plural (ranges over non-atoms only) and *quién* a weak singular (ranges also over atoms). We show that this fails to capture the behavior of *quién(es)* with collective predicates and argue that both range over certain generalized quantifiers (GQs) [Xg].

**2.1. Context.** Singular *which* (1a) disallows 'plural' answers (1c). To capture this, [DI] proposes an ANS operator that presupposes a maximally-informative true answer (2); if  $\llbracket \text{student.SG} \rrbracket^w$  contains only atoms [SI05], the Hamblin set (HS) for (1a) will contain logically independent propositions (1d) and ANS delivers a *Uniqueness Presupposition* (UP) for (1).

(1) a. Which student left? b. Al. c. #Al and Bob. d. {that *a* left, that *b* left}

(2)  $\llbracket \text{ANS} \rrbracket^w = \lambda Q: \exists p \in Q [p(w)=1 \ \& \ \forall p' \in Q [p'(w)=1 \rightarrow p \subseteq p']] . \{p \in Q [p(w)=1 \ \& \ \forall p' \in Q [p'(w)=1 \rightarrow p \subseteq p']]\}$

This contrasts with the *Anti-Uniqueness Inference* (AUI) of plural *which* (3a). With weak plurals [SI05], the propositions in (3a)'s HS in (3d) are related by entailment and ANS's presupposition can be met if more than one of them is true, deriving (3c). The AUI is derived via *Maximize Presupposition!* (MP; [Hm], [SI08]); uttering (3a) triggers the inference that (1a)'s UP is not common ground. This is strengthened to convey that the UP is false [CI].

(3) a. Which students left? b. #Al. c. Al and Bob. d. {that *a* left, that *b* left, that *a* & *b* left}

**2.2. The Puzzle.** [Md] notes that *quién* allows for both 'singular' and 'plural' answers (4), whereas plural *quiénes* only allows for plural answers (5). Given ANS, (4c) is unexpected if singular *quién* ranges only over atoms. Furthermore, if *quién* ranges over atoms and non-atoms, and *quiénes* does too, the two items are equivalent and (5b) is not accounted for.

(4) a. ¿Quién llamó? b. Al. c. Al and Bob. (5) a. ¿Quiénes llamaron? b. #Al. c. Al and Bob.  
who.SG called who.PL called

**3.** [Md] concludes that *quién* is a weak singular (ranging over (non-)atoms) and *quiénes* a strong plural (ranging only over non-atoms) ((6), [Et] for the semantic composition.)

(6) a.  $\llbracket \text{quién} \rrbracket^w = \lambda f_{\langle e, t \rangle}. \exists x [\text{HUMAN}_w(x) \ \& \ f(x)]$  b.  $\llbracket \text{quiénes} \rrbracket^w = \lambda f_{\langle e, t \rangle}. \exists x [\text{HUMAN}_w(x) \ \& \ f(x) \ \& \ |x| > 1]$

Under this view, the HS of (1a) is (3d), which allows ANS to be defined if both A and B called.

**4. A Challenge for 3.** Allowing *quién* to range both over atoms and non-atoms, as in (6a), does not always capture the lack of uniqueness of *quién*. Consider collective predicates, with which *quién* can combine (7a). *Quién* tolerates both unique and non-unique answers with collective predicates; both (7b/b') and (7c/c') can answer (7a), but (7c/c') does not entail that only one circle was formed. Yet, as [Xg] notes, ANS predicts a UP in cases like (7a): the HS of (7a) contains propositions of the form 'that *x* formed a circle' (where *x* is a non-atomic entity) which, like in (3d), are logically independent.

(7) a. ¿Quién formó un círculo? b. A,B,C and D. c. A, B, C, D and E,F,G and H.

who.SG formed a circle b.' The French students. c.' The French st. and the Dutch st.

**5. Higher Order Quién.** To capture the non-uniqueness of *quién* in both (4a) and (7a) in a uniform way while keeping ANS, the HSs of both (4a) and (7a) must contain propositions related by entailment. One way to achieve this is to resort to higher order quantification [S07, S08]. This is what [Et] propose, claiming that *quién* can (optionally) quantify over generalized quantifiers, as in (9). In (10), *quién* takes the property of GQs in (11). Assuming (departing slightly from [Et] for illustration) that the GQs that *quién* ranges over in (9) are all of the form  $\lambda f_{\langle e, t \rangle}. \forall x \in X [f(x)]$  for any non-empty  $X \subseteq D_e$  [cf. Xg], the HS of (3a) boils down to (12) ( $D_e = \{a, b, a \otimes b\}$ ) and does not yield uniqueness with ANS (cf. [Et] regarding semantic composition).

(9)  $\llbracket \text{quién} \rrbracket^w = \lambda P_{\langle \langle e, t \rangle, t \rangle}. \exists Q [P(Q)]$  (10)  $\lambda p [\text{quién} [\lambda 2 [?_p [\lambda w [t_{\langle 2, \langle e, t \rangle \rangle} [\lambda 1 [\llbracket \text{SG } t_{\langle 1, e \rangle} \rrbracket \text{ called } w]]]]]]]$

(11)  $\lambda Q_{\langle e, t \rangle}. p = \lambda w. Q(\lambda x: \text{ATOM}_w(x). \text{CALLED}_w(x))$  (12) {that *a* called, that *b* c., that *a* c. and *b* c.}

To derive the AUI of *quiénes*, which is assumed to range over individuals, [Et] assume a form of *quién* that quantifies over individuals, conveys uniqueness, and competes with *quiénes*.

**6. Challenges for 5.** Appealing to higher order quantification can overcome the challenge in 4 (see [Xg]’s for *which*), but [Et]’s implementation fails to do so because they assume that SG is interpreted over the trace of *quién*, as in (10) (presupposing atomicity of  $g(t_{\langle 1, e \rangle})$ ), which predicts incompatibility with collective predicates (as [Et] note). A version of 5 where SG does not require atomicity (or is not interpreted) does overcome the challenge in 4 (as the HS of (7a) will contain the propositions in (13), which are related by entailment), but it brings back the issue of the competition between *quién* and *quiénes*: the evidence that [S07, S08] presents for higher order quantification argues for a higher order *quiénes* as much as it does for a higher order *quién* (e.g. (14a) does not convey that the speaker is ignorant about who she has to talk to, suggesting that *con quiénes* can range over a narrow scope disjunction), yet *quiénes* still conveys an AUI in cases where it is arguably higher order (as (14c) shows).

(13)  $\{ \dots \text{that } a \oplus b \oplus c \oplus d \text{ f. a circle, that } e \oplus f \oplus g \oplus h \text{ f. a c., that } a \oplus b \oplus c \oplus d \text{ f. a c. and } e \oplus f \oplus g \oplus h \text{ f. a c.} \dots \}$

(14) a. ¿Con quiénes tienes que hablar? b. Con A y B o con C y D. c. # con A. o con C  
with who.PL have-to.2s talk with A and B or with C and D with A or with C

**7. Higher Order *Quién(es)*, Strong Pl, Weak Sg.** To meet the challenges in 6 and 4, we treat both *quién* and *quiénes* as conveying higher-order quantification. We follow [Xg] in assuming that the relevant quantifiers are generalized conjunctions and disjunctions and assume that singular *quién* is weak, in that it ranges over GQs of the form  $\lambda f_{\langle e, t \rangle}. \forall x \in X [f(x)]$  and  $\lambda f_{\langle e, t \rangle}. \exists x \in X [f(x)]$  for any non-empty  $X \subseteq D_e$  (where  $D_e$  is assumed to contain both atomic and non-atomic individuals), and that plural *quiénes* is strong in that it ranges over GQs of the same form, but where  $X$  is any non-empty subset of  $D_e$  containing only non-atomic individuals.

This analysis, like [Md]’s predicts a competition between *quién* and *quiénes* with distributive predicates (4-5). The HS of (5) contains only ‘plural’ answers (e.g. ‘that  $a \oplus b$  called’), in which case ANS is predicted to trigger the *Plurality Presupposition* (PP) that at least one plural answer is true. The HS for (4) will on the other hand contain both ‘plural’ and ‘singular’ answers (e.g. ‘that  $a$  called’), triggering the weaker presupposition that at least one singular or plural answer is true. The inference that (5)’s PP is not common ground is predicted given MP. Hence, in cases where the context makes it clear that the PP is common ground, questions with *quién* are predicted to be deviant. This prediction seems borne out in examples such as (15), where the local context [Sg] of the second conjunct entails that a plurality of students called.

(15) Varias amigas llamaron pero no me acuerdo quiénes (?? quién).

Several friends called but not REFL remember who.PL (?? who.SG). ([Md])

No competition between *quién* and *quiénes* is predicted with collective predicates. Only plural answers in (7a)’s HS can be true, since the singular answers are undefined. ANS generates for (7a) a presupposition equivalent to that of its plural counterpart. *Quién* and *quiénes* are as such predicted to be interchangeable with collective predicates, which is consistent with the facts.

**8. Conclusion.** [Md]’s account of simplex *wh*-quantifiers in Spanish is insufficient to describe their behavior with collective predicates. We propose a conciliatory approach: while [Et]’s proposal does not succeed in preserving [SI05]’s theory of number, it can be successfully used to extend [Md]’s claim for strong plurals and weak singulars. With [Md], we predict inferences from *quién* to be strengthened to convey anti-plurality when the questioner is well informed on the truth of plural answers [Cl]. *Quién* is compatible with common grounds entailing singularity, and initial evidence suggests that using *quién* in contexts where the questioner is well-informed suggests singularity. However, this requires further confirmation. Like [Md], we leave open why inferences from *which students* seem stronger than those from *quién*.

[Cl] Chemla, An epist. step for anti-ps. [DI] Dayal, Locality in wh quant. [Et] Elliott *et al.*, Who and what do *who* and *what* range over. [Hm] Heim, *Artikel und Def.* [Md] Maldonado, Pl. mark. and D-linking... [Sg] Singh, Maximize presupposition! and local contexts. [SI05] Sauerland *et al.*, A new sem. for num. [SI08] Sauerland, Implicated ps; [S07] Spector. Modalized quest. and exh. [S08] Spector. An unnoticed reading for wh-qus: [Xg] Xiang, Interpreting questions...