Plural marking and d-linking in Spanish interrogatives

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Abstract

What is the semantic import of number morphology? This question has been traditionally addressed by focusing on singular and plural noun phrases. The present work brings interrogative phrases into the picture. We analyse Spanish bare interrogative 'quién' and its plural counterpart 'quiénes'. Unlike *which*-questions in both English and Spanish, the behaviour of *quién-* and *quiénes*-interrogatives cannot be easily explained by most accounts of semantic number. In contrast, we argue that the distribution of these interrogatives in Spanish can be well accounted for by assuming that the plural 'quiénes' triggers a *strong plurality presupposition*, and can only be used in *d-linking* contexts, whereas 'quién' carries no specific requirement, as far as its semantics is concerned. As a result, our proposal shows that current approaches to number marking need to be refined in order to account for cross-linguistic and within-language variation.

1   Introduction

The question of the semantic import of overt number morphology is at issue in current semantics research (Link, 2002; Sauerland, 2003; Spector, 2007; de Swart and Farkas, 2010, a.o.). While most approaches have addressed this question by discussing number differences in declarative sentences, this paper analyzes the semantics of singular and plural *wh*-interrogatives, which appear to be problematic for most accounts of both plural and question semantics.

Singular and plural *which/what*-interrogatives[1] in both English and Spanish differ in what the speaker can expect to be a *complete true answer* to her question.

(1) a. Which client called?   ✓ John; ✗ John and Mary

  b. Which clients called?   ✗ John; ✓ John and Mary

(2) a. Cuál/Qué   cliente llamó?
     which.SG/what client   called?
     'Which client called?'   ✓ John; ✗ John and Mary

  b. Cuáles/Qué   clientes llamaron?
     which.PL/what clients   called?
     'Which clients called?'   ✗ John; ✓ John and Mary

Singular *wh*-questions trigger an *uniqueness presupposition*: A question such as (1a) can only be uttered if the speaker believes exactly one client called (henceforth *exactly-one* contexts, Dayal, 1996). Conversely, uttering a plural interrogative such as (1b) triggers the inference that the speaker believes that more

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[1]We will treat *which* and *what*-interrogatives in Spanish as equivalent to each other. As in English, they do contrast in their d-linking requirements.

than one client called (*plurality inference*). These different inferences can be attributed to differences in number morphology.

Interestingly, English *who*-interrogatives such as (3) do not trigger any specific inference about how many clients the speaker believes to have called: they have associated neither a *uniqueness presupposition* nor a *plurality inference*. Despite their singular morphology, these questions do not pattern with singular or with plural *which*-interrogatives[2].

(3) Who called?   ✓ John; ✓ John and Mary

The puzzling behaviour of *who*-interrogatives might be related to the fact that the quantifier 'who' lacks a plural counterpart in English (Chierchia, 1993; Hagstrom, 2003): 'who' can then be thought of as semantically underspecified for number, ranging over both atomic individuals and pluralities. Although the implementation of this idea might differ across accounts (see following section), one can easily notice that a specific prediction is made about languages that distinguish between singular and plural 'who': in these languages, the contrast attested for singular and plural *which*-interrogatives is expected to also arise for *who*-interrogatives. Specifically, singular *who*-interrogatives should trigger a uniqueness presupposition, whereas plural *who*-interrogatives should trigger a plurality inference. Spanish is one of such languages, making a morphological distinction between who_{SG} ('quién') and who_{PL} ('quiénes'):

(4) a. Quién   llamó?
         who.SG called.SG?
         'Who called?'   ✓ John; ✓ John and Mary

     b. Quiénes llamaron?
         who.PL called.PL?
         'Who called?'   ✗ John; ✓ John and Mary

As illustrated in (4a), singular *quién*-questions are compatible with both plural and singular answers. In other words, they appear to behave just like *who*-questions in English, suggesting that 'quién' is not semantically singular (no uniqueness presupposition). In contrast, the plural alternative in (4b) does trigger a plurality inference such that the speaker believes that more than one person called. This inference makes the question incompatible with singular answers.

The Spanish data in (4) presents a challenge for a unified semantics of number morphology: Even in presence of a plural alternative, singular morphology does not have the same semantic import across different *wh*-phrases (cf. contrast between 1a/2a and 4a). As we will see in the following section, most semantic accounts of number morphology consider singular and plural morphemes as alternatives to each other. Within these frameworks, having an unstable meaning for singular marking will cause unstable semantics for plural morphology.

The purpose of this paper is to provide an explanation for the distribution of *quién* and *quiénes*-interrogatives in Spanish. We will argue that the pattern illustrated in (4) can be derived directly from requirements of the plural 'quiénes'. In particular, our account builds on two main assumptions: (a) a strong semantics for the plural 'quiénes', which triggers a *strong plurality* presupposition and can only be used in *d-linking* contexts; and (b) a weak semantics for the singular 'quién', which carries no specific requirement, and can be used whenever its plural alternative is not available. By relying on a strong account of plurality, our proposal challenges current theories of *weak* plural meaning and their cross-linguistic generality.

This article is organized as follows: We will start by presenting some background assumptions about number marking in interrogative sentences (Section 2). Then, Section 3 puts forward our characterization of Spanish *quién* and *quiénes*-interrogatives, which is based on cardinality (Section 3.1)

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[2]For instance, 'who' can be combined with collective predicates (e.g. *Who gathered in the hallway?*), indicating that this interrogative quantifier is not semantically singular; namely it can range over both atoms and pluralities.

and d-linking (Section 3.2) requirements. The complete account for the data is provided in Section 4. Finally, Section 5 concludes and comments on open questions for further research.

2   Number marking in interrogative sentences

The English contrast illustrated in (1) can be well-accounted for by making two assumptions: (A) plural marking has weak semantic import (i.e. *weak account of plurality*, Link, 2002; Sauerland, 2003; Spector, 2007); and (B) interrogatives presuppose the existence of a maximally informative true answer (Dayal, 1996).

Current approaches to plurality stipulate, following Link (2002), that the domain of individuals D_e is closed under sum (i.e. it contains atomic individuals as well as their sums). However, they do differ on how exactly plural and singular predicates draw their reference from the domain. *Weak accounts of plurality* (cf. A) assume that the meaning of plural morphology is strictly weaker than the one of singular: while singular predicates (e.g. 'client') range over atomic individuals, plural predicates (e.g. 'clients') range over both atoms and pluralities. Accounts might differ in how they derive this weak plural meaning (see Spector, 2007; Landman, 2000; Sauerland, 2003 for different proposals). For the sake of simplicity, here we will follow the view proposed in Sauerland (2003; 2005). Note, however, that alternative implementations will not make any substantial difference to our proposal. On Sauerland's view, the singular morpheme presupposes that the extension of the predicate to which it is applied only contains atomic individuals. In contrast, the plural morpheme has no semantic contribution (i.e. it is semantically vacuous)[3].

Assuming that the denotation of a question is the set of propositions that count as its possible answers (Hamblin, 1973), a singular question such as (1a) will only include in its denotation singular propositions of the form 'x called', with x being an atomic individual. This a direct consequence of the singular morphology in the predicate 'client'. Plural questions will range over both singular and plural propositions. An illustration of the denotation of (1a) and (1b) is provided in (5). Following Heim and von Fintel's (2016) reconstruction of Karttunen's (1977) compositional semantics, we assume *wh*-words to be existential quantifiers and derive the question denotation by posting an abstract complementizer that acts as a "proto-question" operator. For simplicity, the requirements of the singular morpheme are assumed to be inherited by the proposition.

(5) a. $[\![1a]\!]^w = \lambda p.\exists x.\, Atom(x) \wedge \mathrm{client}(w)(x) \,\wedge\, p = \lambda w'.\, x \text{ called in } w' = \left\{ \begin{array}{l} \lambda w'.\, m \text{ called in } w', \\ \lambda w'.\, b \text{ called in } w', \\ \lambda w'.\, j \text{ called in } w' \end{array} \right\}$

  b. $[\![1b]\!]^w = \lambda p.\exists x.\mathrm{clients}(w)(x) \,\wedge\, p = \lambda w'.\, x \text{ called in } w' = \left\{ \begin{array}{l} \lambda w'.\, m \text{ called in } w', \\ \lambda w'.\, b \text{ called in } w', \\ \lambda w'.\, j \text{ called in } w', \\ \lambda w'.\, j \oplus m \text{ called in } w', \\ \lambda w'.\, j \oplus b \text{ called in } w', \\ \lambda w'.\, b \oplus m \text{ called in } w', \\ \lambda w'.\, j \oplus m \oplus b \text{ called in } w' \end{array} \right\}$

By the assumption in (B), the set of *true* answers to a question should contain a member that entails all the other members. This member will be the *maximally informative* true answer to the question. Following Dayal (1996), the requirement in (B) can be captured in terms of the answerhood operator defined in (6): a question Q is felicitous only if in all worlds w compatible with common knowledge, $ANS(Q)(w)$ is defined.

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[3]Sauerland furthermore assumes the existence of a star-operator (*) that closes the predicate under sum formation (in the lines of Link, 2002): if the predicate is true of {a, b}, the star operator would make the predicate true of {a, b, a⊕ b}. This operator is compatible with the plural morpheme and incompatible with the singular.

(6) $ANS(Q)(w) = \iota p.p{\in}Q \wedge p(w) \wedge \forall p' {\in}Q: p'(w){\rightarrow} p{\subset}p'$
In words: $ANS(Q)(w)$ is the maximally informative answer to Q in w, if there is one, and is undefined otherwise.

Since singular questions can only have such a maximally informative answer if the set of true propositions is a singleton ('x called' does not entail 'y called' unless $x = y$), the *uniqueness presupposition* is directly captured by the presuppositions of the *ANS* operator. In the case of plural, the set of true propositions can contain more than one member ('$x \oplus y$ called' entails 'x called' and 'y called'). However, once we assume that plural questions have in their denotation both plural and singular propositions (cf. 5b), nothing prevent us from uttering a plural interrogative in a context where a (maximally informative) *singular* answer is expected. This is not a welcome result since, as we have observed, plural questions tend to require a plurality named in their answer (i.e. the aforementioned *plurality inference*).

By analogy with the case of nominal expressions, the plurality inference associated with plural interrogatives can be thought to arise as an *implicated presupposition* (Heim, 1991; Sauerland, 2008), product of the competition between singular and plural alternatives. The basic reasoning goes as follows: In every scenario where two sentences are contextually equivalent (cf. 7a), a pragmatic principle such as *Maximize presupposition!* can apply, requiring to use of the item with stronger presuppositions.

(7) a. Two sentences F and F' are *contextually equivalent* in context c iff in every world w of c where $F(w)$ and $F'(w)$ are defined, $F(w)$ and $F'(w)$ have the same truth value.

b. MAXIMIZE PRESUPPOSITION!
If F and F' are contextually equivalent in c and the presuppositions of F are stronger than those of F', then one must use F and not F.'

The notion of contextual equivalence has to be slightly modified to be applied to interrogative sentences: two interrogatives will be *contextually equivalent* in one context if they have the same maximally informative answer in every world compatible with the context; namely, if ANS returns the same exhaustive true answer[4]. For concreteness, we will then consider ANS to be incorporated into the LF of matrix questions. Whenever it is presupposed that exactly one person went to the party, the two interrogatives in (1) are contextually equivalent, and the speaker should use the alternative carrying stronger presuppositions; namely, the singular.

Given that using the plural interrogative is only appropriate in contexts where it is not common knowledge that there is a unique singular answer, these questions trigger the inference that the uniqueness presupposition is not satisfied: (1b) is then felicitous whenever its singular counterpart (1a) is not. As a result, plural interrogatives such as (1b) are predicted to have the implicated presupposition that it is *not* common knowledge that exactly one person called. That is to say, *it is possible*, according to common knowledge, that more than one person have called.

In the same way as with implicated presuppositions for declarative sentences, whenever the speaker is considered to be reliable and knowledgable, the logic of the epistemic-step for presuppositions (or anti-presuppositions) developed in Chemla (2008) can be applied, and the inference can be strengthened into a *strong* implicated presupposition, such as "it's common knowledge that more than one person called" (i.e. it is common knowledge that it is not the case exactly one person called)[5]. Strikingly, the plurality inference for plural *which*-interrogatives is typically an implicated presupposition of this

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[4]Two interrogative sentences F and F' are *contextually equivalent* in context c iff in every world w of c where $ANS(F)(w)$ and $ANS(F')(w)$ are defined, $ANS(F)(w)$ and $ANS(F')(w)$ return the same maximally informative answer.

[5]In the case of questions, there is of course an inference that the speaker does not know the answer to the question. So for the reliability assumption to hold, it has to be the case the hearer believes that the speaker, at the same time, knows whether one or more than one people called, but does not know who exactly called. It is not clear that this line of reasoning is sufficient to explain why, out of the blue, a plural *wh*-question suggests that the answer involves true plurality, but we will not pursue this question here.

second class (a strong one): when the speaker utters the question, it seems to imply that the complete answer is a plural answer.

It is worth noticing that the distribution of singular and plural forms under a weak account of plurality crucially depends on the asymmetry in presuppositional strength between the two items: the plurality inference for the plural arises as long as the singular has stronger presuppositions; otherwise, a principle such as *Maximize Presupposition!* could not be applied.

To conclude this section, we would like to briefly explore how a weak account of plurality could deal with English *who*-interrogatives. The absence of a uniqueness presupposition for these questions indicates that, despite triggering singular agreement, the *wh*-element 'who' is semantically plural or underspecified (see Dayal, 1996). 'Who' should then range over the whole domain of people, and interrogatives such as (3) should denote a set containing both plural and singular propositions, just like the plural question in (5b). The main difference between plural and 'neutral' interrogatives would be that only the former has an alternative with stronger presuppositions, and, as a result, no plurality inference is predicted for *who*-interrogatives. These assumptions are hard to integrate with the semantics proposed by Sauerland for number morphology: while 'who' phrases appear to receive singular marking, the singular morpheme seems to have the same semantic import as the plural one (i.e. it is vacuous). An attempt of explaining English *who*-interrogatives within Sauerland's account has been recently provided by Elliott et. al (2017). We will briefly discuss this proposal in the next section.

3 Characterizing *quién* and *quiénes* interrogatives

3.1 Cardinality requirement

The distribution of *quién* and *quiénes* interrogatives in Spanish is restricted by conditions on contexts: the possibility of using each of these interrogatives depends on the beliefs the speaker has about the complete answer to her question. The data in (8) illustrate, together with (4), such distribution.

(8) a. Una de mis amigas llamó pero no me acuerdo quién (# quiénes).
    one of my friends called but not REFL remember who.SG (# who.PL)

    'One of my friends called but I don't remember who.'

  b. Una o más de una persona llamó pero no me acuerdo quién (# quiénes).
    one or more than one person called but not REFL remember who.SG (# who.PL)

    'One or more than one person called but I don't remember who.'

  c. Varias amigas llamaron pero no me acuerdo quiénes (?? quién).
    several friends called but not REFL remember who.PL (?? who.SG)

    'Several friends called but I don't remember who.'

  d. Mucha gente llamó pero no me acuerdo quiénes (?? quién).
    many people.SG called.SG but not REFL remember who.PL (?? who.SG)

    'Many people called but I don't remember who.'

Singular *quién*-interrogatives such as (4a) can be felicitously uttered in two alternative scenarios: whenever the speaker expects a singular answer (i.e. *exactly-one* contexts in 8a) and whenever the speaker does not know whether one or more than one person called (e.g. 8b). We will call these contexts *ignorance scenarios* because the speaker is ignorant about the cardinality of the expected answer. The fact that *quién* interrogatives are available in ignorance scenarios is what makes them fully compatible with both plural and singular answers, as observed in (4).

The plural alternative with 'quiénes' is not available in either of these two contexts. *Quiénes* interrogatives can only be felicitous as long as it is common knowledge that a plurality will be named in the complete answer (cf. plurality inference). Specifically, the common ground should contain the

proposition "more than one person VP" to admit a interrogative of the form *quiénes VP?*[6]. In (8c), the speaker asserts that more than one person called, introducing the proposition in the common ground, and questions their identity. *Quién*-interrogatives are degraded in this context[7]. As illustrated in (8d), this contrast is independent of the morphological marking in the noun: even though the noun 'gente' triggers singular agreement in Spanish, it is semantically plural and therefore it can only be antecedent of the plural 'quiénes'.

The availability of *quién*-interrogatives in ignorance contexts (e.g., 8b) is well accounted for by an underspecified entry for 'quién', similar to the one required for 'who' in English.

(9) $[\![\text{QUIÉN}^{[+\text{WH}]}]\!]^w = \lambda F_{et}. \exists x.\ x$ are people in $w \ \wedge\ F(w)(x)$

Since 'quién' will range over the set of people –which we could consider equivalent to the domain–, *quién*-interrogatives will include in their denotation both singular and plural propositions. No constraint would then be imposed to the context of utterance. For instance, in a scenario where the speaker is ignorant about answer cardinality, the *ANS* operator would be able to return both singular or plural propositions, depending on the world.

The question then is how to derive the plurality inference attested for *quiénes*-interrogatives. Depending on the specific account of number marking one adopts, such inference can be derived in one of two ways: as an implicated presupposition, product of the competition with a stronger alternative (cf. weak accounts of plurality described in Section 2), or as part of the literal meaning of the interrogative (i.e. *strong* accounts of plurality).

In their simplest form, weak accounts of plurality predict singular *quién*-interrogatives to give rise to a uniqueness presupposition. The plurality inference attested for the plural should arise as an implicated presupposition. As observed, this first prediction is not borne out by the data: an underspecified entry for 'quién' is indeed required; therefore, there is at least one entry for 'quien' which is not capable of competing with a weak plural alternative.

Nonetheless, one might still conceive the possibility that 'quién' is actually ambiguous between a form that ranges only over atoms ('quién'$_\text{SG}$), and one that is neutral to semantic number ('quién'$_\varnothing$). This ambiguity might emerge from the singular morpheme (see Elliot et al 2017 for an analysis in these lines) or be lexically based. In either case, the neutral form 'quién'$_\varnothing$ would be the one used in ignorance contexts (e.g. 8b), whereas 'quién'$_\text{SG}$, equivalent to 'which person' in English, would be used in *exactly-one* scenarios (e.g., 8a). The plural 'quiénes' would have a weak semantics, equivalent to 'which people' in English, and the plurality inference would arise by the competition with 'quién'$_\text{SG}$ in the relevant contexts. As long as this inference is an implicated presupposition, *quiénes*-interrogatives should be available whenever the singular alternative is not, namely in both *more-than-one* and ignorance scenarios. Hence, the distribution of 'quiénes' should be strictly equivalent to the one of plural *which*-questions in Spanish and English. In (8b), we already showed that *quiénes*-interrogatives are deviant in ignorance scenarios[8]. This pattern persists across different contexts, contrasting –crucially– with the behavior of plural *which*-questions and their Spanish counterpart:

(10) *Juan is expecting at least one friend to come to the party.*

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[6]We assume the notion of common ground proposed by Stalnaker (1978). A proposition is in the common ground if each interlocutor is "disposed to act as if he assumes or believes that the proposition is true, and as if he assumes or believes that his audience assumes or believes that it is true as well".

[7]Speakers report unclear judgments regarding the unavailability of *quién* in these cases. While they all agree in that the alternative with 'quiénes' is preferred, they do not necessarily consider the sentence impossible. This difference in judgments is actually expected under the account developed here.

[8]Arguably, the sluicing example provided in (8b) is also deviant when we replace 'quiénes' by 'which ones' (e.g. i). However, the singular alternative is even more degraded (e.g. ii).

(i) ? One or more than one person called, but I don't remember which ones

(ii) #One or more than one person called, but I don't remember which one

   a. Juan no sabe quién va a venir a la fiesta.
     Juan not know who.SG go PREP come to the party.

     'Juan doesn't know who will come to the party.'

   b. #/?? Juan no sabe quiénes van a venir a la fiesta.
     #/?? Juan not know who.PL go PREP come to the party.

     'Juan doesn't know who will come to the party.'

   c. Juan no sabe qué/cuáles amigos van a venir a la fiesta.
     Juan not know what/which.PL friends go PREP come to the party.

     'Juan doesn't know what/which friends will come to the party.'

   d. Juan doesn't know which friends will come to the party.

In both Spanish and English, plural *which*-interrogatives can be felicitously uttered in ignorance contexts such as the one in (10) (e.g., c/d). This indicates that the *plurality inference* for these interrogatives is indeed an implicated presupposition: the relevant questions can be used as soon as the presupposition of their singular counterpart is not satisfied, including in an ignorance scenario. Instead, *quiénes* interrogatives are still incompatible with this context (e.g., 10b), suggesting that the plurality inference for these questions is not an implicated presupposition.

   A further contrast between *quiénes* and plural *which/what*-questions is obtained when these interrogatives are embedded under a universal quantificational adverb (e.g. 'each day of the week'). Consider the scenario described in (11). This 'mixed' context ensures that every day there was *at least* one person the professor received. As predicted by different accounts of plurality (see Spector, 2007 and Kriz, 2015 for a discussion of this kind of examples), sentences such as (11a) and (11b) can be considered true descriptions of such situation (i.e. the professor received one or more than one student each day of the week'). Instead, *quiénes*-interrogatives are perceived as deviant by Spanish native speakers.

(11) *The professor received one student each day and at least one day he received multiple students.*

   a. The professor knows which students came to his office each day of the week.

   b. El profesor sabe qué/cuáles estudiantes vinieron a su oficina cada día de la
     The professor knows what/which.PL students came to his office each day of the
     semana.
     week.

     'The professor knows which students came to his office each day of the week.'

   c. ?? El profesor sabe quiénes vinieron a su oficina cada día de la semana.
     ?? The professor knows who.PL came to his office each day of the week.

     'The professor knows who came to his office each day of the week.'

Note that this contrast cannot be explained by relying on relevance or contextual differences (Kriz, 2015): for each of the three sentences in (11) it is equally irrelevant whether one or more than one student was received by the professor.

The examples presented in (8)-(11) (see illustration in Table 1) suggest that *quién* and *quiénes*-interrogatives cannot be explained with the same tools we used to account for *which*-interrogatives. Namely, they cannot be explained in terms of weak account of plurality. Rather, the properties of these questions can be nicely integrated within a *strong plural semantics* (Chierchia, 1998; de Swart and Farkas, 2010), such that the plural 'quiénes' carries a *more-than-one* requirement as part of its literal meaning. In principle, we cannot commit to including such requirement directly in the semantics of the plural morpheme: a weak plural meaning is still required in order to explain the behavior of *which*-interrogatives in both Spanish and English.

(12) $[\![\text{QUIÉNES}^{[+\text{WH}]}]\!]^w = \lambda F_{et}. \exists x.$ are people in $w \ \wedge \ \underline{|x| > 1} \ \wedge \ F(w)(x)$

	COMMON GROUND	
Exactly one **person VP**	*At least one* **person VP**	*More than one* **person VP**
Which/What person *VP*? (EN/SP)	Which/What people *VP*? (EN/SP)	
Who *VP*? (EN)		
Quién *VP*? (SP)		Quiénes *VP*? (SP)

Table 1: Distribution of interrogatives depending on the contexts where they can appear. Shaded cells indicate the alternatives that carry stronger presuppositions.

As we will observe in more detail in Section 4, a lexical entry such as (12) ensures that the denotation of *quiénes*-interrogatives includes plural propositions, making them only compatible with *more-than-one* contexts. In this respect, *quiénes*-interrogatives are the mirror image of singular *which*-questions: while the latter presuppose that the complete answer involves an atomic individual, the former presuppose that the complete answer involves a non-atomic individual.

3.2   D-linking requirement

We have proposed that *quiénes*-interrogatives impose a *more-than-one* requirement into the common ground. While satisfying this requirement is a necessary condition to license a *quiénes*-interrogative, it is not a sufficient one. Additionally, the plural 'quiénes' seems to require a *discourse-linked* context, where the domain of individuals over which the quantifier ranges is either contextually salient or has been previously introduced into the discourse by an indefinite noun phrase or whatever element which could license anaphora (Pesetsky, 1987; Comorovski, 2013).

Consider the context in (13). This scenario ensures that the speaker believes that more than one person is in the house, but differs from previous examples in that there is no contextually salient or discourse-given set of people. *Quiénes*-interrogatives are not licensed in these cases, and only the alternative with 'quién' can be uttered (e.g. 13a). A similar pattern is attested with plural indefinites (13b; Alonso-Ovalle and Menéndez-Benito, 2011; Etxeberria and Giannakidou, 2010). As expected, the contrast is reversed if an antecedent for the *wh*−phrase has been previously introduced in the discourse (13c)[9].

(13)   *Mary and John arrive at their apartment, where there is supposed to be no one. They hear two people whispering inside. Mary asks:*

    a. Quién   (# quiénes) está ahí?
        Who.SG (# who.PL) is   there?
        'Who is in there?'

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[9]'Quién' and 'quiénes' also differ in their ability to appear in interrogatives without existential import. As *who*-interrogatives in English (Krifka, 2011), singular *quién*-interrogatives can appear both in *there*-insertion contexts (e.g. i) and in scenarios where the speaker puts in doubt the existence of propositions in the set of true answers (e.g. ii, Aguero-Bautista, 2001). *Quiénes*-interrogatives are deviant in these contexts.

  (i) Quién (# quiénes) hay en la fiesta?
     Who.SG (# who.PL) was at the party?
     'Who was there at the party?'

  (ii) *Mary's parents decided not to let her go out on Friday's night. Very upset, Mary says to them:*
      Quién (# quiénes) se creen que son?
      Who.SG (# who.PL) REFL think that are?
      'Who do you think you are?'

The availability of appearing in *there*-insertion contexts has been traditionally used to place DPs in the (in)definiteness scale (Heim, 1987). In (9), 'quién' proves to be better than 'quiénes' in this context, suggesting that the later is a stronger DP than the former.

b. Algún   ladrón (# algunos ladrones) debe haber entrado.
   Some.SG thief   (# some.PL thieves)   must have entered.

   'Some thief must have broken-in'

c. Dos personas están hablando en el   dormitorio, pero no sé   quiénes (# quién)   son.
   Two people   are   talking   in the bedroom,   but not know who.PL (# who.SG) are.

   'Two people are talking in the bedroom, but I don't know who they are.'

Another piece of evidence indicating the need of an additional *d-linking* requirement comes from the possibility of combining the singular 'quién' with collective and reciprocal predicates (14a/b). Collective and reciprocal predicates can *only* be predicated of pluralities; therefore, the speaker is *by default* opinionated about the cardinality of the expected answer. Given that *quiénes*-interrogatives have stronger presuppositions than their singular alternative (cf. 12), questions such as (14a) should be blocked. Nonetheless, these *quién*-interrogatives are actually preferred in *non-d-linked* contexts.

A similar pattern arises when quantificational adverbs quantify over the embedded question (Quantificational Variability Effects, Berman, 1991). The sentence in (14c) triggers the inference that multiple people called and for most of them, Mary knows that they called. The embedded interrogative 'who$_{sg}$ called' needs to have a plural maximal answer in order to allow such reading.

(14) a. Quién se   juntó   ayer   a la noche?
         Who.SG REFL gathered yesterday at the night?

         'Who gathered last night?'

      b. Quién se   conoce entre   sí   en la fiesta?
         Who.SG REFL know   between them at the party?

         'Who knows each other at the party?'

      c. María sabe   sólo en parte quién   llamó.
         María knows only in part who.SG called'

         'Mary mostly knows who called'

The examples above suggest that the plural 'quiénes' can only range over a discourse or contextually salient set: 'quiénes' is always understood as 'quiénes out of the salient set of people'[10]. This property, described as *d-linking*, has been used to account for the syntactic behaviour of interrogative sentences (e.g. *which*-interrogatives in English). However, it has not been formally defined in the semantics literature, being alternatively assimilated to specificity or definiteness. For the purposes of this paper, I consider that a restrictor is *d-linked* in a context *c* if *c* provides a set of discourse referents (in the sense of dynamic semantics; Heim, 1983) that can be recovered by a plural pronoun or an overt partitive construction. In contexts that do not provide this salient set, such as the scenario given in (13), these constructions are not licensed:

(15) (cf. context in 13)

      a. ?? Ellos deben ser ladrones.
         'They must be thieves'

      b. ?? Dos de los ladrones nos están robando.
         'Two of the thieves must have broken in'

As is the case for pronouns and overt partitives, some interrogative elements are *inherently* d-linked (i.e. they can only be uttered if the restrictor is d-linked in the utterance context); others, instead, are underspecified for d-linking, and they can appear in any context. *Wh*-words such as 'which' and 'quiénes' seem to belong to the first group, whereas English 'who' and 'quién' belong to the

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[10]One might be tempted to treat the interrogative 'quiénes' as a definite description (e.g. $the(\lambda x \, people(x))$), in the same way it has been proposed for *which*-phrases in English (Rullmann and Beck, 1998; Novel and Romero, 2010). The *d-linking* requirement would then be captured by the standard familiarity constraint for definite phrases (i.e. the reference of the definite has to be "familiar" to the audience, Heim, 1983). We will leave this possibility open for future research.

second. Interestingly, some of these interrogative elements can optionally take partitives as restrictors. Whenever they do, we can ensure that the utterance context provides a contextual reference for the partitive, and therefore the restrictor is d-linked in the context. This is the case for 'quién' and 'quiénes': they can both take overt partitives (e.g. 16).

(16) a. Quién   de tus   amigos llamó ayer?
          who.SG of your friends called yesterday?
          'Which one of your friends called yesterday?'

      b. Quiénes de tus   amigos llamaron ayer?
          who.PL of your friends called   yesterday?
          'Which ones of your friends called yesterday?'

We can thus predict that whenever the *wh*-element takes a partitive and the cardinality requirement is met (i.e. *more-than-one* contexts), only the alternative with 'quiénes' will be licensed[11]. This is indeed the case:

(17) a. * Quién   de tus   amigos se   juntó   ayer?
          * who.SG of your friends REFL gathered yesterday?
          'Which one of your friends gathered yesterday?'

      b. Quiénes de tus   amigos se   juntaron ayer?
          who.PL of your friends REFL gathered yesterday?
          'Which ones of your friends gathered yesterday?'

      c. * María sabe   sólo en parte quién   de sus amigos llamó.
          * María knows only in part who.SG of her friends called.
          'Mary mostly knows which one of her friends called.'

      d. María sabe   sólo en parte quiénes de sus amigos llamaron.
          María knows only in part who.PL of her friends called.
          'Mary mostly knows which ones of her friends called.'

4   Account

The use conditions of *quién* and *quiénes*-interrogatives can be summarized as follows (see also Table 2 for a complete paradigm):

(18) A sentence of the form *Quiénes* VP? can be felicitously uttered in *c* iff:

      a.   **cardinality requirement**
          the question presupposes its complete answer involves a non-atomic individual: $c \cap [\![$more than one person $VP]\!]$

      b.   ***d-linking* requirement**
          the question presupposes its complete answer will be drawn from a 'contextually salient' (or previously introduced) set of individuals.

      Otherwise, the alternative *Quién VP?* should be used.

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[11]For inherently d-linked words, having an overt partitive does not make any difference. For example, 'which' is one of the few *wh*-words in English that can take an overt partitive as a complement. However, since it is also inherently d-linked, both *which*-interrogatives below can only be felicitously uttered if the context provides a salient set of books, from where the speaker is asking for a choice.

  (i) Which book did you read?

 (ii) Which of the books did you read?

The plural 'quiénes' is constrained by the conjunction of (a) and (b): As long as one of the two requirement is not fulfilled in the common ground, the alternative with 'quién' will be the only one available option. *Quién*-interrogatives are therefore underspecified, and their use conditions are disjunctive: they can be used either when the plurality requirement is not met or when the context is not d-linked.

| | COMMON GROUND | | |
	Exactly one person VP	*At least one* person VP	*More than one* person VP
D linked	Which/What person *VP*? (EN/SP)	Which/What people *VP*? (EN/SP)	
		Who *VP*? (EN)	
	Quién *VP*? (SP)		Quiénes *VP*? (SP)
Non-D linked		Who *VP*? (EN)	
		Quién *VP*? (SP)	
	What person *VP*? (EN/SP)	What people *VP*? (EN/SP)	

Table 2: Final Distribution of interrogatives depending on the contexts where they can appear.

Given that the two requirements in (18) are only imposed on 'quiénes', it is natural to infer that they are encoded in the semantics of plural morphology. However, in light of the broader set of data (e.g. *which* and *cuál*-interrogatives), this assumption appears faulty. While the exact contribution of plural marking needs to be further explored, in what follows we will assume that the plurality and d-linking requirements emerge specifically for 'quiénes', as part of its lexical meaning.

Let us now inspect our account by working on the examples in (4). Since providing a formal definition of d-linking exceeds the scope of this paper, the requirement in (18b) will be expressed by simply assuming that 'quiénes' includes a pronominal element, represented by an index whose reference is determined by the assignment function and serves as the restrictor of the interrogative quantifier. Following Heim and Kratzer (1998) account of referring pronouns, an appropriated context for the use of 'quiénes$_i$' is one that provides a specific assignment function for the index *i* (i.e. *appropiated-ness condition*). Moreover, 'quienes$_i$' triggers the presupposition that the value assigned to *i* by the assignment function is a plural individual (an individual that contains at least two atomic parts). This presupposition is cashed out as a definiteness condition in (19b), given Heim and Kratzer's notational conventions. The existential quantifier will range over the referents introduced by this anaphor; hence, 'quiénes$_i$ can be thought as equivalent to 'which of them', modulo the plurality requirement. For the sake of the example, we will assume the d-linking requirement is met in the utterance context. That is to say, the utterance context provides discourse referents for each of the members in the set of people, which in our example are Mary, John and Bill.

Adopting the lexical entries in (19), the interrogatives in (4a) and (4b) will have the denotations in (20a) and (20b). Note that the LFs in (20) are derived by means of Heim and von Fintel's (2016) take on Karttunen (1977) semantics, as we have done before.

(19) a. $[\![\text{QUIÉN}^{[+\text{WH}]}]\!]^w = \lambda F_{et} \exists x.\ x$ are people in $w \wedge F(x)(w)$

   b. $[\![\text{QUIÉNES}_i^{[+\text{WH}]}]\!]^{w,g} = \lambda F_{et} : g(i)$ are people in w . $\exists x.\ x \preceq g(i) \wedge |x| > 1 \wedge F(w)(x)$

(20) $[\![\text{ people }]\!] = \{m, j, b, m \oplus j, m \oplus b, j \oplus b, m \oplus j \oplus b\}$

   a. $[\![4a]\!]^w = \lambda p.\ \exists x.\ x$ are people in $w \wedge p = \lambda w'.x$ called in w'

$$= \left\{ \begin{array}{l} \lambda w'.\ m \text{ called in } w', \\ \lambda w'.\ b \text{ called in } w', \\ \lambda w'.\ j \text{ called in } w', \\ \lambda w'.\ j \oplus m \text{ called in } w', \\ \lambda w'.\ j \oplus b \text{ called in } w', \\ \lambda w'.\ b \oplus m \text{ called in } w', \\ \lambda w'.\ j \oplus m \oplus b \text{ called in } w' \end{array} \right\}$$

b. $[\![4b]\!]^{w,g} = \lambda p : g(i)$ are people in w. $\exists x.\ x \preceq g(i)\ \wedge\ |x| > 1\ \wedge\ p = \lambda w'.x$ called in w'

$$= \left\{ \begin{array}{c} \lambda w'.\ j \oplus m \text{ called in } w', \\ \lambda w'.\ j \oplus b \text{ called in } w', \\ \lambda w'.\ b \oplus m \text{ called in } w', \\ \lambda w'.\ j \oplus m \oplus b \text{ called in } w' \end{array} \right\}$$

After applying the *ANS* operator to (20a) and (20b), the two corresponding LFs have different presuppositional strength: the set of worlds where (20b) is defined is included in set the worlds (20a) is defined. In every context where it is common ground that exactly one person went to the party, (20b) will yield to a presupposition failure, leading to the attested oddness (e.g. 8a). Conversely, if it is common ground that more than one person (out of a salient set of people) went to the party, the two interrogatives will be contextually equivalent[12]. A principle such as *Maximize Presupposition!* will then select (20b), since this is the LF carrying a stronger presupposition.

When a *quién*-interrogative is uttered in a context where the d-linking requirement is met, one should infer that it's not presupposed that the question has a plural answer, or the alternative with 'quiénes' should have been used. Questions such as (4a) therefore trigger an ignorance inference: according to what is common knowledge, it is possible that one or more than one person has called. This explains why *quién*-interrogatives are compatible with *ignorance* scenarios. However, if the speaker can be considered to be reliable and knowledgeable, following the logic of the epistemic step for implicated presuppositions or anti-presuppositions, an 'exactly-one' inference (cf. *strengthened* implicated presupposition) will be derived. One would then be in a position to infer that, according to what is common ground, exactly one person has called[13].

Finally, whenever the d-linking requirement is not fulfilled in the common ground (i.e. there is no reference for the plural anaphora in the context), *quiénes-* interrogatives are predicted to yield to a presupposition failure. The denotation of the question will be empty, and the existential presupposition of the ANS operator will not be satisfied in the common ground. *Quién*-interrogatives will then be the only available alternative. Note that the two interrogatives can only be contextually equivalent if and only if the context is both d-linked and involves more than one person who VP (see 7a). Since in non d-linked contexts *Maximise Presupposition!* can never be applied, in these contexts *quién*-questions will not trigger any inference regarding the cardinality of the expected answer (cf. no implicated presupposition). This explains the distribution attested in examples such as (13) and (14).

5   Beyond interrogatives: Conclusions and issues for further research

The account provided in this article contributes to the current research on number semantics by bringing interrogative quantifiers into the picture. We have addressed the contrast between *quién* and *quiénes*-interrogatives in Spanish, claiming that plural morphology has a *strong* semantic import into the quantifier meaning, whereas singular marking is semantically vacuous (i.e. *strong plural/weak singular* semantics). We have then argued that the distribution of the two interrogatives arises from the existence of two requirements (cardinality and d-linking) which seem to be linked to plural morphology.

As a result, our analysis shows that current approaches to number marking need to be made more sophisticated to account for both cross-linguistic and within-language variation. Although the behavior of 'quién' and 'quiénes' is well explained by a *strong plural/weak singular* semantics, the meaning of

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[12]Note that these two interrogatives are only contextually equivalent if we compare LFs *containing* the *ANS* operator: applying the answerhood operator to these the two interrogatives will return the same maximal true answer for all worlds compatible with the context.

[13] At this point, it's important to note a difference of strength between implicated presuppositions associated to plural *which*-interrogatives (cf. Section 2) and to *quién*-interrogatives. As observed, in most contexts, *which*-interrogatives (e.g. 1b) trigger a quite *strong* plurality inference (i.e. it is common ground that more than one client called). Instead, singular *quién*-questions tend to convey complete ignorance, compatible with a standard implicated presupposition (i.e. it is possible, according to common knowledge, that only one person have had called).

other indefinites in both Spanish and English is still best accounted for in terms of a weak semantics for plural morphology. As observed, singular *which*-questions do trigger a uniqueness presupposition (e.g. 1a/2a), whereas plural *which*-interrogatives are fully compatible with ignorance contexts, where it's not common knowledge that exactly one individual will be named in the complete answer (e.g. 10). Accounts relying on a unified semantics for singular and plural morphemes (cf. Sauerland, 2003; Sauerland et al., 2005) are therefore proven to be misleading.

Rather, one might suggest that number morphology has different semantic import depending on whether it applies to single-word quantifiers (i.e. often denominated indefinite pronouns or generalized quantifiers) or to determiners. Specifically, traditional approaches could account for number marking applied to determiners, whereas single-word quantifiers would follow a weak singular/strong plural pattern. An analysis in these lines would explain the difference between 'quién'/'quiénes' and 'which'/'what'-phrases. Indeed, a contrast between these two different kinds of quantifiers is also attested in the declarative domain, where some singular single-word quantifiers seem to have a weak semantics, making them compatible with a collective predicate (p.c. Benjamin Spector). An illustration of such behaviour is shown in (21) for different quantifiers in English. The same pattern is attested in Spanish.

(21) a. Everyone gathered
      b. *Every student gathered

(22) a. Nobody gathered
      b. *No student gathered

Note that, if the ideas sketched above are on track, every single-word quantifier that can receive both plural and singular marking is predicted to have the same distribution as 'quién' and 'quiénes' in Spanish.

There are, however, some counterexamples to this generalisation. A first notable exception is the distribution of English 'someone'. Like the singular determiner 'some', 'someone' is unable to appear as the subject of a collective predicate (e.g. *Someone gathered*), suggesting that it is not a weak singular despite being a single-word quantifier. Additionally, some plural determiners might also impose *strong* plural requirements, even independently of having a strong singular as their alternative. This seems to be the case for the existential determiner 'unos' (*ones*) in Spanish, which directly competes with the singular indefinite 'un' (*a*) (see Martí, 2008; Alonso-Ovalle and Menéndez-Benito, 2011 for the relevant examples).

All these ideas are tentative, but they serve to illustrate the complexity of the problem, reinforcing the need for a "mixed" approach to number semantics in order to account for the complete range of data. Further research will hopefully help to clarify this issue.

Let us finally point out that, besides discussing the cardinality requirements associated to number morphology, our account of *quién* and *quiénes*-interrogatives also establishes an unexpected link between plural marking and d-linking. Although an homologous connection has been attested for plural epistemic indefinites in Spanish (Alonso-Ovalle and Menéndez-Benito, 2011), as illustrated in (13), the details of such relation remain unexplained in our account. We remain agnostic as to whether d-linking is a requirement directly triggered by plural morphology when it applies to certain quantifiers.

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