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QUANTIFIERS IN PAIR-LIST READINGS[*]

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In this paper the term pair-list reading will be applied to both types (1) and (2):

(1) Who did every dog bite?
     'For every dog, who did it bite?'

(2) Who did six dogs bite?
     'For six dogs of your choice, who did each bite?'

Type (1) will be referred to as a fixed domain reading and type (2) as a choice reading, when the distinction is necessary.

Pair-list readings arise when the interrogative contains a quantifier; the issue to be addressed is what role this quantifier plays. The standard view is that the quantifier here does not have the same kind of quantificational force as in other, "normal" contexts; instead, it contributes a restriction on the domain of the question. Furthermore, it is assumed that interrogatives on the pair-list reading are lifted, i.e., denote generalized quantifiers over individual questions. Abstracting away from certain differences between authors (Groenendijk and Stokhof 1984, Higginbotham 1991, Chierchia 1993), matrix as well as complement pair-list readings are assigned the following kind of interpretation:

(3) $\lambda P \exists X[X$ a set determined by the quantifier & $P(\text{which } x \in X \text{ bit whom})]$

where P is a variable ranging over properties like being a secret, being known by John or being wondered about by John.

In this paper I argue that (3) should be traded for two distinct interpretations. The arguments for the revisions are empirical. They come from observing

exactly what quantifiers support pair-list readings in matrix and in complement contexts and analyzing what logical apparatus is necessary for accommodating these possibilities. In other words, the argument is guided by the heuristic formulated in Szabolcsi (1996):

(4) What range of quantifiers participates in a given phenomenon is suggestive of exactly what that phenomenon consists in.

The two proposed interpretations are as follows. In distinction to (3), (5) has domain restriction but no lifting, and (6) has lifting but the quantifier operates in its own usual manner.

(5) Matrix questions and complements of *wonder*-type verbs:
which $x \in A$, which y [x bit y]
where A is the unique set determined by the quantifier

(6) Complements of *find out*-type verbs:
$\lambda P[Q(\lambda x[P(\text{which} y[x \text{bit} y])])]$
where Q is the usual interpretation of the given quantifier

Since various papers in this volume argue that bare indefinites, universals and modified numerals contribute differently to the interpretation of the sentence, (6) cannot mean that in extensional complements, all types of noun phrases are "quantified in" in the sense of Montague, for instance. Rather, "the usual interpretation of the quantifier" needs to be read as a cover term: each type of noun phrase induces a pair-list reading in the same syntactico-semantic fashion that is characteristic of it in other scopal contexts. This is supported by the fact that the different types of noun phrases induce pair-list readings in somewhat different syntactic configurations. This issue is discussed in great detail in the next chapter (Beghelli 1996), with specific reference to the syntax and semantics of distributivity.

The organization of the paper is as follows:

Section 1 provides a brief summary of the pair-list literature, singling out some points that are particularly relevant for the coming discussion.

Section 2 shows that the dilemma of quantification versus domain restriction arises only in extensional complement interrogatives. In matrix questions and in intensional complements, only universals support pair-list readings, whence the simplest domain restriction treatment suffices. Related data, including coordination and cumulative readings, are discussed.

Section 3 argues that in the case of extensional complements, the domain restriction treatment is inadequate for at least two independent reasons. One has to do with the fact that not only upward monotonic quantifiers support pair-list readings, and the other with the derivation of "apparent scope out"

readings. The reasoning is supplemented with some discussion of the semantic properties of "layered quantifiers."

The above will establish the need for quantification, so the question arises how the objections explicitly enlisted in the literature against quantification can be answered. Section 4 considers the de dicto reading of the quantifier's restriction, quantificational variability, and the absence of pair-list readings with *whether*-questions, and argues that they need not militate against the quantificational analysis. Section 5 summarizes the emergent proposal.

Finally, section 6 discusses the significance of the above findings for the behavior of weak islands. It has been claimed that one way to evade a weak island violation is for the potentially offending quantifier to support a pair-list reading. The present paper predicts, then, that the quantifiers that give rise to weak island violations in matrix questions and intensional complements are not the same as those that do in extensional complements. The data will be shown to bear out this prediction, which in turn provides additional support for the scopal approaches to weak islands and to pair-list readings.

1   SOME PROPOSALS IN THE LITERATURE

As was mentioned in the introduction, it is currently assumed that quantifiers do not behave in their usual manner when supporting pair-list readings; rather, they uniformly provide a domain restriction for the question. Why is quantification into interrogatives a problematic issue? Detailed discussions of the problems and how they are handled in the literature can be found in Groenendijk and Stokhof (1984, 1989), Higginbotham (1991), Lahiri (1991), and Chierchia (1993). The present section merely singles out a few points that will be relevant in the coming discussion.

The crux of the matter is that quantification is defined for domains of type t (expressions that can be true or false), and interrogatives are not such. Now essentially two strategies can be followed. One is to find a suitable subexpression or superexpression of type t, and quantify into that. Another is to let the quantifier contribute to the interpretation of the interrogative in some non-quantificational way which, however, gives the same semantic result.

In the discussion below, when a question contains a quantifier, I will be concerned only with the pair-list reading. No mention will be made of the other (primary) reading.

1.1   Karttunen

To begin with, Karttunen (1977) interprets the *wh*-question (7a) as the set of true propositions which have the semantic format 'Fido bit a.' E.g., if Fido

bit Mary and Judy and no one else, then (7b) denotes the set of propositions $\{^\wedge$Fido bit Mary, $^\wedge$Fido bit Judy$\}$.

(7) a. Who did Fido bite? *or* who Fido bit

   b. $\lambda p \exists x [^\vee p \ \& \ p = {}^\wedge (\text{Fido bit } x)]$

Trying the "subexpression trick," quantification into (7b) would give the following result:

(8) a. Who did every dog bite? *or* who every dog bit

   b. * $\lambda p \forall y [\text{dog}(y) \ \to \ \exists x [^\vee p \ \& \ p = {}^\wedge (y \text{ bit } x)]]$

As Karttunen points out, (8b) is not what we want: the set of propositions in (8b) is empty whenever there is more than one dog. Thus (in the 1977 paper) he effectively invokes the "superexpression trick." He proposes that pair-list readings are obtained by quantifying into a superordinate clause; for matrix questions he assumes embedding under a silent performative verb. Using Hendriks' (1993) technique to generate extraclausal scope, we may restate this solution by postulating a uniformly lifted representation for pair-list readings. (9b) is the set of properties (like being known to John) such that for every dog y, the set of true answers to the question who y bit has those properties:

(9) a. Who did every dog bite? *or* who every dog bit

   b. $\lambda P \forall y [\text{dog}(y) \ \to \ P(\lambda p \exists x [^\vee p \ \& \ p = {}^\wedge (y \text{ bit } x)])]$

1.2 Groenendijk and Stokhof

Compare this with Groenendijk and Stokhof's (1984) proposal. These authors interpret the basic interrogative as a single proposition: the set of those worlds i in which the things Fido bit are the same as in the real world j.[1] E.g., if Fido bit Mary and Judy and no one else, then (10b) denotes the proposition $^\wedge(\{x \mid \text{Fido bit } x\} = \{\text{Mary, Judy}\})$.[2]

(10)   a. Who did Fido bite? *or* who Fido bit

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[1]Groenendijk and Stokhof appeal to explicit quantification over possible worlds. Take, for instance, $\lambda x[\text{bit}(i)(x)(\text{Fido})]$. Here *bit* is understood as denoting the intension of the verb *bit*. Then *bit(i)* is its extension in world i. The whole lambda expression denotes the set of those who Fido bit in world i. $\lambda i[\text{bit}(i)(\text{King})(\text{Fido})]$ is the set of worlds in which Fido bit King, i.e., the proposition that Fido bit King. Montague (1974) would have written this as $^\wedge(\text{bit}(\text{King})(\text{Fido}))$. Groenendijk and Stokhof cannot use this simpler notation because it would not enable making reference to worlds, which they need in (10b). These notational complications are quite independent of our main concern.

[2]A proposal to treat questions as generalized quantifiers is presented in Gutiérrez Rexach (1996). This can be regarded as an extensional version of Groenendijk and Stokhof in view of the fact that *Who did Fido bite?* is interpreted as $\lambda P[\lambda x[\text{person}(x) \ \& \ \text{Fido bit}(x)] = P]$, where P is an answer set.

b. $\lambda i[\lambda x[\text{bit}(i)(x)(\text{Fido})] = \lambda x[\text{bit}(j)(x)(\text{Fido})]]$

In this case the "subexpression trick" does work for some examples:

(11)   a. Who did every dog bite? *or* who every dog bit

      b. $\lambda i \forall y[\text{dog}(j)(y) \rightarrow (\lambda x[\text{bit}(i)(x)(y)] = \lambda x[\text{bit}(j)(x)(y)])]$

However, as Groenendijk and Stokhof point out, this does not give the desired result when the quantifier is an indefinite:

(12)   a.   Who did six dogs bite? *or* who six dogs bit

      b. * $\lambda i \exists_6 y[\text{dog}(j)(y) \;\&\; (\lambda x[\text{bit}(i)(x)(y)] = \lambda x[\text{bit}(j)(x)(y)])]$

The crucial difference is that in (11a) we have a universal and, consequently, the question has a unique true and complete answer. The question in (12a) on the other hand does not have a unique true and complete answer, i.e., it does not denote a unique proposition. On the intended interpretation, one first has to choose some set of six dogs (hence the name choice question); only after this is accomplished can the real question be asked and receive a true and complete answer. To accommodate the existential quantifier that captures choice, lifting is necessary. The format of the simplest amendment of (12b) would come quite close to (my expression of) Karttunen's (9b):

(13)   a. Who did six dogs bite? *or* who six dogs bit

      b. $\lambda P \exists_6 y[\text{dog}(j)(y) \;\&\; P(j)(\lambda i[\lambda x[\text{bit}(i)(x)(y)] = \lambda x[\text{bit}(j)(x)(y)]])]$

The properties P that a lifted question takes as argument are like being a secret or being known by John.

    Groenendijk and Stokhof (1984) discuss Karttunen's quantificational approach in detail and reject it. The ultimate reason is that (9b) as well as (13b) interpret the predicate *dog* de re. I return to this in section 4.1 below. They propose a quite different approach, namely, that the quantifier, whether it be a universal or an existential, does not act in pair-list readings the same way it does elsewhere. Instead, it determines a set that serves to restrict the domain of the question. The crucial insight is that the universal in *Who did every dog bite?* functions in the same way as the *wh*-in-situ in *Who did which dog bite?*. Similarly, *Who did six dogs bite?* may be interpreted as *Who did which of the six dogs that you chose bite?*.

    The set that serves to restrict the domain of the question is a witness set of the quantifier. (For some background, see Chapter 1.)

(14) A set W is a witness of the generalized quantifier GQ iff W is an element of GQ and is also a subset of the smallest set GQ lives on.

Universals have a unique witness. The witness of $[\![every\ dog]\!]$ is the set DOG. An indefinite containing the numeral n has as many witnesses as there are distinct n-tuples in the relevant part of the universe; e.g. any set that contains at least six dogs and no non-dogs is a witness of $[\![six\ dogs]\!]$.[3] Thus the general format of pair-list readings in Groenendijk and Stokhof (1984) is as follows:

(15)   a. Who did every/six dog(s) bite? *or* who every/six dog(s) bit

       b. $\lambda P \exists W [W$ a witness of $[\![every/six\ dog(s)]\!]$ &
$$P(j)(\lambda i[\lambda x_{x \in W} \lambda y[\mathrm{bit}(i)(y)(x)] = \lambda x_{x \in W} \lambda y[\mathrm{bit}(j)(y)(x)]])]$$

Since $[\![every\ dog]\!]$ has a unique witness, the set DOG, lifting in this case might be dispensed with and we could have (16):

(16) $\lambda i[\lambda x_{x \in \mathrm{DOG}} \lambda y[\mathrm{bit}(i)(y)(x)] = \lambda x_{x \in \mathrm{DOG}} \lambda y[\mathrm{bit}(j)(y)(x)]]$

Many complicated-looking details of (15b) are irrelevant for the coming discussion, so from now on I will abbreviate it as follows:

(17) Schematic representation of the pair-list reading using domain restriction:

$$\lambda P \exists W [\mathrm{witness}(W, [\![QP]\!]) \ \& \ P(\text{which } x \in W \text{ bit whom})]$$

Technically, both (17) and (9b) contain a property variable P that applies to a question denotation. The main difference is that in (9b), the quantifier occurs outside this question denotation, whereas in (17), only the choice of W does. The rest of the action associated with the quantifier (cf. *which $x \in W$*) occurs inside the question denotation. In 3.2 we shall see that this is what eventually qualifies (9b) "quantificational" and (17) "non-quantificational."

    This is the background that I assume below. A few further comments are in order.

    As Chierchia (1993) explains in detail, there is a to some extent terminological debate concerning whether pair-list readings involve scope and quantification into interrogatives. Groenendijk and Stokhof (1984) maintain that the quantifier is assigned scope over the *wh*-phrase, but the phenomenon is not quantification. Higginbotham and May (1981), May (1985) and Higginbotham (1991, 1993) on the other hand argue that we are dealing with both scope and quantification; however, their explication of what quantification amounts to in this context is, in the pertinent respects, logically equivalent to Groenendijk

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[3]Groenendijk and Stokhof actually use minimal elements, and Chierchia, minimal witnesses, in the definition of domain restriction. Minimality causes a problem because it collapses $[\![at\ least\ six\ dogs]\!]$, $[\![more\ than\ five\ dogs]\!]$ and $[\![exactly\ six\ dogs]\!]$ on the one hand, and all decreasing quantifiers on the other. Plain witness gives the correct results. I presuppose this improvement in the main text.

and Stokhof's (1984) allegedly non-quantificational solution. For this reason, I do not discuss this theory separately; unless otherwise indicated, whatever I say about Groenendijk and Stokhof is assumed to hold of Higginbotham and May, too.

1.3 Chierchia

Engdahl's (1985) approach, which inspired Chierchia's (1992, 1993) and Jacobson's (1992), constitutes a genuine alternative. Engdahl takes functional questions (18) to be paradigmatic and proposes that individual questions (19) as well as pair-list questions (20) are but special cases:

(18) a. Who did every dog/no dog bite?
       which f, every/no dog x bit $f(x)$

      b. Its (own) master.
       f = master-of

(19) a. Who did Fido bite?
       which f, Fido bit f(Fido)

      b. Mary.
       $f = \{\langle \text{Fido, Mary} \rangle\}$

(20) a. Who did every dog bite?
       which f, for every dog x, x bit $f(x)$

      b. Fido bit Mary, Spot Fido, and King my cat.
       $f = \{\langle \text{Fido, Mary} \rangle, \langle \text{Spot, Fido} \rangle, \langle \text{King, my cat} \rangle\}$

As Chierchia explains, the parallelism between the classical functional reading and the so-called pair-list reading is grounded in the fact that a function may be defined "intensionally," pointing out a generalization, or "extensionally," simply specifying a set of ordered pairs. The classical functional reading obtains when a generalization is available, cf. (18b). The pair-list reading obtains when we are content with an extensional definition, cf. (20b).

This approach differs from all the above in that it does not assume a QP>WH scope relation in pair-list readings: the *wh*-phrase has widest scope. Chierchia enlists a novel empirical reason for adopting this analysis: he proposes to explain the well-known subject/object asymmetry in pair-list licensing with reference to a Weak Cross-over effect induced by the "layered trace" fx. It seems, however, that a wider range of data exhibits intricate patterns that can by no means be reduced to WCO. There are differences between matrix and complement and between *every* and *each* that WCO cannot predict, and even the behavior of VP-internal arguments seems to diverge from the WCO

pattern. See Beghelli (1996) for a detailed discussion of the relevant data. In the light of these, I do not find Chierchia's syntactic argument compelling.

Exactly how interrogatives are interpreted and how the quantifier contributes to the pair-list reading are matters that are independent of the above choice. Chierchia (1993) combines Engdahl's functional approach with Karttunen's interpretation of interrogatives and Groenendijk and Stokhof's innovation of letting the quantifier contribute a domain restriction. The result is as follows:

(21) a. Who did every/six dog(s) bite? *or* who every/six dog(s) bit

     b. $\lambda P \exists W [W$ a witness of $[\![every/six\ dog(s)]\!]$ &
$$P(\lambda p \exists f_{f \in [W \to \text{ANIMATE}]} \exists x_{x \in W} [^{\vee}p \ \& \ p = {}^{\wedge}\text{bit}(x, f(x))])]$$

1.4   Summary

Singling out a few points that are particularly relevant for the coming discussion, let me conclude this section with the following observation:

(22) Groenendijk and Stokhof's, Higginbotham's and Chierchia's approaches to pair-list readings share the following properties (overtly or in view of logical equivalence):

    a. No descriptive or theoretical distinction is made between matrix and complement cases;

    b. All pair-list readings are (allowed to be) interpreted as generalized quantifiers over individual questions;

    c. The quantifier is assumed to contribute a set that serves to restrict the domain of the question.

I will challenge these assumptions on the basis of data concerning what quantifiers support pair-list readings.

2   THE MATRIX VERSUS EXTENSIONAL COMPLEMENT ASYMMETRY

This section will demonstrate that the ranges of quantifiers that support genuine pair-list readings in matrix and in complement contexts are quite different. In brief, only universals do so in the matrix and in intensional (*wonder*) complements, whereas almost all quantifiers do so in extensional (*find out*)

complements.[4] Anticipating the detailed data to be presented in the sections below, let us see what the significance of these observations might be.

The traditional ideal of formal elegance requires that the accounts of quantificational phenomena be designed to be as general as possible. The results presented in this volume as well as elsewhere indicate, however, that very often only particular subsets of quantifiers participate in a given process. One way to deal with this is to supplement the general accounts with filters. Another is to go for specialized accounts from the very beginning. A specialized account is one that builds on the distinctive properties of that subset of quantifiers that actually participate in the phenomenon to be accounted for and does not try to be applicable to others. This is the strategy I am following. Therefore, the accounts of matrix and complement pair-list readings must match the respective participating quantifiers.

Consider matrix questions first. As Section 1 made clear, interpreting pair-list readings as generalized quantifiers over individual questions ("lifting") is necessitated only by choice questions, which do not have a unique true and complete answer. If only universals need to be taken care of, then, using a Groenendijk and Stokhof-style interpretation of interrogatives, either the simplest form of quantification (12b) or the simplest form of domain restriction (17) will do.

(12b) $\lambda i[\forall y[\mathrm{dog}(j)(y) \rightarrow (\lambda x[\mathrm{bit}(i)(x)(y)] = \lambda x[\mathrm{bit}(j)(x)(y)])]]$

(17) $\lambda i[\lambda x_{x \in \mathrm{DOG}} \lambda y[\mathrm{bit}(i)(y)(x)] = \lambda x_{x \in \mathrm{DOG}} \lambda y[\mathrm{bit}(j)(y)(x)]]$

More precisely, only (12b) is really contingent on adopting Groenendijk and Stokhof's particular interpretation of interrogatives. Recall that the gist of (17) is that it assimilates *Who did every dog bite?* to *Who did which dog bite?*. Thus an analog of (17) should be possible to devise in any theory that handles multiple interrogation.

Let us assume that domain restriction is the adequate account of matrix pair-list questions. Does some form of it extend to complement interrogatives in general, as suggested in the literature? It will be pointed out in 3.1 that the answer depends on the monotonicity properties of the participating quantifiers. Given that the quantifiers that support complement pair-list readings are not all filters and, furthermore, some of them are not even upward monotonic, we shall see that the data lead the conclusion that the answer is No.

It is clear, then, that on my analysis pair-list readings do not constitute a unitary phenomenon. It may be a little unsettling to assign divergent semantic analyses to matrix and intensional/extensional complement cases but, in fact, Beghelli (1996) points out that they must diverge in syntax, too.

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[4] The intensional/extensional qualification of these complements comes from Groenendijk and Stokhof.

2.1   Universals versus modified numeral indefinites

The basic observation that indefinites only support pair-list readings in complements was made in the course of joint work with Frans Zwarts in 1992. A study by St. John (1993) confirmed this and revealed the significance of cumulative readings; Doetjes (1993) independently made consonant suggestions. I thank S. Spellmire for assistance with the field work from which come the more detailed data which the present paper rests on.

Consider first (23) versus (24):

(23) Who   OK Fido bit X, Spot bit Y, . . .
      Which boys   OK Fido bit X, Spot bit Y, . . .
      Which boy   did *every dog* bite?   % Fido bit X, Spot bit Y, . . .
      What boy   % Fido bit X, Spot bit Y, . . .

(24) Who   * Fido bit X, Spot bit Y, . . .
      Which boys   did *more than two dogs*   * Fido bit X, Spot bit Y, . . .
      Which boy   bite?   * Fido bit X, Spot bit Y, . . .
      What boy   * Fido bit X, Spot bit Y, . . .

There is a clear contrast between the two sets. *Every dog* is a basically good inducer of pair-list readings (although not as good as is assumed in the literature: many speakers reject the examples that contain an overtly singular *wh*-phrase, see the %'s). On the other hand, no speaker is tempted to answer the question containing *more than two dogs* with a list of pairs. Similar to *more than two dogs* are all "modified numerals," e.g. *two or more dogs, exactly two dogs, fewer than two dogs, many/few dogs*. As to *Who did at least two dogs bite?*, some speakers are willing to answer it with a pair-list, but this is probably a pragmatic "mention some" effect induced by a non-logical use of *at least.* The reason to believe this is that (i) logically equivalent *two or more dogs* never elicits pair-list answers, and (ii) speakers who answer the *at least two dogs* question with a pair-list tend pick just two dogs, rather than three or eleven.

But the contrast between universals and "modified numeral indefinites" vanishes in complements, together with the mysterious (to me) marginality of singular *wh*-phrases. For instance:

(25)   a.   John found out who/which boys every dog bit.   cf. (23)
            OK 'John found out about every dog who/which boys it bit'

      b.   John found out which boy every dog bit.
            OK 'John found out about every dog which boy it bit'

(26)   John found out which boy more than two dogs bit.   cf. (24)
     OK 'John found out about more than two dogs which boy each bit'

Similar to *more than two dogs* are practically all the modified numerals listed above; the data will be discussed more closely in 3.1.

To be more precise, the matrix effects disappear only in a subset of the complement cases. The paradigm below indicates that the complement of *wonder* behaves exactly like matrix questions:

(27)   a. John wonders who every dog bit.   cf. (23), (25)
           OK pair-list

        b. John wonders which boy every dog bit.
           % pair-list

(28) John wonders who more than two dogs bit.   cf. (24), (26)
      ?? pair-list

The demarcation line is between matrix verbs that Groenendijk and Stokhof call extensional versus the ones that they call intensional. The names are due to the fact that on their approach, the extension of a question is its answer. The sentence *John found out who came* means 'John found out the answer to the question *Who came?*.' On the other hand, *John wonders who came* means 'John stands in the wonder-relation with the question *Who came?*.' Apparently, one cannot stand in the wonder-relation to a question which, not being a possible matrix question, cannot be asked in its own right.[5]

What the data show, then, is that modified numeral indefinites support a pair-list reading only in (extensional) complements. One possibility is that the asymmetry between matrix (24) and complement (26) hinges on the very notion of choice. Intuitively, the desired reading seems to require more than the existence of a witness set about whose elements the question may be asked. Rather, it seems to require that the indefinite be able to "offer up sets for choice." Modified numeral indefinites are apparently unable to do so, and this is not surprising: as Szabolcsi (1996) shows, they are essentially counters, not set denoters. In contrast, pair-list readings in the complement do not involve any "choice." As the paraphrases indicate, they involve counting (here: counting the dogs about whom John found out which boy they bit). For the modified numeral, this is business as usual.

2.2   The natural habitat of lifted questions

In this section, I wish to take another look at the explanation for the matrix versus subordinate asymmetry offered at the end of 2.1.

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[5] There are other respects in which complements of *wonder* behave like matrix questions. Munsat (1986) notes a variety of such points, including the licensing of negative polarity items. Berman (1990) draws a parallelism in the context of quantificational variability. G. Carlson (p.c.) points out that in some American English dialects, *wonder*-complements exhibit inversion, together with sequence of tenses.

I suggested that the reason why modified indefinites do not support matrix pair-list questions is that, being counters, they cannot offer up sets for choice. If this is true, then bare numeral indefinites, which are known to introduce set (group) referents, are expected to be great inducers of choice readings. But, while certainly there is improvement, they are just not good enough:

(29)   Which man/who did more than two dogs bite?
         * Fido bit X, King bit Y, and Spot bit Z.

(30)   Which man/who did two dogs bite?
         ? Fido bit X, and King bit Y.

Moreover, while English allows this use of bare numerals, Dutch does so to a much lesser extent (even Groenendijk and Stokhof themselves (1984, pp. 555–6) express serious doubts about the availability of these readings in Dutch):

(31)   Welk boek lazen twee jongens?
         what book read   two   boys
       ?* Jaap read War and Peace, and Henk read Magic Mountain.

Thus the possibility arises that no matrix interrogative ever involves choice and (30), to the extent it is acceptable, is an instance of something else.[6] But what can be wrong with choice?

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[6] In this note I offer an analysis of what this "something else" might be. I admit, however, that I do not yet have a fully satisfactory pretheoretical grasp of these particular data, whence the analysis may need to be revised in the future. I expect that this will not affect the rest of the proposal in this paper.

Bare numeral indefinites in English appear to be able to support matrix pair-list (choice) readings. I will first claim that these are not really pair-list cases.

Krifka (1991) and Srivastav (1992) discuss questions with definites, and argue that they support not pair-list but cumulative readings. Consider:

(i) Who		OK Fido bit X and Spot bit Y.
Which boys	did *the dogs* bite?	OK Fido bit X and Spot bit Y.
Which/what boy		* Fido bit X and Spot bit Y.

They argue that the "real answer" here would be *The dogs, Fido and Spot, bit X and Y (between them),* and the apparent pair-list answers are just more cooperative ways of spelling out how exactly the bitings were distributed. (The same basic observation had been made in Szabolcsi 1983, p. 128, in response to Haïk 1984.)

I suggest that the indefinites data in (30) is to be interpreted in the same way. Namely, an answer of the pair-list format is acceptable only insofar as it merely disambiguates an acceptable answer of the cumulative format:

(ii) Who		OK Fido bit X and King bit Y
		= They bit X and Y
Which boys	did *two dogs* bite?	OK Fido bit X and King bit Y
		= They bit X and Y
Which/what boy		?? Fido bit X and King bit Y
		$\neq$ They bit X and Y

What is the evidence for this analysis?

Prior to proposing an answer, it is in order to note that the claim that only universals support pair-list readings is in some sense not new. At earlier stages of their work, both Groenendijk and Stokhof (1982) and Chierchia (1992) had made such a claim and offered their own explanations for the restriction. The critical difference between these theories and mine is that they assumed that all matrix and complement cases work identically, whereas I am observing a descriptive contrast and am therefore seeking an explanation that holds for matrix questions but not, for instance, the *wh*-complement of *find out*.

As was pointed out in 1.2, the fact that an interrogative does not have a unique true and complete answer requires lifting the question and interpreting it as a generalized quantifier, viz. as a set of properties like being a secret,

Two dogs questions resemble *the dogs* questions in that they typically require *wh*-phrases that are not overtly singular. This is unfortunately of less diagnostic value than Krifka and Srivastav think, since many speakers of English reject the singular even with fixed domain readings. However, I have found reliable informants who do accept the singular in the case of *every dog* (hence the % in (23)) and nevertheless reject it in the case of *the dogs* and *two dogs,* which squares with the analysis.

Another relevant fact is that plain *X and Y* is itself an acceptable answer to *Who/ Which boys*[plural!] *did two dogs bite?* in the cumulative situation where one dog bit *X* and the other bit *Y*, i.e., when the dogs bit one person each.

Why is the cumulative option unavailable to modified numeral indefinites, cf. (29)? The term "cumulative" may be a little misleading here, since Scha (1981) introduced it in connection with cardinalities, and indeed, *More than two dogs bit fewer than six boys between them* is fine. The readings in (30)/(ii) should rather be called "distributed group" readings. I suggest that *more than two dogs* and its brothers do not participate in such readings because, unlike *the/two dogs,* they are not potential group denoters in the relevant sense. This accords with Kamp and Reyle's (1993) observations; for further discussion, see Szabolcsi (1996) and Beghelli (1996).

The claim that bare numerals support cumulative (distributed group) readings, not pair-list readings does not directly solve our basic problem, however. Since groups consisting of two dogs can be many, choice is involved here, too. Also, there is a type of data that has not been mentioned yet: disjunctive questions.

(iii) Who did Fido or King bite?   ok King bit John.

On Groenendijk and Stokhof's analysis, these are choice questions, too (and, according to their judgment, the intuitively best case).

What I am going to suggest is that (iii) is not an instance of the choice reading. Rather, the sole interpretation of the question is one where the *wh*-phrase has widest scope, i.e., 'Who is such that either Fido or King bit him?' The answer given above is a partial answer (presented in a co-operatively explicit format à la Srivastav and Krifka), which is elicited under particular pragmatic circumstances that Groenendijk and Stokhof (1984) call "mention-some" contexts. In the same vein, I assume that the pertinent distributed group reading of (ii) *Who/which boys did two dogs bite?* is also a "mention-some" example, rather than a choice reading. Thus its representation is as in (iv), with B a variable over groups of boys and D over groups of dogs:

(iv) $\lambda i[\lambda B \exists D[|\mathrm{ATOMS}(D)| = 2 \ \& \ \forall b \leq B[\exists d \leq D[d \ \mathrm{bit}(i) \ b]] \ \&$
   $\forall d \leq D[\exists b \leq B[d \ \mathrm{bit}(i) \ b]] = \lambda B \exists D[|\mathrm{ATOMS}(D)| = 2 \ \&$
   $\forall b \leq B[\exists d \leq D[d \ \mathrm{bit}(j) \ b]] \ \& \ \forall d \leq D[\exists b \leq B[d \ \mathrm{bit}(j) \ b]]]$

being known by John, etc. Now, such an interpretation is entirely natural for complement interrogatives, which are indeed syntactic arguments of expressions denoting such properties. But matrix interrogatives never combine with expressions of this sort (unless we literally adopt Ross's silent performative hypothesis). Instead, they are genuine questions. Thus it seems natural to interpret them in a way that directly links them to possible answers, which is what the unlifted interpretations do; and it is not natural to interpret them as lifted questions. The natural habitat of lifted questions is the argument position.[7]

In general, I assume that it is justified to interpret an expression E as a function over properties P only if E actually combines with denoters of such properties. This constraint properly distinguishes lifted questions from questions-as-generalized quantifiers in the sense of Gutiérrez Rexach (1996). In the former case, the question takes properties denotable by matrix clauses as argument; in the latter case, the question takes properties denotable by elliptical answers as argument. The latter is fully justified for a matrix question.

If this reasoning is correct, then only interrogatives which in virtue of their semantic form have a unique answer are possible in the matrix. This claim excludes choice questions with indefinites, whether modified or bare. Interestingly, it also makes predictions for data in a related domain: conjunctions and disjunctions of questions.

2.3   Conjunctions and disjunctions of interrogatives

Groenendijk and Stokhof point out that both fixed domain questions and choice questions come in (at least) two varieties:

(32)   a. What did every girl read?

          b. What did Mary read? And, what did Judy read?

(33)   a. What did some girl read?

          b. What did Mary read? Or, what did Judy read?

The parallelism between the (a) and the (b) cases is of course based on the fact that universal quantification reduces to conjunction (intersection), and existential quantification to disjunction (union). What is relevant to us here is that the two-question sequence in (32b) has a unique complete and true answer, exactly as (32a) does, while the two-question sequence in (33b) lacks one (involves a choice), exactly as (33a) does. This entails that the representation of (32b) can go unlifted, but that of (33b) cannot:

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[7]I thank G. Chierchia for discussion on this point.

(34) What did Mary read? And, what did Judy read?

$$\lambda i[\lambda x[\text{read}(j)(x)(\text{mary})] = \lambda x[\text{read}(i)(x)(\text{mary})]] \cap$$
$$\lambda i[\lambda x[\text{read}(j)(x)(\text{judy})] = \lambda x[\text{read}(i)(x)(\text{judy})]]$$
$$= \lambda i[\lambda x[\text{read}(j)(x)(\text{mary})] = \lambda x[\text{read}(i)(x)(\text{mary})] \ \&$$
$$\lambda x[\text{read}(j)(x)(\text{judy})] = \lambda x[\text{read}(i)(x)(\text{judy})]]$$

(35) What did Mary read? Or, what did Judy read?

$$* \quad \lambda i[\lambda x[\text{read}(j)(x)(\text{mary})] = \lambda x[\text{read}(i)(x)(\text{mary})]] \ \cup$$
$$\lambda i[\lambda x[\text{read}(j)(x)(\text{judy})] = \lambda x[\text{read}(i)(x)(\text{judy})]]$$
$$= \lambda i[\lambda x[\text{read}(j)(x)(\text{mary})] = \lambda x[\text{read}(i)(x)(\text{mary})] \ \vee$$
$$\lambda x[\text{read}(j)(x)(\text{mary})] = \lambda x[\text{read}(i)(x)(\text{judy})]]$$

$$\lambda P[P(j)(\lambda j \lambda i[\lambda x[\text{read}(j)(x)(\text{mary})] = \lambda x[\text{read}(i)(x)(\text{mary})]]) \ \vee$$
$$P(j)(\lambda j \lambda i[\lambda x[\text{read}(j)(x)(\text{judy})] = \lambda x[\text{read}(i)(x)(\text{judy})]])]]$$

We are now predicting that question disjunctions are unavailable wherever pair-list readings with indefinites are. Let us see how this prediction works out.

Question disjunctions that illustrate the choice reading in the literature invariably come in an inter-sentential format, as in (33b). If this were an irrelevant detail, the *or* connecting the two sentences could easily be moved into intra-sentential position. But it cannot:

(36) a.   Who did you marry? *Or,* where do you live?

b. ?? Who did you marry *or* where do you live?

This suggests that the *or* in (33b) and (36a) does not really offer a choice but, instead, is an idiomatic device that allows one to cancel the first question and replace it with the second. This idiomatic character is corroborated by the fact that the Hungarian equivalents are entirely unacceptable unless *inkább* 'rather, instead' is added; something that we do not expect if the connective acts as a standard Boolean operator. The marginality of (36b) indicates, then, that questions cannot be directly disjoined.

Just as pair-list readings with indefinites are perfect in extensional complements, disjunction becomes impeccable, too. But the claim that questions cannot be directly disjoined is confirmed by the fact that (37) only has a wide scope *or* (distributive) interpretation obtained by lifting both disjuncts:

(37) John found out who you married *or* where you live.

i.   'John found out who you married or found out where you live'

ii. * 'John found out (who you married or where you live)'

Naturally, for this distinction to make sense, the two readings must be distinct. According to Groenendijk and Stokhof (1989), *know wh-φ and/or wh-ψ* is logically equivalent to *know wh-φ and/or know wh-ψ*. I disagree with this in the case of *or*. Take (38):

(38) a. Bill knows where John lives or knows who Sue married.

  b. Bill knows (where John lives or who Sue married).

If Bill never heard of Sue, (38a) may be true but (38b), if grammatical at all, seems implausible. Intensional verbs, as above, retain the matrix effect:

(39) ?? John wonders where you live or who you married.
  'John would be happy to know either'

The claim that interrogatives must be lifted first to become disjoinable is corroborated by syntactic data from Hungarian and Korean (Seungho Nam, p.c.). In these languages, even *wh*-complements are introduced by a subordinator morpheme. The Hungarian subordinator is *hogy,* and the counterpart of (37) is unacceptable unless both disjuncts contain a *hogy*:

(40) János megtudta, hogy kit   vettél feleségül vagy *(hogy) hol
   John   found-out *that* whom you   married   or   *(*that*) where
   laksz.
   you-live

In Korean, *ci* is the subordinator:

(41) a. * na-nun Mary-ka   etiey   sal-**kena** Kathy-ka   etiey
       I-top   Mary-nom where live-**or**   Kathy-nom where
       sal-nun-**ci**   al-ayo
       live-pres-**comp** know

  b.   na-nun Mary-ka   etiey   sal-nun-**ci**   **hokun** etiey
       I-top   Mary-nom where live-pres-**comp or**   where
       sal-nun-**ci**   al-ayo Kathy-ka
       live-pres-**comp** know   Kathy-nom
       'I know where Mary lives or where Kathy lives'

That our predictions are borne out for the right reason (that is, for a semantic, not a logico-syntactic one) is corroborated by the fact that conjunctions pattern like universals. *And* can be moved into intra-sentential position, and the repetition of the subordinator (*hogy/ci*) is optional:

(36)′ a. Who did you marry? *And,* where do you live?

b. Who did you marry *and* where do you live?

(40)′ János megtudta, hogy kit   vettél feleségül és   (hogy) hol
      John found-out *that* whom you   married *and* (*that*) where
      laksz
      you-live

(41a)′ na-nun Mary-ka   etiey sal-**ko**   Kathy-ka   etiey
       I-top   Mary-nom where live-**and** Kathy-nom where
       sal-nun-**ci**   al-ayo
       live-pres-**comp** know
       'I know where Mary lives and where Kathy lives'

To conclude, it seems plausible that the reason why matrix choice questions (whether they involve modified numeral indefinites, bare numeral indefinites, or disjunction) do not exist is that matrix clauses cannot denote generalized quantifiers of the pertinent kind. (For a preliminary account of some residual cases, see note 6.)

It is worth noting that my findings refute the letter, but not the spirit, of Groenendijk and Stokhof's theory of choice questions. It is true that the data turn out to be different than they assumed. But what their theory says really is that *if* choice questions exist, they *have to* be lifted. The fact that choice questions do not exist in a context where it is reasonable to assume that denoting lifted questions is impossible is perfectly consistent with this theory.

3   THE NECESSITY OF QUANTIFICATION INTO (EXTENSIONAL) COMPLEMENT INTERROGATIVES

3.1   Domain restriction and monotonicity

Let us from now on focus solely on (extensional) complement interrogatives.

In what follows I will assume that all complement interrogatives denote generalized quantifiers. The question, then, is whether the domain restriction schema in (17) is an adequate general representation of complement pair-list readings:

(42)   a. ... who QP bit

     b. $\lambda P \exists W [\text{witness}(W, [\![QP]\!]) \,\&\, P(\text{which } x \in W \text{ bit whom})]$

I argue that it is not adequate, for at least two independent reasons. The first has to do with monotonicity. The second has to do with "apparent scope out" readings, to be discussed in 3.2.

The simple point to be made in this subsection is that domain restriction requires upward monotonicity. Why? "Domain restriction" means that we pick a set and restrict our attention to its members, ignoring whatever happens outside. But we can only safely do so if that set is determined by an increasing quantifier. To illustrate with non-interrogative examples,

(43)   a. *(At least) two men walk* = There is a set of (at least) two men who walk
            (it does not matter if men outside this set also walk)

        b. *Exactly two men walk* ≠ There is a set of exactly two men who walk
            (we must guarantee that all walking men are in this set)

        c. *Less than two men walk* ≠ There is a set of less than two men who walk
            (we must guarantee that all walking men are in this set)

The schema in (42) faces exactly the same problem as the paraphrases in (43). For instance, if P is replaced by *John knows,* we get that there is a witness W of QP about whose members John knows who they bit, ignoring whatever else John knows. (42) misinterprets any sentence in which the QP inducing the pair-list reading is not upward monotonic.

At this point the empirical question of exactly what quantifiers support pair-list readings becomes crucial. It is sometimes claimed in the literature that only upward monotonic cases work. The data justifying this claim tend to involve only matrix questions with *no N,* however. That is, neither other decreasing quantifiers, nor non-monotonic quantifiers (which pose exactly the same logical problem) are investigated.

In 2.1 I have anticipated that, in distinction to matrix questions, almost all quantifiers support pair-list readings in extensional complements. Let us now take a closer look at the data.

One type of context I used to elicit the relevant judgments is as follows. We are in the business of finding out how dangerous each neighborhood dog is and get together to compare notes. This context simply makes the competing non-pair-list reading of the complement irrelevant, without being either pragmatically or syntactically too special to produce representative judgments. A sample of the results is as follows:

(44)   a.   I found out who *three dogs* bit.

        b.   I did a lot better! I found out who *more than five dogs* bit.

    c.   John is not here but I have glanced at his list, and I estimate that he found out who *more than five but certainly fewer than ten dogs* bit.

    d.   And I know that Judy found out who *exactly four dogs* bit.

    e.   ? Bill is very lazy: he only found out who *at most three dogs* bit.

    f.   * Mary is even worse: she found out who *no dog* bit.

    g.   Don't worry; I think we now know who *every dog* bit.

What we see is that the only type of quantifier that is clearly excluded in this context is *no dog*. With this one exception, increasing (44a, b, g), non-monotonic (44c, d), and decreasing (44e) quantifiers are found to support a pair-list reading. It is true that decreasing examples seem to require the presence of *only* in the matrix and even so, they may be somewhat worse than the rest. The crucial fact is, however, that upward monotonicity is not a sine qua non for the pair-list reading.

The conclusion is that the domain restriction schema (42) needs amending. Let us consider three alternatives.

The first, (45) just adds an ad hoc maximality condition to (42), so that it will not go wrong if QP is not upward monotonic.

(45) $\lambda P \exists W [\text{witness}(W, [\![QP]\!]) \ \& \ P(\text{which } x \in W \text{ bit whom})$
           $\& \ \forall x [x \notin W \ \to \ \neg P(\text{whom } x \text{ bit})]]$

The second version, (46) departs from this most radically: it is standard quantification into a lifted interrogative, assigning wide scope to *Q dogs* over the *wh*-phrase.

(46) $\lambda P Q x [\text{dog}(x), P(\text{who } y[x \text{ bit } y])]$

The third version, (47) is an interesting intermediate case. If we read the original (42) as a noble, though empirically incorrect, attempt to express that only increasing quantifiers support pair-list readings, then (47) just expresses, in the same spirit, what seems to emerge from (44) as the correct empirical generalization, namely, that all quantifiers except for the type *no dog* do so. This is how (47) works. QP is required to have a non-empty witness A. "Negative" quantifiers like *no dog* are distinguished by having the empty set as their unique witness, so this formulation lets all others in (given a universe that is not trivially too small).[8] The rest ensures that all and only the members of A count:

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[8] If data involving other decreasing quantifiers are not judged to be quite good enough, (47) can be reformulated as follows:

    $\lambda P \exists A \exists B [\text{non-}\emptyset \text{ minimal witness}(B, [\![QP]\!])$
    $\& \ \text{witness}(A, [\![QP]\!]) \ \& \ \forall x [P(\text{whom } x \text{ bit}) \text{ iff } x \in A]]$

(47) $\lambda P \exists A[\text{non-}\emptyset \text{ witness}(A, [\![QP]\!]) \ \& \ \forall x[P(\text{whom } x \text{ bit}) \leftrightarrow x \in A]]$

At first sight (47), too, seems like an innocent improvement over (42): the maximality condition is no longer added like an afterthought. But the new formulation makes a crucial difference. In (42), both reference to the relevant witness and universal quantification over its members took place inside the argument of the property variable P: cf. $P(\textbf{which } \boldsymbol{x} \in \boldsymbol{W} \text{ bit whom})$. In (47), both take place outside P: cf. $\forall \boldsymbol{x}[P(\text{whom } x \text{ bit})\textbf{iff } \boldsymbol{x} \in \boldsymbol{A}$. This has the consequence that (47) is every bit as "quantificational" as (46) is.

How shall we choose between these formulations?

(45), let's face it, is quite ugly. But notice that there is a certain similarity between it and a schema discussed in Beghelli, Ben-Shalom, and Szabolcsi (1996): the schema for branching quantification proposed in Sher (1991). Informally, Sher's definition of branching goes as follows: There are two sets A and B such that their cross-product $A \times B$ is in the relation R, and $A \times B$ is the largest cross-product in R. Both schemata start out with a formulation that makes sense only when increasing quantifiers are involved, namely, a formulation involving existential quantification over elements/witnesses of the quantifier. Then both schemata are supplemented with an independent maximality condition to take care of the non-monotonic and decreasing cases. So, if Sher's schema is acceptable (independently of what natural language examples correspond to it), (45) should be acceptable, too. Or should it? It seems to me that there is a difference. Namely, in the case of branching there is extremely good motivation for appealing to existential quantification over sets. This is what captures a core ingredient of our intuition about branching, namely, that it involves two sets that are chosen independently. In other words, our intuition about branching is heavily based on the increasing case, whence this "modular" approach seems justified. On the other hand, I do not believe we have a comparable core intuition about increasing cases in complement pair-list readings. (The matrix case is different!) Therefore, it seems to me that (45) can be ruled out on purely aesthetic grounds.

Aesthetics notwithstanding, it remains to be seen whether there is hard empirical evidence in favor of any of these alternatives. In 3.2 I argue that there is.

Here we require QP to have a non-empty minimal witness B. This excludes all decreasing quantifiers (and also non-continuous quantifiers with a decreasing component, e.g. *fewer than two or more than six dogs,* which does not seem problematic). But we cannot stick with B: the minimal witnesses of *exactly three dogs* are the same as those of *three or more dogs* and *more than two dogs,* but sentences containing these QPs are not synonymous. We must be allowed to pick an appropriately big enlargement A of B to do the real work. This is what my formulation exploits. I thank D. Ben-Shalom for discussion on these matters.

3.2 "Apparent scope out" phenomena

3.2.1 Evidence for quantification into lifted interrogatives

It is generally agreed that whatever rule assigns scope to QPs like *every student,* it operates within the boundaries of one clause. A typical example is (48):

(48) Some librarian or other found out that every student needed help.
     * 'every > some'

It is striking, then, that a comparable reading of (49) is entirely natural. Notice that on this reading not only the existence of students can be inferred in the matrix, but also the matrix subject becomes referentially dependent: the librarians vary with the boys:

(49) Some librarian or other found out which book every student needed.
     OK 'every > some'

Should we allow *every student* to distributively scope out of its own clause? The qualification "distributively" is of utmost importance here. It is observed in Farkas (1996) and Beghelli and Stowell (1994) that both universals and bare numeral indefinites can take unbounded scope. This, however, pertains only to (some subset of) their restrictor; they do not make extraclausal quantifiers referentially dependent. Thus it would be quite exceptional for (49) to rely on such a possibility.

Moltmann and Szabolcsi (1994) argue that distributive scoping out is not necessary. It is proposed that the critical reading arises when the complement clause (i) has a pair-list reading and (ii) is assigned scope over the matrix subject. This latter is of course a clause-internal step. That is, the derivation is not (50) but (51):

(50) * [every student]$_i$ [some librarian found out which book x_i needed]

(51) [$_\text{pair-list}$ which book every student needed]$_i$ [some librarian found out v_i]

Apart from saving the clause-boundedness of *every N*'s distributive scope, there are specific reasons for assuming (51). I will come back to these in 3.2.3, but first let us consider how the issue at hand helps evaluate the alternatives introduced in the previous section.

The question is what formal interpretation the pair-list reading must have for (51) to yield the "apparent scope out" effect. Let's see. In (52) through (54), I quantify (45) through (47) into *some librarian found out p*:

(52) $\lambda P \exists W$ [witness(W, [[every student]]) &
     P(which $x \in W$ needs which book) & MAXIMALITY]

$$(\lambda p[\exists z[\text{librarian}(z) \ \& \ \text{found-out}(z, p)]]) =$$
$$\exists W[\text{witness}(W, [\![\text{every student}]\!]) \ \& $$
$$\exists z[\text{librarian}(z) \ \& \ \text{found-out}(z, \text{which } x \in W \text{ needs which book})] \ \& $$
$$\forall x[x \notin W \ \rightarrow \ \neg \exists z[\text{librarian}(z) \ \& $$
$$\text{found-out}(z, \text{which book } x \text{ needs})]]]]]$$

(53) $\lambda P \forall x[\text{student}(x) \ \rightarrow \ P(\text{which book } y[x \text{ needs } y])]$
        $(\lambda p[\exists z[\text{librarian}(z) \ \& \ \text{found-out}(z, p)]]) =$
   $\forall x[\text{student}(x) \ \rightarrow \ \exists z[\text{librarian}(z) \ \&$
        $\text{found-out}(z, \text{which book } y[x \text{ needs } y])]]$

(54) $\lambda P \exists A[\text{non-}\emptyset \ \text{witness}(A, [\![\text{every student}]\!]) \ \&$
        $\forall x[P(\text{which book } x \text{ needs}) \text{ iff } \ x \in A]]$
        $(\lambda p[\exists z[\text{librarian}(z) \ \& \ \text{found-out}(z, p)]]) =$
   $\exists A[\text{non-}\emptyset \ \text{witness}(A, [\![\text{every student}]\!]) \ \& \ \forall x[\exists z[\text{librarian}(z) \ \&$
        $\text{found-out}(z, \text{which book } x \text{ needs})] \text{ iff } \ x \in A]]$

Recall that (45) is Groenendijk and Stokhof's original domain restriction interpretation of the pair-list reading, supplemented by an ad hoc maximality condition to take care of not upward monotonic QPs. (52) shows that quantifying (45) into the matrix clause does not make the librarians vary with the students. It is easy to see why: as was mentioned above, in (45) all quantificational action takes place inside the argument of P that matrix material will replace. Thus matrix and complement quantifiers cannot interact scopally.

On the other hand, both (46) and (47) give the desired result: the librarians vary with the students. This confirms that they are variations on the same quantificational theme.

To summarize, first we have seen that not only upward monotonic quantifiers support pair-list readings. Restricting the domain of the question to a witness of a non-upward quantifier is logically incorrect unless a maximality condition is supplied. Two ways of stating the maximality condition plus a purely quantificational alternative were offered. Second, we have seen that of the two ways of handling maximality, only one can also cope with apparent scope out readings. This, however, is in every pertinent respect equivalent to the quantificational alternative.

The conclusion is, then, that the interpretation of complement pair-list readings must involve quantification into lifted questions. This, however, may be formulated in slightly different ways, e.g. (46) or (47).

3.2.2   Decreasing quantifiers

A minor issue, the choice between (46) and (47), is still left open. As they stand, both presuppose that the failure of (some or all) decreasing QPs

to support pair-list readings has an independent explanation; technically, they differ in that (47) stipulates this restriction explicitly, while (46) requires some additional device.

Groenendijk and Stokhof, as well as Higginbotham (1991) offer an independent explanation in pragmatic terms: a question that asks you to remain silent is not felicitous:

(55)   Who did no dog bite?
　　　* 'For no dog, tell me who it bit (=don't tell me anything)'

This explanation, however, does not extend to complement cases like (44f). It would make perfect pragmatic sense for *Mary found out who no dog bit* to mean that Mary did not find out about any dog who it bit; nevertheless, speakers do not accept this reading. Likewise, the pragmatic explanation, being question-specific, does not account for Moltmann's (1992) and Schein's (1993) observation that parallel readings are absent from other *wh*-constructions:

(56)　a.　John is taller than [how tall] no other student is.
　　　　　* 'John isn't taller than any other student'

　　　b.　John read what no student wrote.
　　　　　* 'John didn't read any student's writing'

Moltmann (1992) proposes that the reason is that decreasing quantifiers do not take inverse scope. Matters may not be that simple, though. As we have seen, only the type *no N* is entirely unable to support a pair-list reading, while the range of quantifiers that practically do not take inverse scope is much larger (see 3.2.3 and Szabolcsi 1996). As of date, I am not aware of an enlightening syntactic or semantic explanation for the exceptional behavior of *no N*.

3.2.3　"Layered quantifiers"

The "apparent scope out" phenomenon bears a great burden in ruling out (45), the domain restriction schema (amended by an ad hoc maximality condition). Now, the use of quantification into a lifted interrogative yields results that are logically equivalent to quantification into a superordinate clause (see Hendriks 1993 for a general theory that bears this out). Thus it is worth making an excursus and show that the proposed analysis, called the "layered quantifier" analysis in Moltmann and Szabolcsi (1994), is empirically justified. Below I will review two types of supporting evidence. First, consider (57):

(57) More than one librarian found out which book every boy stole from her.

Here the complement contains a pronoun to be bound by the matrix subject. The matrix subject is chosen so that it can exhibit variation and can bind a singular pronoun, but not corefer with it, cf.:

(58)   a. Some librarian lost *her* hat. *She* was sad.

        b. More than one librarian lost *her* hat. *She was sad.

Let us examine the "librarians vary with boys" reading and ask whether *more than one librarian* can bind *her* on that reading. The derivation in (50) would predict that it can, since only *every boy* is quantified into the matrix: the rest of the complement, including *her,* is within the scope of *more than one librarian*:

(59) [every boy$_2$ [more than one librarian$_1$ found out which book t$_2$ stole from her$_1$]]

On the other hand, (51) predicts that binding is not possible, because the whole complement is quantified in and is thus outside the scope of *more than one librarian*:

(60) * [which book every boy stole from her$_1$]$_3$[more than one librarian$_1$ found out t$_3$]

Speakers judge that the critical reading is in fact unavailable, i.e., (60) is the correct representation.

   The second type of evidence has to do with some restrictions on when the apparent scope-out reading is available. Consider, for instance, (61). It does have a pair-list reading ' ... found out about more/fewer than six boys which book they needed,' but we have a fixed librarian: librarians cannot vary with boys.

(61) Some librarian or other found out which book more/fewer than six boys needed.

The analysis in (50) would require a new stipulation to the effect that *every boy,* but not *more/fewer than six boys,* can scope out of its clause. In contrast, Moltmann and Szabolcsi (1994) correlate the differential interpretations with the fact that *every boy,* but not *more/fewer than six boys,* is a good inverse scope taker in itself, and show that the analysis in (51) automatically predicts that the generalized quantifier representing the pair-list reading inherits its scopal abilities from its internal wide scope quantifier.

   Since we are dealing with a property of all "layered quantifiers" that has some interest of its own, let us examine the general case first. A "layered quantifier" is any generalized quantifier that has another one quantified into it. For instance, in noun phrases this other quantifier may be a genitive or prepositional phrase. Notice now that the examples in (62) can be paraphrased so that the determiner of the internal wide scope quantifier becomes the determiner of the whole layered quantifier (and an existential appears):

(62)   a. every girl's fingerprint = every fingerprint that belongs to some girl

     b. more/fewer than three girls' fingerprints = more/fewer than three
       fingerprints that each belong to some girl

Why is this interesting? Most semantic properties of a noun phrase can be predicted from what its determiner is. Thus when equivalences like in (62) obtain, it is likely that the whole quantifier's behavior will match that of its internal wide scope quantifier. Scope behavior is one relevant semantic property, and witness:

(63)   a. Someone saw every girl.
       OK 'every girl > someone'

      b. Someone saw more/fewer than three girls.
       ?* 'more/fewer than three girls > someone'

(64)   a. Someone saw every girl's fingerprint.
       OK 'every girl's fingerprint > someone'

      b. Someone saw more/fewer than three girls' fingerprints.
       ?* 'more/fewer than three girls' fingerprints > someone'

In what cases does the above equivalence obtain? Makoto Kanazawa (p.c.) drew our attention to the following simple rule:

(65) The following equivalence, in which D is the internal wide scope quantifier's determiner,

$$\lambda P[Dx[R(x)][P(fx)]] = \lambda P[Dy \exists x[R(x) \ \& \ (y = fx)][P(y)]]$$

holds for any D when f is a one-to-one function. It holds even without f being one-to-one iff D is $\exists$, $\forall$, or their negations, ~~or D is simply decreasing in its VP argument~~.

It is worth emphasizing that the lefthand side of the equivalence is any faithful interpretation of the noun phrase, not necessarily its "standard logical form." Consider, for instance, *every girl's fingerprint*. All we are interested in now is that its meaning can be faithfully expressed as (66), where the *fingerprint of* relation is one-to-one; we are not asking whether exactly (66) should be the format in which the grammar produces its logical form:

(66) $\lambda P \forall x[\text{girl}(x), P(\iota y[\text{fingerprint-of}(x)(y)])]$

Note also that f need not map individuals to individuals, it may operate on sets/groups. Thus, for instance, *fewer than six girls' books* is not problematic, because we can construct a one-to-one function that maps each girl to the set of all her books:

(67)   a. fewer than six girls' books ≠ fewer than six books that belong to some girl

         b. fewer than six girls' books = fewer than six maximal book-sets that each belong to some girl

On the other hand, even if by definition every girl has a unique favorite movie, whence *favorite movie of* is a function, many girls may share a favorite, whence this function is not one-to-one. It is easy to check, however, that with the determiners in (68) the equivalence still holds:

(68)   a. every girl's favorite movie = every movie that is some girl's favorite

         b. a girl's favorite movie = a movie that is some girl's favorite

         c. no/not every girl's favorite movie = no/not every movie that is some girl's favorite

         d. fewer than three girls' favorite movies = fewer than three movies that are each some girl's favorite

When does the equivalence fail? One type is where the function is not one-to-one and D is a non-decreasing numerical determiner. Observe that in (69a,b) there is no guarantee that there are at least three distinct movies that are each some girl's favorite; it may be that every girl's favorite is either "Aladdin" or "Jurassic Park." Another type is where there is no function at all, as in (69c): the *a-poem-by* relation is not a function.

(69)   a. three girls' favorite movies ≠ three movies that are each some girl's favorite

         b. exactly three girls' favorite movies ≠ exactly three movies that are each some girl's favorite

         c. a poem by every poet ≠ every poem that is by a poet

In fact, examples in which the "head noun" of the layered quantifier has its own overt determiner typically pattern with (69c) in failing to exhibit the interesting equivalence.

Having considered the general case, let us return to pair-list readings. Recall that we are interested in deriving the fact that the complement interrogative on its pair-list reading inherits its semantic properties from its internal wide scope quantifier. Consider:

(70) (I found out) which book every boy/more than six boys needed.

Here we always have a one-to-one function from boys to questions: for each boy x, we have a unique question of the form *which book x needed.* Therefore, pair-list readings exhibit the equivalence in (65):

(71) which book D boy(s) needed =
D question(s) such that for some boy x, the question is which book x needed

Consequently, D indeed determines the scopal abilities of the pair-list quantifier. *Which book every boy needed* is predicted to be able to make the matrix subject referentially dependent, *which book more than six boys needed* is predicted not to.

4 EMPIRICAL OBJECTIONS TO THE QUANTIFICATIONAL APPROACH

Observe that the output of my analysis of quantifiers in complement pair-list readings is (semantically) the same as that of Karttunen (1977). The difference is that while Karttunen quantifies directly into a superordinate clause, I quantify into a lifted interrogative. We have seen that in isolation, these two are logically equivalent, although the present choice turns out to be preferable when more complex data are considered.

Recall now that Groenendijk and Stokhof as well as Chierchia do not merely propose another, domain restriction analysis; they also argue explicitly against quantification.[9] The present section briefly comments on specific empirical issues that arise in connection with the de dicto reading of the quantifier's restriction (4.1), quantificational variability (4.2), and the absence of pair-list readings with *whether*-questions (4.3). I wish to thank U. Lahiri and F. Moltmann for discussions on these matters.

4.1 The "de dicto" reading of the restrictor

One important reason why Groenendijk and Stokhof object to Karttunen's (1977) treatment of pair-list readings in terms of quantification into interrogatives is that this does not account for the fact that the common noun part of the QP is interpreted "de dicto." Consider (72). Karttunen's analysis says that, for every individual who is a criminal, John knows what candy that individual craves—but John himself need not know that the individual is a criminal. The restrictor *criminal* is outside the scope of *know,* i.e., it is read "de re." Groenendijk and Stokhof claim that this is not sufficient for the truth of (72): John

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[9] Karttunen and Peters (1980) also propose a pair-list analysis different from Karttunen's (1977), which however has ad hoc features and has not been pursued further.

himself must also know that those individuals are criminals, i.e., the restrictor must occur inside the scope of *know* and be read "de dicto."[10]

(72) John knows what candy every criminal craves.

This objection carries over to my (46) and (47) in the following sense. If the complement clause is interpreted as an extensional object of *know, know* is part of what replaces the variable P. Thus reference to the common noun or witness set of QP is made only outside the scope of *know*. It is of course also possible to interpret the whole generalized quantifier that stands for the complement as an intensional object, in which case the problem does not arise.[11]

Now, it appears to me that Groenendijk and Stokhof's own stronger claim is in fact too strong, in two respects. First, compare (72) with (73):

(73) John has just discovered what candy every criminal craves.

This sentence need not mean that John has just discovered that the guys are criminals, although it may be natural to require that he be independently aware of them being criminals. That is, it seems that we are dealing with presupposed awareness and not with an entailment expressible strictly in terms of whatever the matrix verb happens to be (here: *discover*). The fact that Groenendijk and Stokhof consistently use *know* in their examples masks this difference.

Second, even the presupposition of awareness is restricted to cases where the matrix subject is an intelligent being acting knowingly. In (74), the experiment will neither reveal that the guys are criminals, nor does it have any awareness of this.

(74) This experiment will reveal what candy every criminal craves.

The same holds of John in (75), in case he informs us inadvertently, in an indirect way:

(75) If we trick him into rambling about his customers, John will tell us what candy every criminal craves.

Third, it seems that on the "varying librarians" reading (which I argued involves quantifying the whole complement, not merely its QP, into the matrix clause) librarians need not be aware that the person whose book needs they found out about is a student:

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[10]More precisely, in addition to the domain restriction derivation, Groenendijk and Stokhof allow for quantifying into the matrix, too. Naturally, the "de dicto" claim does not apply to this latter case. This coexistence of two alternative derivations does not make the empirical predictions easy to check.

[11]My understanding is that the verb *know* takes an intensional complement in a different sense than *wonder* does. The argument of *know* is the intension of a lifted interrogative; the complement of *wonder* is that of an unlifted one. I assume that the complement of *know*, like that of *seek*, may be either extensional or intensional in the pertinent sense.

(76) Some librarian or other found out which book every student needed.

All in all, it appears that the data do not compel us to adopt Groenendijk and Stokhof's specific formulation. It is not my aim in this paper to develop an alternative proposal. Let me assume that some theory of presuppositions and intensionality is able to handle the facts that are undoubtedly there. (The datum in (76) may indeed suggest that the phenomenon Groenendijk and Stokhof observe is contingent on the whole complement being interpreted as an intensional object. Intensional interpretation is excluded when the complement is quantified into the matrix to make the subject referentially dependent.)

4.2   Quantificational variability

Another objection may be derived from a point made in Chierchia (1993). Chierchia mentions that one important advantage of his treatment of pair-list readings, which is in many respects like Groenendijk and Stokhof's, is that Lahiri's (1991) proposal for the treatment of the "quantificational variability effect" straightforwardly extends to it. To recap, the QVE is the phenomenon that, in the presence of a quantificational adverb like *usually* or *for the most part, which students* may wind up meaning 'most students.' The pioneering analysis of these data is Berman's (1990), who appeals to unselective binding. Lahiri's alternative does not involve unselective binding but reproduces the same intuitive result. He interprets (77) roughly as follows:

(77) Mary knows, for the most part, which students came.
   'Mary knows most parts of the complete answer to the question which students came = For most students, Mary knows whether they came'

Chierchia (1993, p. 218) comments on the extension of this analysis to pair-list readings, "In a situation with three people a, b, and c, where a loves b, b loves c, and c loves a, if Mary knows that a loves b and b loves c, sentence [78] would be true."

(78) Mary knows, for the most part, who everyone loves.

He notes that the QVE obtains only with universals and not with indefinites, e.g.:

(79) Mary knows, for the most part, who six students love.

The absence of a QVE is predicted on the domain restriction analysis. The complement interrogative in (79) has no unique complete answer, so Lahiri's algorithm—correctly—cannot apply.

How can the QVE data be possibly accounted for if the pair-list reading is derived using quantification? Although the problem initially looks staggering,

Groenendijk and Stokhof (1993) offer a trick that does the job.[12] In this paper, the authors propose a general account of the QVE that relies crucially on both fundamental assumptions and indepedently motivated particular techniques of dynamic semantics. I review the pertinent aspects of their proposal without trying to justify the underlying theory here.

In standard first order logic, the equivalence in (80) holds only if x is not free in ψ:

(80) $\forall x[\phi \rightarrow \psi] = \exists x\phi \rightarrow \psi$

It is a defining property of dynamic semantics that the equivalence holds without such a restriction. Thus we can trade the original universal of the sentence for an existential. $\exists x\phi \rightarrow \psi$ can then be subjected to existential disclosure, which removes the existential quantifier and makes x available for further quantification. Thus *most* can effectively quantify over the variable originally bound by the universal. So, (78) is interpreted as (81):

(81) 'For most persons, Mary knows (completely) who that person loves'

Fortunately, these equivalences do not hold if we replace *every* with an indefinite.

With the main job thus done, let us ask whether this result is exactly the same as Lahiri's and Chierchia's. This question is not easy to answer because they do not spell out what count as parts of a pair-list answer, but it seems they would quantify over pairs, as in (82), not over loving persons, as (81) does:

(82) 'For most person$_1$/person$_2$ pairs, Mary knows whether p_1 loves p_2'

In the model that Chierchia considers for (78) *love* is a one-to-one function, so the two readings cannot be distinguished; but this need not be so. Consider two models that make a distinction. R's are lovers and d's are loved ones. Bold face indicates that Mary knows that the relevant r loves that particular d:

(83)   a. r_1 d_1 $\mathbf{d_2}$ $\mathbf{d_3}$ b. r_1 d_1
             r_2 d_4 $\mathbf{d_5}$ $\mathbf{d_6}$ r_2 d_2
             r_3 d_7 $\mathbf{d_8}$ $\mathbf{d_9}$ r_3 $\mathbf{d_3}, \ldots, \mathbf{d_{500}}$

In (83a), Mary knows most of the pairs but her knowledge of each individual lover is partial. (83b) is the by now classical test case in which one lover is a member of overwhelmingly many pairs, and while Mary does not have any knowledge about any majority of the lovers, she does about this person. My judgment is that (78) is false in both models, thus in fact (81) is correct.

This means that (if the assumptions of dynamic semantics are generally tenable) the quantificational approach to pair-list readings can be married with a fully satisfactory treatment of quantificational variability.

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[12]I. Heim (p.c.) points out that Groenendijk and Stokhof's proposal is preliminary in that it does not spell out a compositional treatment.

4.3 Complements with *whether*

Finally, as is noted already in Karttunen and Peters (1980), quantifying into interrogatives incorrectly predicts that interrogatives with *whether* have pair-list readings:

(84)   John found out whether everyone left.
      * 'John found out about everyone whether he left'

It is argued in Moltmann and Szabolcsi (1994) that this is really part of a bigger problem of why quantification into clauses lacking a variable binding operator is not attested:

(85)   a. whether every girl walks   * $\lambda P \forall x[\text{girl}(x) \rightarrow P(\text{whether } x \text{ walks})]$

      b. that every girl walks   * $\lambda P \forall x[\text{girl}(x) \rightarrow P(\text{that } x \text{ walks})]$

How do we know that (85b) is not available? If it were, then, assuming that complement clauses can be quantified into the matrix, as is suggested in Section 3, quantifiers in the complement would systematically appear to scope over quantifiers in the matrix. But this is not the case, cf. (48). Moltmann and Szabolcsi offer preliminary speculations, but this particular problem remains largely open for the time being.

5 "QUANTIFICATION:" A DIVERSE PHENOMENON

In sum, I have defended the view that the variety of quantifiers that support pair-list readings in extensional complements necessitates a treatment that can be called "quantificational" in truth-conditional terms. Now, various papers in this volume argue that bare indefinites, universals and modified numerals contribute differently to the interpretation of the sentence (where the differences may be representational/procedural, rather than truth-conditional). In the light of this, the claim concerning quantification cannot mean that in extensional complements, all types of noun phrases are simply "quantified in" in the sense of Montague, for instance. Rather, "quantification" needs to be read as a cover term. The intended interpretation is that each type of noun phrase induces a pair-list reading in the same syntactico-semantic fashion that is characteristic of it in other scopal contexts. This is what contrasts with the claim that the uniform contribution of QPs to pair-list readings is in terms of domain restriction.

According to the typology in Szabolcsi (1996), quantifiers fall into two main categories. Universals and bare numeral indefinites are argued to introduce

discourse referents. In the case of universals, the referent is the unique witness of the quantifier; in the case of indefinites, it is a plural individual whose atoms are the elements of a minimal witness. In both cases, the referent is associated with a separate distributive operator. Hence, the interpretation of (86) will be roughly as in (87). (87) is like (47), simplified by removing the "non-empty witness" qualification and the biconditional that ensures maximality. These simplications are possible, because the quantifiers at issue are all monotonically increasing.

(86) ... who every dog/two dogs bit

(87) $\lambda P \exists A[\text{witness}(A, [\![every/two\ dog(s)]\!]) \ \& \ \forall x[x \in A \ \rightarrow \ P(\text{whom } x \text{ bit})]]$

The other category of quantifiers comprises modified numerals and other decreasing items; these are argued to perform a counting operation on a predicate denotation, in the manner of generalized quantifiers. Hence, (88) can be represented straightforwardly in the manner of (46):

(88) ... who more/fewer than six dogs bit

(89) $\lambda P \text{more/fewer-than-six } x[\text{dog}(x), P(\text{who } y[x \text{ bit } y])]$

As was noted in 3.2.2, this latter formula presupposes an independent account of why the type of *no dog* cannot appear here.

The claim that whereas universals in matrix questions and intensional complements behave in an unusual way that can be assimilated to multiple interrogation, the various quantifiers that support pair-list in extensional complements do so in their own usual manner, is corroborated, quite spectacularly, by the syntactic analysis in Beghelli (1996). Since those facts are quite complex, I do not attempt to summarize them here; the reader is referred to Beghelli's work in the next chapter.

6   CONSEQUENCES FOR WEAK ISLANDS

Finally, let me explore the consequences of the above observations for the phenomenon that originally prompted me to investigate pair-list readings: weak islands. Szabolcsi and Zwarts (1993) propose that weak island violations are in fact a scope phenomenon:

(90) Weak island violations come about when an extracted phrase should take scope over some intervener but is unable to. Harmless interveners are harmless only in that they can give rise to at least one reading of the sentence that presents no scopal conflict of the above sort: they can "get out of the way."

Consider the following contrast:

(91)   a.   How much milk did every kid drink?

        b.   * How much milk did fewer than five kids drink?

The claim is that neither example has a reading on which *how much milk* is scoping over the subject quantifier (the reason why this is so is discussed in detail in that paper). For (91a), suppose that Billy drank a pint of milk, Johnny drank a quart, and Pete drank a tiny cup. On the plain WH > ∀ reading, (91a) should be answered as "A tiny cup," i.e. the smallest amount that a kid drank. But this is not a good answer. The reason why (91a) is nevertheless grammatical is that *every kid* can "get out of the way" by supporting two other readings. One is where we presuppose that every kid drank the same amount of milk and want to identify this amount. One might say that *every kid* is scopeless, or scope independent of WH, on this reading. The other good reading is the pair-list reading, which may be dubbed the ∀ > WH reading. In contrast to (91a), (91b) is ungrammatical because *fewer than five kids* can only take narrow scope; it doesn't have a single chance to "get out of the way."

We focus on pair-list readings now. Szabolcsi and Zwarts (1993, section 4) did not present novel observations but merely stated, with reference to then-current literature, that indefinites and universals, in distinction to decreasing quantifiers, are expected not to create weak islands, because they can support choice readings and fixed domain readings, respectively.

The present paper has made novel claims concerning the distribution of pair-list readings. Let us see what the consequences are for weak islands.

The most important descriptive claim made above is that different quantifiers support pair-list readings in the matrix or intensional complements and in extensional complements (universals versus almost all quantifiers). This predicts that a much wider range of quantifiers creates weak islands in the first type of context (providing, of course, that supporting a pair-list reading is the only option for the quantifiers in question to "get out of the way").

Examples with decreasing quantifiers bear this prediction out quite spectacularly. They create a weak island in the matrix and in intensional complements, but not in extensional complements:

(92)   a.   * How did fewer than five kids behave?

        b.   * I wonder how fewer than five kids behaved.

        c.   (He didn't do well in his survey.) He only found out how fewer than five kids behaved.

Modified numerals also present the same kind of contrast, although some speakers feel that the matrix examples are not entirely out, either:

(93)   a.   ?/?? How did more than five kids behave?
           ?/?? How did between ten and twenty kids behave?

       b.   ?/?? I wonder how more than five kids behaved.
           ?/?? I wonder how between ten and twenty kids behaved.

       c.   I found out how more than five kids behaved.
            I found out how between ten and twenty kids behaved.

How can (93a, b) be relatively acceptable? It seems to me that they are acceptable to the extent these sentences presuppose that more than five / between ten and twenty kids behaved uniformly, and ask to identify this uniform behavior. The extensional complement examples on the other hand are impeccable and do not need such a presupposition: they have a pair-list reading. (For some reason, decreasing quantifiers do not lend themselves to a uniformity presupposition.)[13]

Definites and bare numeral indefinites have been claimed not to induce pair-list readings. Nevertheless, matrix questions/intensional complements involving these are also acceptable:

(94)   a. How did the boys behave?
         How did three boys behave?

       b. I wonder how the boys behaved.
         I wonder how three boys behaved.

       c. I found out how the boys behaved.
         I found out how three boys behaved.

Here we have a variety of salvaging options. Definites, and possibly indefinites, can support distributed group readings that are superficially quite similar to pair-list (see note 6). Furthermore, both *the boys* and *three boys* can denote groups and, as Doetjes and Honcoop (1996) point out, plural individuals being scopeless, they are as innocuous as proper names.

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[13]Szabolcsi and Zwarts report that many speakers find even *at most five people* an acceptable intervener, as opposed to *few people,* for instance (their (35c)). They refer to Groenendijk and Stokhof's claim that these quantifiers may support an increasing group reading. Although at present I do not know which of the normally decreasing quantifiers have such an alter ego, Groenendijk and Stokhof's specific claim indeed seems to be confirmed. E.g. S. Spellmire points out to me the following contrast:

i.   At most/fewer than five men ever went to the beach.

ii.   At most/fewer than five men each went to the beach.

iii.   * At most/fewer than five men each ever went to the beach.

I should add, though, that the reason why the group version eludes the weak island effect is presumably that it supports a uniformity presupposition and not, as was conjectured in Szabolcsi and Zwarts, that it supports a choice reading.

In sum, it appears that the current account of pair-list readings, in conjunction with the scope account of weak islands, correctly predicts a complex set of data that no other proposal in the literature does.

The observation that matrix choice questions do not exist necessitates some revision of Szabolcsi and Zwarts' preliminary account of examples involving indefinites; given, however, that these items have other options to "get out of the way," the general coverage of the account is not diminished.

Further subtle predictions come from considering the syntactic positions that quantifiers need to occupy to support pair-list readings. This topic is discussed in detail by Beghelli (1996) in the next chapter.

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