What makes pair list answers available: An experimental approach

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What makes pair-list answers available: An experimental approach*

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Abstract

Question/quantifier interactions have long been assumed to exhibit a subject/object asymmetry regarding the availability of pair-list answers (May 1985). However, the precise nature of this asymmetry remains controversial, and individual acceptability judgments reported in the literature vary significantly (Beghelli 1997, Chierchia 1993, Szabolcsi 1997, Agüero-Bautista 2001). In order to assess the degree of such variability and determine what factors actually contribute to pair-list answer availability, we ran three psycholinguistic experiments using judgment tasks. Our results provide nuanced confirmation for a structural asymmetry, underscore the importance of the nature of the interacting quantifiers, and call into question the role played by the presuppositional status and the plurality of the question terms. Moreover, we uncovered the existence of a group of individuals who do not appear to exhibit the standard subject/object asymmetry for pair-list answers. We discuss the theoretical implications of this finding and suggest that an extension of Beghelli's (1997) account may be used to capture this hitherto unreported pattern.

0. Introduction

Questions with universal quantifiers in argument position may allow for at least two types of answers: a single answer (SA; 1a), and a pair-list answer, (PLA; 1b)[1]. Object

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[1] Engdahl (1986), Chierchia (1993), Krifka (2003) distinguish between three readings of questions containing a quantifier: a narrow-scope reading (or a reading leading to a single answer), a pair-list and a functional reading. We will only consider two relevant types of readings in this paper, namely, those leading to single answers and pair-list answers.

questions with a subject quantifier, like (1), typically allow both. By contrast, the availability of a PLA for subject questions with an object quantifier, as in (2), is more controversial.

(1) *Who did everyone kiss?*
  (a) *Everyone kissed John* – SA
  (b) *Mary kissed John, Jane kissed Nick and Sarah kissed Michael* – PLA
(2) *Who kissed everyone?*

Beyond the syntactic position of the question and quantifier terms, a number of additional factors have been claimed to affect the availability of PLA: the lexical nature of the question-words, their presuppositional status and number (Agüero-Bautista 2001 Chierchia 2003), as well as the nature of the interacting quantifiers (Williams 1988, Beghelli 1997). To further complicate the picture, individual acceptability judgments reported in the literature are sometimes at odds with each other (Dayal 1996, Szabolcsi 1997, Agüero-Bautista 2001). Here, we propose to use psycholinguistic experimentation to tease apart these competing empirical claims and assess the contribution of each of the factors discussed above. By providing a more solid empirical basis our results, in turn, can be used as a new foundation for theory construction.

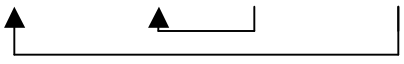
The paper is organized as follows: Section 1 discusses the main factors that have been claimed to affect the availability of PLA, and summarizes the empirical predictions arising from competing theoretical accounts. Section 2 presents our experimental results and Section 3 discusses the theoretical implications of our findings. We conclude by suggesting possible interpretations of the conflicting data and how those can be incorporated in the existing theoretical landscape**.**

1. Background

1.1 Theoretical approaches to wh/quantifier interaction

There are a number accounts for the contrast in (1-2) long regarded as a standard case of subject/object asymmetry (May 1985, Chierchia 1993, among others). Those not only differ in the mechanisms they use to explain question/quantifier interactions but, crucially, also in the judgments they report about the facts. May (1985), who was the first to observe this contrast, proposed an ECP-based structural account related to other well known subject/object asymmetries such as the Comp-trace effect (Pesetsky 1982 among others[2]). For PLA to be available a quantifier must take scope over a wh-expression at LF, a configuration that obtains when both expressions form a Sigma sequence after the quantifier raises and adjoins to IP. The process is constrained by the Path Containment Condition (Pesetsky 1982). Pair-lists are available for subject quantifiers interacting with object questions because the paths nest, as shown in (3).

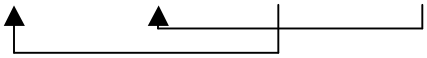
(3) *Who did everyone see?*
  $[_{CP}$ Who$_i$ $[_{IP}$ everyone$_j$ $[_{TP}$ t$_j$ [see $[_{NP}$ t$_i$]$_i$]]]]



[2] The view that Comp-t effects result from characteristic structural asymmetry has been questioned in works starting with Deprez (1991, 1994) and more recently in Kandybowicz (2006) among others.

For questions with object quantifiers, PLA are not available because the paths of QR and of wh-movement cross, as can be seen in (4); to avoid yielding crossing paths, the quantifier must raise lower in the tree, adjoining to VP, and thus cannot scope over the question term.

(4) *Who saw everyone?*
$[_{CP}$ Who$_j$ $[_{IP}$ everyone$_i$ $[_{TP}$ t_j [see $[_{NP}$ t_i $]_i]]]]$



Chierchia (1993), though developing a different approach to question/quantifier interactions, still regards a structural asymmetry as fundamental for the availability of PLA. In his view, PLA result from the binding by a quantifier of the functional variable left by the movement of a question-term. This quantificational binding, like that of a pronoun, is constrained by Weak Crossover, which is also structurally determined. A configuration where an IP-adjoined, LF-raised object quantifier binds the functional variable left by a subject wh-question results in a WCO violation, ruling out PLA. To account for some apparent exceptions like (5), where PLA with object quantifiers seem to obtain, Chierchia further suggests that semantically plural wh-phrases allow list answers in a way similar to how plural pronouns escape the WCO constraints in examples like (6). The latter involves a WCO violation which should yield ungrammaticality, as in (7). But the plurality of the pronoun *their* in (6) rescues the structure from a potential WCO violation.

(5) *Who put everything on the platter?* PL ok.
(6) *Their mothers like every boy in the class*.
(7) **His$_i$ mother loves everyone$_i$*.

Along similar lines, Chierchia (1993) further suggests that PLA are available with object quantifiers in subject questions with a semantically plural *wh*-term like *who*, but not with a strictly singular one like *which*. Thus subject/object asymmetries here surface only for a subset of questions, the strictly singular ones; they are possible when the question term is plural or, like *who*, allows for a plural reading.

For Beghelli (1997), the availability of PLA depends on the nature of the interacting quantifier more than on the nature of the wh-term or its structural position. Strongly distributive quantifiers like *each* are always raised to the specifier of a designated projection Dist(ributive)P, higher than IP which allows inverse scope of an object over a subject. In (8), raised *each* in DistP can bind the variables introduced by the wh-phrase, so PLA are available. Weakly distributive quantifiers like *every*[3], on the other hand, are lexically underspecified for distributivity and therefore cannot be raised to DistP. As a result, subject/object asymmetries are predicted to obtain with weak distributive and non-distributive quantifiers, but not with strongly distributive ones.

[3] Beghelli (1997) relies on Szabolsci's (1997) classification of quantifiers and treats both *every* and *each* as being strongly distributive. Yet, when *every* interacts with a wh-term, the set variable introduced by the universal quantifier is bound by the question operator not the existential operator, resulting in the loss of strong distributivity.

(8) Which girl kissed each boy? PL ok.
[$_{CP}$ Which girl$_j$ [$_{DistP}$ each boy$_i$ [$_{IP}$ t_j [kiss [$_{NP}$ t_i]$_i$]]]]

In yet a different approach, Agüero-Bautista (2001) argues that the availability of PLA is constrained by the discourse properties of wh-phrases. While *which* is lexically presuppositional, *who* is not. For Agüero-Bautista, presuppositionality constrains reconstruction; only non-presuppositional wh-phrases can reconstruct into their original theta-position – presuppositional ones cannot. Since reconstruction below a quantifier is a necessary condition for PLA, this explains (9). Presuppositional wh-phrases can reconstruct to Spec IP above an object quantifier, but not down to a theta-marked Spec vP.

(9) *Which student read every book?* * PL
[$_{CP}$ Which student$_j$ [$_{IP}$ every book$_i$ [$_{IP}$ t_j [read [$_{NP}$ t_i]$_i$]]]]

In contrast, *who* can sometimes reconstruct to its original theta-position, because its presuppositional status is determined by discourse, not the lexicon. Along with Chierchia (1993), Agüero-Bautista predicts that in a subject *who* question interacting with an object *every,* PLA can be available, if *who* is not presupposed. Moreover, in line with Beghelli (1997), Agüero-Bautista claims that *each* can QR to a position higher than *every*, which allows it to take scope over the trace of a *wh* reconstructed in Spec IP. This again predicts that with *each,* no subject/object asymmetry should arise. Finally, using examples from Spanish, Agüero-Bautista argues that the plurality of a *wh*-word is of no relevance to PLA, contra Chierchia (1993). He concludes that question/quantifier interactions only give rise to subject/object asymmetries in cases that involve presuppositional or definite interrogative determiners interacting with quantifiers other than *each*.

Table 1 summarizes the empirical predictions of the accounts reviewed above. All the accounts predict the unavailability of PLA for questions where a presuppositional/singular subject wh-phrase interacts with object *every*. As already discussed, the accounts reviewed above also make a number of conflicting predictions. Chierchia (1993) claims that PLA are possible for questions with a wh-phrase that can be plural, like *who.* This entails that PL answers should also be possible for questions in which a plural which-phrase interacts with an object quantifier. The latter structure is predicted to lack a PL reading in the approach of Agüero-Bautista (2001). Finally, some accounts (Beghelli 1997, Agüero-Bautista 2001) predict PL answers to be available for subject questions with object *each* but not with *every*, suggesting that the type of the quantifier in object position affects the availability of PLA.

Table 1. Availability of pair-list answers for subject questions with object quantifiers*

Subject questions	**May (1985)**	**Chierchia (1993)**	**Beghelli (1997)**	**Agüero-Bautista (2001)**
Who kissed every girl?	-	+	-	+
Which boy kissed every girl?	-	-	-	-
Which boys kissed every girl?	-	+	-	-
Which boy kissed each girl?	+		+	+

* Plus signs indicate that PLA are possible and minus signs that they are unavailable.

2. Experiments

In an attempt to resolve the disagreement about data summed up in section 1 and to determine what factors affect the availability of pair-list answers, we ran three psycholinguistic experiments using judgment tasks. Specifically, based on claims made by the accounts we reviewed in section 1.1, our experiments were designed to test the effect of three main factors on the availability of PLA: the presuppositional nature of the wh-phrase (*who* vs. *which*, experiment 1) (Agüero-Bautista 2001), the distributive status of the quantifier (*every* vs. *each*; experiment 2) (Beghelli 1997, Szabolcsi 1997), and the plurality of the wh-term (*which* singular vs. *which* plural; experiment 3) (Chierchia 1993). Across all three experiments, we used the case subject *which* interacting with object *every*, where all the accounts reviewed predict the unavailability of PLA, as a baseline condition. In each experiment, we also manipulated the grammatical position of the quantifier, i.e., subject vs. object, as well as answer type, i.e. single answer vs. PLA. In all three experiments, participants were given question-answer pairs and they had to judge, on a 1-7 scale, whether the answer in question was a possible answer for the relevant question. We used a scale instead of a binomial choice (i.e., Yes/No) because of the variation in judgments reported in the literature (see section 1.1). A scale can show not only mean ratings assigned by participants, but, crucially, the degree of variation that exists in judgments. Undergraduate students naïve to linguistic theory participated in the experiments to ensure that there was no effect of bias (Gibson & Fedorenko 2010; for a different approach see Sprouse & Almeida 2010). All three experiments were run using the Survey Monkey software (SurveyMonkey.com, LLC).

2.1 Experiment 1 Who / which

2.1.1 Method

Design. Experiment 1 was designed to test whether the presuppositional nature of the wh-expression involved (*which* vs. *who*) (Chierchia 1993, Agüero-Bautista 2001) affects the availability of PLA. We kept the question/answer pairs as close to those discussed in the literature as possible. We also included a set of practice and control items to ensure that participants understood the task, could assign low/middle/high ratings when required, and accepted pair-list answers as a possible answer type when appropriate. In this experiment, we manipulated answer type, grammatical position of the quantifier, presuppositional status of the wh-term (lexically vs. discourse presuppositional wh-phrases as well as possibly plural vs. singular wh-phrases), yielding a 2x2x2 design, 2 (quantifier position: subject vs. object) x 2 (answer type: single vs. pair-list) x 2 (wh-type: *who* vs. *which*) in

which all three factors were treated as within-subjects variables. Crossing of these factors resulted in 8 different conditions.

Participants. 33 adult native speakers of English participated in this experiment. All were undergraduate students at Rutgers University and they received course credit for participation.

Materials and procedure. Participants were asked to rate 32 critical items (8 conditions, 4 items per condition) and 60 control/filler statements which included answers to questions with wh-words only, quantifiers only, questions with clearly acceptable or unacceptable answers, as well as questions with pragmatically odd answers. Four lists were created in which order of items was randomized and participants were randomly assigned to a list. The experiment started with the presentation of three trial stimuli, which showed possible, impossible and 'intermediate' answers. Participants then took the main test that lasted approximately 15-20 minutes. Participants could take as long as they wanted to give their answers, but they were not allowed to go back and change their responses. Each trial consisted of a question and an answer to that question. The task was to determine whether that answer was a possible answer to the relevant question on a 1 - 7 scale (where 1 was 'definitely no' and 7 'definitely yes'). A sample question is given in (10).

(10) *Which driver took everybody home last night?*
Tom took Ms. Franko, Bob took Ms. Dombovski, and Jack took Mr. Perkins.

2.1.2 Results and discussion

Beginning with performance on the control items, we found that our participants experienced no difficulty with the task and were indeed able to assign appropriate ratings. To be sure, participants assigned high ratings to our 'appropriate answer' controls (mean = 6.8), they accepted PL answers when those were available (multiple wh-questions) (mean = 6.72), and in the case of inappropriate answers, they assigned low ratings (mean = 2.08). Participants were also sensitive to intermediate levels of 'appropriateness' of an answer and were clearly able to use the middle of the scale when necessary (mean = 5.01).

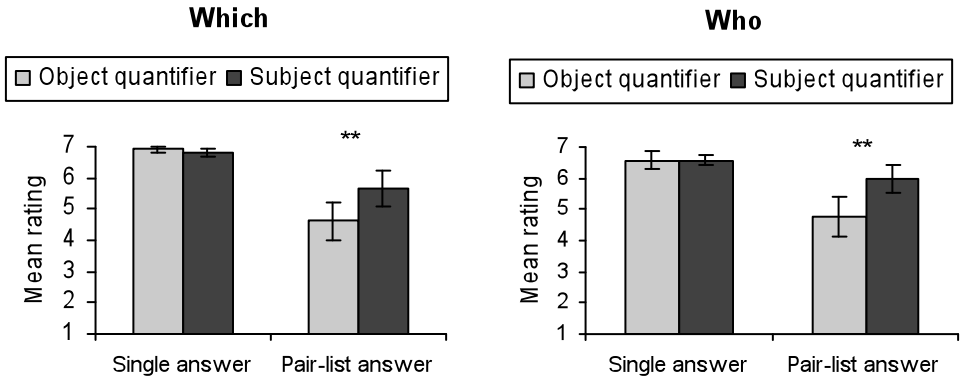
We now turn to critical items. Here, we analyzed mean ratings using ordinal logistic regression[4]. Recall that experiment 1 had the following design: 2 (quantifier position: subject vs. object) x 2 (answer type: single vs. pair-list) x 2 (wh-type: *who* vs. *which*). The analysis revealed a significant effect of answer type ($p < 0.01$) with SA scoring higher than PLA, and an effect of grammatical position of a quantifier ($p < 0.01$) as answers to questions with subject quantifiers received higher ratings compared to object quantifier questions. The main effect of wh-type was not significant ($p = 0.668$); an important point to which we return. For questions with object quantifiers (2), pair-list answers were significantly less acceptable than for those with subject quantifiers (1) which resulted in a significant interaction of answer type and quantifier position ($p< 0.01$). This reflects the classic subject/object asymmetry described by May (1985) which

[4] For a discussion of categorical data analysis see Agresti (2002), Jaeger (2008).

predicts pair-list answers to be available for questions with subject quantifiers and not to be available for questions with object quantifiers.

Figure 1 shows that for questions with both *who* and *which* SA ratings are high, suggesting that the speakers accepted SA as predicted. The bars representing PL answer ratings are lower for subject questions with an object quantifier than for an object wh-phrase interacting with a subject quantifier. This pattern holds both for questions with *who* and *which*.

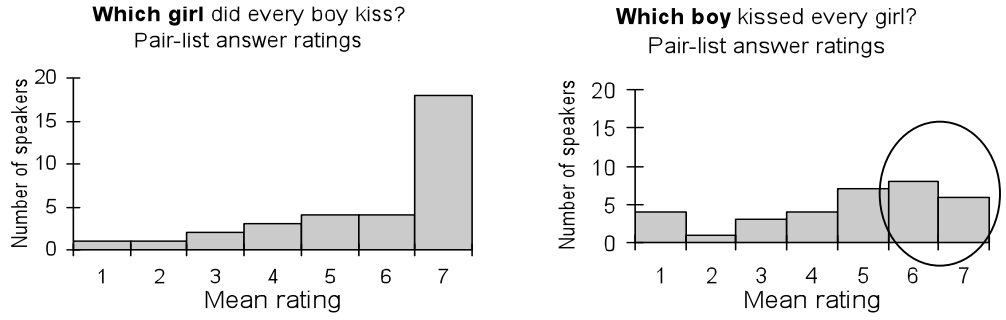
Figure 1. Subject/object asymmetry



Singular presuppositional wh-phrases, like *which*, are predicted to lack a PL reading, a conclusion shared by all theoretical accounts reviewed in this paper (May 1985, Chierhcia 1993, Beghelli 1997, Agüero-Bautista 2001). Also notice that PL answer ratings for subject questions with object quantifiers appear relatively high for a type of answer supposed to lead to ungrammaticality. PLA ratings for subject questions with an object quantifier are also significantly higher than ratings for unacceptable answers in the control conditions ($p < 0.01$, Kruskal-Wallis test).

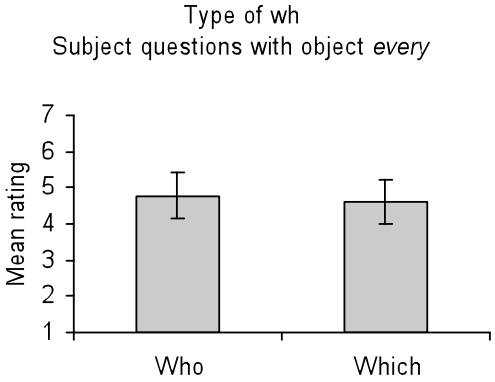
We now turn to a more detailed analysis of the responses. According to May (1985), pair-lists should be available for questions with subject quantifiers, but not for wh-questions with object *every*. Figure 2 shows the distribution of ratings assigned by the speakers to different types of answers. The speakers indeed accepted PLA in questions with subject quantifiers (left histogram). But for questions with object quantifiers the prediction does not hold. The right histogram shows that there is a cluster in the left part of the graph and a cluster in the right part of the graphs as well, reflecting the fact that a number of participants also assigned high ratings to pair-list answers to subject questions with an object quantifier. Further analysis revealed that at least 30% of the participants consistently assigned a rating of 6 or 7 to pair-list answers to subject questions with object quantifiers, in contrast to the predicted unavailability of PLA in this case (May 1985, Beghelli 1997).

Figure 2. Distribution of ratings (averages across 4 items of a given type)



We now go back to our finding that the manipulation of wh-type (*who* vs. *which*) had no significant effect on the availability of PLA (figure 3). This finding is noteworthy, because it does not accord with the predictions that the plurality of *who* (Chierchia 1993), or its ability to allow reconstruction (Agüero-Bautista 2001) should make pair-list answers more available than with *which* in subject questions with an object quantifier *every*.

Figure 3. Effect of wh-type on PLA



Moreover, the strong correlation between the ratings for PL answers to questions with *who* in subject position interacting with an object *every* against the PL ratings for subject *which* interacting with the same object quantifier ($r = 0.85$, $p < 0.01$) suggests that people who accepted pair-list answers with *who* also accepted pair-list answers to questions with *which,* contrary to the theoretical predictions made by Chierchia (1993), Agüero-Bautista (2001).

2.2 Experiment 2 Each / every

2.2.1 Method

Design. Experiment 2 examined the contribution of the quantifiers (*every* vs. *each*) regarding the availability of PL answers (Williams 1988, Beghelli 1997, Szabolschi 1997, Agüero-Bautista 2001). In a 2x2x2 design the following factors were manipulated: answer type (PLA and SA); quantifier position (subject vs. object) and quantifier type (*each* vs. *every*). Wh-type was held constant in this experiment, namely *which sg*.

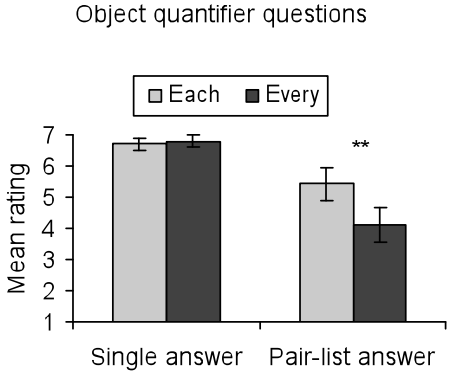
Participants. 29 native speakers of English participated in the experiment. All participants were Rutgers undergraduate students. They received course credit for participation.

Materials and procedure. The experimental procedure was the same as the one described for experiment 1.

2.2.2 Results and discussion

As in experiment 1, our dependent measure was the mean rating analyzed using ordinal logistic regression. The analysis revealed a significant effect of answer type ($p < 0.01$), quantifier position ($p < 0.01$), and quantifier type ($p < 0.01$). The results confirmed the subject/object asymmetry with questions with subject quantifiers PLs receiving higher ratings than questions with object quantifiers showing a significant interaction of quantifier position and answer type ($p < 0.01$). This result confirms the predictions of the theoretical accounts (May 1985 among others) and replicates the findings of experiment 1. A significant interaction of quantifier type and quantifier position ($p < 0.01$) shows that PLA are more readily available for subject questions with an object quantifier *each* than with *every,* as predicted by Beghelli (1997), Agüero-Bautista (2001) (Figure 4). This provides confirmation to the idea that it is the distributivity of a quantifier that significantly affects the availability of PL answers in question/quantifier interactions.

Figure 4. Effect of quantifier type on PLA



2.3 Experiment 3 Which sg / Which pl

2.3.1 Method

Design. Experiment 3 tested the role played by the plurality of the wh-phrase (*which*-singular (11) vs. *which*-plural (12)) (Chierchia 1993, Agüero-Bautista 2001).

(11) *Which student read every book last week?*
(12) *Which student**s** read every book last week?*

Three factors were manipulated in the experiment: quantifier position (subject vs. object), answer type (SA vs. PLA) and the grammatical number of a wh-phrase (singular wh-phrases vs. plural wh-phrases).

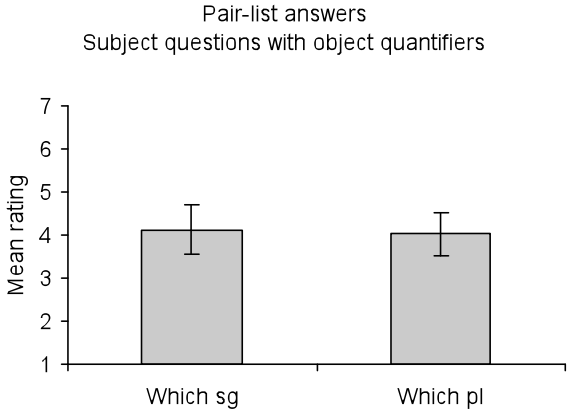
Participants. 33 native speakers of English participated in the experiments. All participants were Rutgers undergraduate students. They received course credit for participation.

Materials and procedure. The experimental procedure was the same as in experiments 1 and 2.

2.3.2 Results and discussion

The analysis of mean ratings using ordinal logistic regression showed a significant effect of answer type with, again, single answers receiving higher ratings overall than pair-list answers ($p < 0.05$); there is also overall a significant effect of quantifier position ($p < 0.01$). The analysis revealed no significant effect of wh-number ($p = 0.292$). The interaction of quantifier position and answer type is significant ($p < 0.01$). The interaction of wh-number and answer type is significant ($p < 0.01$) but affected by the ratings for single answers, this result is of no relevance to the current discussion. What is important though is that the ratings for PLA to subject questions with *which sg* and *which pl* were not statistically different from each other. This finding goes against Chierchia's (1993) hypothesis and confirms Agüero-Bautista (2001) generalization based on data from Spanish that the plurality of a wh-phrase does not affect the availability of PL answers to subject questions with object quantifiers.

Figure 5. Effect of wh-number on PLA



Results from experiment 3 also replicated the findings of experiments 1 and 2 and confirmed the prediction that overall PL answers are more acceptable for object questions with subject quantifiers than for subject questions with object quantifiers (May, 1985 among others).

3. General discussion

Overall, our results indicate that the subject/object asymmetry reported in the literature holds for questions with the universal quantifier *every*: PL answers to subject questions with this type of object quantifiers (2) receive on average significantly lower ratings than questions like (1).

(1) *Who did everyone kiss?*
(2) *Who kissed everyone?*

This finding was replicated in all three experiments. Yet, the ratings for PL answers to subject questions with the object quantifier *every* are also rather high for a type of answer that is supposed to be rejected by the grammar. This observation raises the question of whether the constraints that regulate the availability of PL answers are purely structural. At the same time, there are no speakers who assign higher ratings to subject question PL answers than to object question PL answers, as correctly predicted by May (1985). This observation suggests that the availability of PLA is regulated by a complicated interaction of grammatical and discourse factors.

We observed more variation in the speakers' responses for subject questions with object quantifiers than a strictly structural accounts would lead us to expect; more specifically, the standard subject/object asymmetry in the availability of PLA does not hold for at least 30% of the speakers in our experiments[5]. This finding brings significant support to theoretical accounts that take strictly structural factors to not be sufficient to account for question/ quantifiers interactions (Beghelli 1997 among others). On a purely syntactic account, these results lead to the postulation of two distinct dialects: one exhibiting and the other not exhibiting subject/object asymmetry. However, no population factors currently known to us could be linked to this distinction so the hypothesis postulating two separate dialects raises the questions as to what would be responsible for the existence of these two different grammars. Given this conclusion, the idea that factors other than purely structural ones are at stake in the availability of pair-list answers seems more plausible. Our experiments looked at two additional factors, one taking into account the morpho-semantic dimension of plurality and the other – discourse factors of presuppositionality.

Discourse factors associated with wh-type did not show a clear effect on the availability of pair-list answers. PL answers to questions with subject *who* were accepted by some speakers and rejected by others. This could be explained by the fact that without context speakers differ in the level of presuppositionality they attribute to *who*. If the question term was treated as presuppositional - in other words being similar to *which* - reconstruction into a theta-position was impossible resulting in the rejection of a PL answer. If, on the other hand, *who* was treated as a non-presuppositional wh-phrase, nothing constrained reconstruction and a PL was possible. Such an interpretation of the results might explain variation in ratings for PL answers to questions with subject *who*.

[5] Syrett & Lidz (2011) report a similar pattern of responses from a study on Antecedent-Contained Deletion. In a series of experiments they tested whether children and adults can access the embedded and the matrix interpretations of a sentence with ACD. For sentences where ACD is contained in a finite clause the matrix reading is supposed to be barred because of the locality constraints on QR. Syrett & Lidz discovered that 30% of adults accessed the supposedly ungrammatical matrix interpretation at least once during the experimental session and 4 adults out of 28 did so at least half of the trials (the participants also provided justification of their choice). These results – in combination with children's general willingness to accept the matrix interpretation and provide explicit justifications in doing so – led Syrett & Lidz to question whether the supposed locality constraints of QR are actually encoded in the grammar or arise as a result of processing difficulty.

However, it is unclear how this analysis could be extended to explain the variation in responses to questions with *which.* Being lexically presuppositional, the latter is predicted to be unable to reconstruct into a theta-position and no PL should be available. This is clearly not the case for at least 30% of our participants.

Our results show that the most relevant non-structural factor affecting the availability of PL answers is the lexical nature of the interacting quantifier. Confirming predictions of Beghelli (1997) we show that distributive quantifiers give rise to significantly higher acceptance rates of pair-list answers to subject questions**.** It seems that Beghelli's account of quantifier distributivity can be extended to explain the data we observed. Our suggestion at this point is tentative. If some speakers treat *every* as a strongly distributive quantifier, which it is, and it remains strongly distributive even when interacting with a wh-term, then it would be possible to say that those speakers who accepted a PL, treat *every* like *each*, the latter quantifier is known to facilitate the access to a PL reading. The difference between the two quantifiers is whether they can be raised to DistP to take scope over the wh-term. More specifically, for a lexical reason left unclear, *each* bears a strongly distributive feature that has to be checked. This property allows *each* to rise to DistP even if its set variable is bound by the wh-operator and not the existential operator. If the set variable introduced by *every* could avoid being bound by the wh, or similar to *each*, become somehow more distributive, then it would follow that *every* would work like *each*. We are conjecturing that a number of speakers created contexts that allowed them to limit the witness set of the quantifier in the sense of Szabolcsi (1997). This would have the result of making *every* equivalent to *each* namely, insensitive to binding by a question operator and hence, strictly speaking, contextually strongly distributive. In short, we are conjecturing that the difference between *each* and *every* is that while the former is lexically strongly distributive, the latter can be contextually so, given adequate contextual limitation on the set that is introduced by the quantifier.

Overall, our findings indicate that the data surrounding wh-quantifier interaction are more complex than predicted by earlier syntactic theories with at least 30% of speakers not exhibiting subject/object asymmetry. The nuanced array of facts that we uncovered - sometimes at odds with more recent accounts - underscores the role of controlled experimentation as an important tool for theory construction. The results show the benefits of running formal experiments in cases that have been claimed controversial. Obtaining responses from a larger group of speakers allowed us to explain the variation initially reported in the literature. Disagreement in reported judgments and predictions reflects actual variability that we observe among speakers, and, therefore should be treated not as contradictory evidence but instead as a fuller reflection of wh/quantifier interaction.

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