Intervention Effects in Alternative Questions

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Abstract Alternative questions exhibit intervention effects, in that the disjunctive phrase may not be c-commanded by a focusing or quantificational element. This seems to hold crosslinguistically. We provide an analysis of this phenomenon that combines a focus semantic explanation of intervention effects in questions with an analysis of alternative questions in which the disjunctive phrase makes available appropriate alternatives in a way similar to a wh-phrase. We point out consequences for the analysis of intervention as well as for the analysis of alternative questions. We also note interesting further issues pertaining to the semantic contribution of disjunction.

Keywords Alternative questions · Alternative semantics · Covert movement · Disjunction · Intervention effects

1 Introduction

An alternative question (AltQ, for short) is a question like (1) below, where two alternatives are mentioned in the question in the form of a disjunction. An acceptable answer to the question is one of the alternatives.

(1) a. Is Ning's baby a girl or a boy?
    b. Answers: Ning's baby is a girl.
                  Ning's baby is a boy.

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We adopt the standard Hamblin/Karttunen semantics of questions (Hamblin, 1973; Karttunen, 1977), according to which the meaning of the question is the set of possible answers to the question. In the example, this is the set of propositions in (2a), given more informally in (2b).

(2) a. $\{p: p = [\lambda w.\text{Ning's baby is a girl in } w] \vee p = [\lambda w.\text{Ning's baby is a boy in } w]\}$
   b. {that Ning's baby is a girl, that Ning's baby is a boy}

We chose in (1) an example in which the only pragmatically plausible interpretation is as an AltQ, for illustration. This is not normally the case, however. In examples like (3), an ambiguity arises between an interpretation as an AltQ and an interpretation as a Yes/No-question (Y/NQ, for short).

(3)   Did Sally teach syntax or semantics?

Below, we specify the question meaning, an example answer and a paraphrase for both interpretations.

(4)   Alternative Question [AltQ] Reading:
    a.   Question meaning: {that Sally taught syntax, that Sally taught semantics}
    b.   Example Answer: Semantics
    c.   Paraphrase: Which of syntax and semantics did Sally teach?

(5)   Yes/No-Question [Y/NQ] Reading
    a.   Question meaning: {that Sally taught syntax or semantics, that Sally didn't teach syntax or semantics}
    b.   Example Answer: Yes.
    c.   Paraphrase: Did Sally teach syntax or semantics or not?

Availability of the AltQ reading depends on intonation: it seems that both disjuncts must be focused in order for it to be present ((6a), cf. (3)). Intonation suggests that focus assignment in (3) on the AltQ reading is as in (6b). See Bartels (1999) and Han and Romero (2004a) for discussion.

(6) a. Did Sally teach SYNTAX or SEMANTICS?
    b. Did Sally teach [syntax]$_F$ or [semantics]$_F$?

Han (1999) and Han and Romero (2001, 2004a) observe that the AltQ interpretation is lost in such questions when a preposed negation is added, as in (7).

(7)   Didn't Sally teach syntax or semantics?
    a.   Yes.
    b. #   Semantics.   [*AltQ]

To this we add the observation that elements like *only* can have a similar effect: (8a) does not have an AltQ interpretation, in contrast to (8b) without *only*. Note that

there is nothing wrong with the meaning that would arise if (8a) were interpreted as an AltQ. That meaning is paraphrased in (8c).

(8) a. #   Does only John like Mary or Susan?   [*AltQ]
     b.   Does John like Mary or Susan?
     c.   Is it Mary or Susan who only John likes?

The issue we address in this paper is when the AltQ interpretation disappears, and why this happens. We argue that (7) and (8a) are instances of the intervention effect in questions observed in Beck (1996) for German wh-questions and Pesetsky (2000) for English wh-questions. The AltQ reading disappears when a problematic intervener prevents association of the disjunctive phrase with a licensing interrogative complementizer. Our analysis has interesting consequences for the analysis of AltQs as well as the analysis of the intervention effect in questions. Most importantly perhaps, we argue for an analysis of intervention and an analysis of AltQs that does not rely on movement.

The structure of the paper is as follows. In Sect. 2 we will collect the relevant data on AltQs and compare them to data on wh-questions. Important parallels will emerge. We summarize Beck's (2006) theory of wh-intervention effects in Sect. 3. Sect. 4 develops a compositional semantics of AltQs on the basis of which the intervention effect in AltQs is explained, using Beck's theory. Section 5 is devoted to the question of how alike AltQs and wh-questions are. We explore consequences of our analysis related to disjunction in Sect. 6. Sect. 7 points out some questions for future research and Sect. 8 presents our conclusions.

2 The phenomenon

This section presents a crosslinguistic overview of INTERVENTION EFFECTS in wh-questions and in alternative questions. To date, we have collected data from four languages: English, German, Hungarian and Korean. Before we proceed, a comment on our use of the term 'intervention': we discuss intervention effects in the sense of Beck (1996) (also Honcoop, 1998; Pesetsky, 2000), namely effects described by the generalization in (10) below: empirically, a focusing or quantificational element somehow interfering with a wh-phrase c-commanded by it. We do not address minimality effects in the syntactically wider sense discussed for example in Rizzi (1990, 2001), which have also sometimes been referred to as intervention effects, and which include minimality constraints on head movement, A-movement etc. In this delimitation of our project, we follow the view expressed in Beck (2006) that intervention effects in questions are best grouped with a different set of effects; those are focus related minimality effects, which also show up with focus sensitive particles and NPI licensing. This is a semantically triggered intervention effect, as we will see below. We do not believe that this semantic effect should be extended to minimality effects in Rizzi's sense, which seem clearly syntactic in nature. Conversely, as we will demonstrate, we think that our type of intervention effect receives an insightful analysis in the interpretation component and should therefore not be subsumed under syntactic minimality.

2.1 Intervention effects in German

2.1.1 Wh-intervention effects in German

The data below illustrate the wh-intervention effect in German described in Beck (1996). An intervener like *nur* ('only') may not c-command a wh-phrase in situ (9a) (disregard the reading of *wen* as an indefinite). Contrast this with the well-formed (9b) without the intervener. (9c) shows that the effect depends on the structural relationship between the intervener and the wh-phrase: when the wh-phrase precedes and c-commands the intervener, the question is fine. In this paper, we represent the peculiar way in which intervention effects are unacceptable with '?*' (unless a particular example gives rise to a different judgement).

(9) a. ?* | Wann | hat | nur | Maria | wen | eingeladen? |
|---|---|---|---|---|---|
| *when* | *has* | *only* | *Maria* | *whom* | *invited* |

    b. | Wann | hat | Maria | wen | eingeladen? |
|---|---|---|---|---|
| *when* | *has* | *Maria* | *whom* | *invited* |

    c. | Wann | hat | wen | nur | Maria | eingeladen? |
|---|---|---|---|---|---|
| *when* | *has* | *whom* | *only* | *Maria* | *invited* |

    'When did (only) Maria invite whom?'

There is a whole class of elements that trigger the same effect as *nur* in German, including in particular nominal and adverbial quantifiers. Some illustrations are given in (10). For a more comprehensive empirical overview of the relevant German data (including a discussion of the various problematic interveners and the role of scrambling), see Beck (1996) and also Pesetsky (2000).

(10) a. ?* | Wann | hat | niemand | wen | eingeladen? |
|---|---|---|---|---|
| *when* | *has* | *nobody* | *whom* | *invited* |

      'When did nobody invite whom?'

    b. ?* | Wann | hat | fast | jeder | wen | eingeladen? |
|---|---|---|---|---|---|
| *when* | *has* | *almost* | *everyone* | *whom* | *invited* |

      'When did almost everyone invite whom?'

    c. # | Wer | hat | oft | wen | eingeladen? [perhaps ok on a single-pair reading] |
|---|---|---|---|---|
| *who* | *has* | *often* | *whom* | *invited* |

      'Who often invited whom?'

On the basis of such data, we formulate the empirical generalization given in (11) (formulation adopted from Kim (2002)). By 'A intervenes between B and C' we mean that A c-commands B, and C c-commands both A and B, as illustrated in (11b); we write 'Q' for the interrogative complementizer and 'Op' for the intervener.

(11) A focusing or quantificational element may not intervene between a wh-phrase and its licensing complementizer.
    a. * [Q [...[Op[...wh-phrase...]]...]]
    b. [C [... [A [... B ...]] ...]]

2.1.2 AltQ intervention effects in German

The data in (12) are completely parallel to those in (9), with the disjunctive phrase taking the place of the wh-phrase in situ. The judgements reported refer to the AltQ-reading only, in this and the following paradigms; questions marked ungrammatical under the AltQ reading may still have an acceptable Y/NQ interpretation. We see that intervening *nur* causes the same intervention effect ((12a) vs. (12b)) and that the effect depends on the structural relationship between the disjunctive phrase and the intervener ((12a) vs. (12c)).

(12) a. ?* Hat nur Maria den Jonas oder die Ida eingeladen?
           has *only* *Maria* *the* *Jonas* *or the* *Ida invited*
      b. Hat Maria den Jonas oder die Ida eingeladen?
           has *Maria* *the* *Jonas* *or* *the* *Ida* *invited*
      c. Hat den Jonas oder die Ida nur Maria eingeladen?
           has *the* *Jonas* *or* *the* *Ida* *only* *Maria invited*
      'Did (only) Maria invite Jonas or Ida?'

AltQs permit more variation regarding their syntactic shape than wh-questions, in that the disjuncts can be various kinds of category. (13)–(14) illustrate that this does not make a difference for the intervention effect. As we see in (15), the various interveners that create an intervention effect in wh-questions in German do so in AltQs as well.

(13) a. Hat Peter Kaffee getrunken oder Kuchen gegessen?
           has *Peter coffee drunk or cake eaten*
      'Did Peter drink coffee or eat cake?'
      b. ?* Hat nur Peter Kaffee getrunken oder Kuchen gegessen?
           has *only Peter coffee drunk or cake eaten*
      'Did only Peter drink coffee or eat cake?'

(14) a. Hat Peter das Buch gekauft oder geliehen?
           has *Peter the book bought or borrowed*
      'Did Peter buy or borrow the book?'
      b. ?* Hat nur Peter das Buch gekauft oder geliehen?
           has *only Peter the book bought or borrowed*
      'Did only Peter buy or borrow the book?'

(15) a. ??Hat niemand Kaffee getrunken oder Kuchen gegessen?
           has *nobody coffee drunk or cake eaten*
      'Did nobody drink coffee or eat cake?'
      b. ?? Hat fast jeder Kaffee getrunken oder Kuchen gegessen?
           has *almost everyone coffee drunk or cake eaten*
      'Did almost everyone drink coffee or eat cake?'
      c. # Hat Peter oft Kaffee getrunken oder Kuchen gegessen?
           has *Peter often coffee drunk or cake eaten*
      'Did Peter often drink coffee or eat cake?'

Thus we come to the generalization in (16). The effect is quite parallel to wh-questions, with the disjunctive phrase taking the place of the wh-phrase. It seems to us that this is true crosslinguistically; we will look at a few more languages to see this.

(16)　A focusing or quantificational element may not intervene between a disjunctive phrase and its licensing complementizer.

　　　* [Q [...[Op[...[A or B]...]]...]]

2.2 Intervention effects in Korean

2.2.1 Wh-intervention effects in Korean

Beck and Kim (1997) point out the analogy between Korean data like (17) and German data like (9). In Korean, too, a wh-phrase in situ may not be c-commanded by an intervener. The relevant data are simpler since Korean is a wh-in situ language.

(17)　a. ?*　Mina-man　　nwukwu-lul　chotayha-ess-ni?
　　　　　　Mina-only　　*who-Acc*　　*invite-Past-Q*
　　　b.　　Mina-nun　　　nwukwu-lul　chotayha-ess-ni?
　　　　　　Mina-Top　　*who-Acc*　　*invite-Past-Q*
　　　c.　　*Nwukwu-lul　Mina-man　　chotayha-ess-ni?*
　　　　　　who-Acc　　　*Mina-only*　　*invite-Past-Q*
　　　　　　'Who did (only) Mina invite?'

(18) below shows that *-man* 'only' is not unique in triggering a wh-intervention effect in Korean.

(18)　a. ?*　Mina-to　　　nwukwu-lul　chotayha-ess-ni?
　　　　　　Mina-also　　*who-Acc*　　*invite-Past-Q*
　　　b.　　Nwukwu-lul　Mina-to　　chotayha-ess-ni?
　　　　　　who-Acc　　　*Mina-also*　　*invite-Past-Q*
　　　　　　'Who did also Mina invite?'

But compare (19) to German (10c): the adverbial quantifier 'often' triggers an intervention effect in German but not in Korean. The set of problematic interveners for wh-phrases is thus subject to crosslinguistic variation (as discussed in Beck (1996, 2006), Beck and Kim (1997)).

(19)　a.　Mina-nun　　cacwu　　　　nwukwu-lul　phathi-ey　chotayha-ess-ni?
　　　　　　Mina-Top　*often*　　　　*who-Acc*　　*party-Dir*　*invite-Past-Q*
　　　b.　Mina-nun　　nwukwu-lul　cacwu　　　phathi-ey　chotayha-ess-ni?
　　　　　　Mina-Top　*who-Acc*　　*often*　　　*party-Dir*　*invite-Past-Q*
　　　　　　'Who did Mina often invite to the party?'

2.2.2 AltQ intervention effects in Korean

Unlike English and German, Korean does not use one ambiguous surface form to express both a Y/NQ and an AltQ interpretation. (20a) is unambiguously interpreted as a Y/NQ. The corresponding AltQ must be phrased as in (20b) with a different connective *animyen*, which combines two categories of at least the size of VP.

(20) a. Mina-ka   cha-na   coffee-lul   masi-ess-ni?
        Mina-Nom   tea-or   coffee-Acc   drink-Past-Q
        'Did Mina drink tea or coffee or not?'
        [only Y/NQ]
     b. Mina-ka   cha-lul   masi-ess-ni   animyen coffee-lul   masi-ess-ni?
        Mina-Nom tea-Acc   drink-Past-Q   if.not   coffee-Acc   drink-Past-Q
        'Which of tea or coffee did Mina drink?'
        [only AltQ]

This means that once more, Korean data are easier empirically, since we can simply consider well-formedness without distinguishing two different interpretations. (21a,b) below contrast with (20b), thus exhibiting an intervention effect.

(21) a. ?* Mina-man cha-lul masi-ess-ni   animyen   coffee-lul   masi-ess-ni?
         Mina-only tea-Acc drink-Past-Q if.not   coffee-Acc   drink-Past-Q
         'Did only Mina drink tea or coffee?'
     b. ?* Mina-to   cha-lul   masi-ess-ni   animyen coffee-lul masi-ess-ni?
         Mina-also   tea-Acc   drink-Past-Q if.not coffee-Acc   drink-Past-Q
         'Did also Mina drink tea or coffee?'

Unsurprisingly, the same effect arises when we vary the shape of the disjunctive phrase.

(22) a. Mina-ka   ku   chayk-ul   sa-ss-ni   animyen pilli-ess-ni?
        Mina-Nom   that book-Acc   buy-Past-Q   if.not   borrow-Past-Q
        'Did Mina buy or borrow the book?'
     b. ?* Mina-man   ku   chayk-ul   sa-ss-ni   animyen pilli-ess-ni?
        Mina-only   that book-Acc   buy-Past-Q   if.not   borrow-Past-Q
        'Did only Mina buy or borrow the book?'

The example below shows that the element *cacwu* 'often', which was harmless as an intervener in Korean wh-questions, is equally harmless as an intervener in AltQs. Thus in a given language, the set of problematic interveners is the same in both types of questions, while at the same time there is variation between languages regarding what the set of problematic interveners is.

(23)   Mina-ka   cacwu   John-ul   phathi-ey   chotayha-ess-ni
        Mina-Nom   often   John-Acc   party-to   invite-Past-Q
        animyen   Bill-ul   phathi-ey   chotayha-ess-ni?
        if.not   Bill-Acc party-to   invite-Past-Q
        'Did Mina often invite John or Bill to the party?'

2.3 Intervention effects in English

2.3.1 Wh-intervention effects in English

Intervention effects in English wh-constructions have been found by Pesetsky (2000). Two examples are given in (24). It should be noted that such effects only arise in English wh-questions in otherwise permissible violations of superiority (cf. Pesetsky, 2000). Thus many configurations that would be ungrammatical instances of the intervention effect in German are acceptable in English. Examples are given in (25).

(24) a. ?* Which book didn't which student read _?
      b. ?* Which boy did only Mary introduce which girl to _?

(25) a. Who did only John introduce to whom?
      b. Which children didn't buy which book?

2.3.2 AltQ intervention effects in English

The data below show that English AltQs show the same intervention effect as German AltQs (the judgements refer once more to the AltQ reading only). The acceptability of (27) illustrates that the structural relation between the intervener and the disjunctive phrase is relevant. And (28a–c) show that just like in German, various quantificational expressions are interveners (compare Pesetsky for an investigation of the class of problematic interveners in English wh-questions).

(26) a. ?*   Didn't Sue read 'Pluralities' or 'Barriers'?
      b. ?*   Didn't Sue or Molly read 'Pluralities'?
      c. ?*   Did only Mary introduce Sue to Bill or (to) Tom?
      d. ?*   Did only Mary introduce Sue or Molly to Bill?

(27) Did John or Susan invite only Mary?

(28) a. ?*   Did very few students drink coffee or tea?
      b. ?*   Did only John drink coffee or tea?
      c. ?*   Does even John like Mary or Susan?

It is interesting that AltQs in English and German are much more parallel than wh-questions in the two languages: in AltQs, an intervention effect arises invariably in both English and German.

2.4 Intervention effects in Hungarian

2.4.1 Wh-intervention effects in Hungarian

The final language for which we have collected relevant data is Hungarian. Lipták (2001) argues that Hungarian has wh-intervention effects. (29) is her example. To this we add (30) and (31). Note the word order/syntactic structure effect exhibited by these data (analogous to Korean and German).

(29) a. ?* Mindig   kit   hívtál   meg? (Lipták, 2001)
            always   *who-Acc*   *invited-2sg*   *PV*
     b.   Kit   hívtál   meg   mindig?
            who-Acc   *invited-2sg* *PV*   *always*
            'Who did you invite all the time?'

(30) a. ?* Mindenki   mit   ivott?
            everyone   *what*   *drank*
     b.   Mit   ivott   mindenki?
            what   *drank* *everyone*
            'What did everyone drink?'

(31) a. ?* Senki   mit   nem   ivott?
            no.one   *what* *not* *drank*
     b.   Mit   nem   ivott senki?
            what   *not*   *drank* *no.one*
            'What did no one drink?'

Lipták (2001) shows that just like contrastive focus, wh-phrases in Hungarian move overtly to the designated focus position, namely, SpecFocP, but not all the way up to SpecCP as in English. Focusing in Hungarian is always detectable from verb movement up to Foc^0. The postverbal position of the aspectual verb particle *meg* in (29) shows that the verb has been raised, since in their declarative counterparts without any contrastive focus the same particle precedes the verb, as illustrated in (32) (cf. (29)). That wh-phrases move to SpecFocP in Hungarian is evident from the fact that they are in complementary distribution with the contrastive focus constituent in the same clause. Hungarian is thus different from English and German on the one hand, which have wh-movement to SpecCP, and from Korean on the other hand, which is a wh-in-situ language. Nonetheless, the wh-intervention effect is parallel.

(32) Mindig   meghívtam   Pétert.
      always   *PV-invited-1sg*   *Péter-Acc*
      'I always invited Péter.'

2.4.2 AltQ intervention effects in Hungarian

As we have by now come to expect, the same expressions that cause an intervention effect in Hungarian wh-questions also cause one in AltQs (as before, the judgement refers to the AltQ reading). The position of the verb and the disjunctive phrase in (33) tells us that the disjunctive phrase, just the wh-phrase in (29), moved to SpecFocP. Both disjuncts have to be stressed, just as in English (something we don't generally represent, for simplicity). The AltQ data show the same word order/structure effects as the wh-questions.

(33) a. ?* Mindig   Pétert   vagy   Marit   hívtad   meg?
            always   *Péter-Acc*   *or*   *Mari-Acc*   *invited-2sg*   *PV*

	b.	Pétert	vagy	Marit	hívtad	meg	mindig?
		Péter-Acc	*or*	*Mari-Acc*	*invited-2sg*	*PV*	*always*

'Did you always invite Péter or Mari?'

(34) a. ?*

		Mindenki	kávét	vagy	teát	ivott?
		everyone	*coffee*	*or*	*tea*	*drank*
	b.	Kávét	vagy	teát	ivott	mindenki?
		coffee	*or*	*tea*	*drank*	*everyone*

'Did everyone drink coffee or tea?'

(35) a. ?*

		Senki	nem	ivott	kávét	vagy	teát?
		nobody	*not*	*drank*	*coffee*	*or*	*tea*
	b.	Kávét	vagy	teát	nem	ivott	senki?
		coffee	*or*	*tea*	*not*	*drank*	*nobody*

'Did nobody drink coffee or tea?'

2.5 Summary of the facts and consequences for linguistic theory

We have seen that intervention effects in questions arise crosslinguistically, in languages that otherwise behave quite differently with respect to the syntax of wh-constructions. Intervention effects in AltQs show a homogeneous picture, in that the following generalization holds in all four languages we investigated.

(36) A focusing or quantificational element may not intervene between a disjunctive phrase and its licensing complementizer.
* [Q [...[Op[...[A or B]...]]...]]

We have seen evidence that the wh-intervention effect and the AltQ intervention effect should receive a parallel analysis: The same languages show both kinds of intervention effects. The class of problematic interveners is the same for both in a given language (remember the facts about 'often' in German vs. Korean). And finally, the syntactic conditions for the effect to arise seem parallel (cf. the German and Hungarian word order facts). An interesting exception to this is English, where wh-intervention effects are more limited than AltQ intervention effects.

We conclude that we need an analysis of intervention effects, and an analysis of alternative questions, that gives a basically parallel explanation for both types of intervention effect. Below (in Sect. 3 and 4) we propose to combine the available compositional analyses of AltQs (Romero & Han's (2003) analysis and von Stechow's (1991) proposal) with Beck's (2006) explanation of intervention effects. We will keep the English facts in mind for Sect. 5, where we compare the nature of wh-questions and AltQs.

3 Analysis of intervention effects in wh-questions

Beck (2006) develops a system of compositional interpretation for questions from which the intervention effect follows as uninterpretability. This section describes an

informal, technically simpler version of this system. The reader is referred to Beck (2006) for the complete theory.

3.1 The idea

Consider (37a)—a prototype of an intervention effect (we intend (37a) to be an abstract representation of the pattern of intervention effects, not an example sentence; you could instantiate it as Korean (rendered with English words)). We assume that we are concerned with a structure like (37b), in which the interrogative complementizer is filled with a question operator Q. The wh-phrase wants to associate with Q. Furthermore, the structure contains a focused phrase and an operator ('only' in the example) that associates with focus. The strategy pursued in Beck (2006) is to derive the ungrammaticality of such structures from the interpretation component of the grammar. In order to do this, one must specify how questions on the one hand and association with focus on the other hand are interpreted compositionally. The basic idea will be that wh-phrases and focus make use of the same interpretational mechanism, and because of that, focus interferes with a wh-phrase in situ.

(37) a. * Only John invited who?
     b. * [Q ... [Op [$_\phi$ ... XP$_F$ ... wh ...]]]

Let us first make plausible the idea that wh-phrases and focus are interpreted in an analogous way. Example (38) with focus on *John* has the ordinary denotation in (39)—it expresses the proposition that John left (given informally in (39b) and more precisely in (39a)). Besides its ordinary meaning, (38) contributes the focus semantic denotation in (40)—a set of alternative propositions that vary in the place of the focused element (Rooth, 1985, 1992). An example set is given in (40a), a more general formulation in (40b) (informally) and in (40c) (more precisely).

(38) [John]$_F$ left.

(39) a. λw.John left in w
     b. that John left

(40) a. {that John left, that Bill left, that Amelie left, ...}
     b. {that x left | x ∈ D}
     c. {p: p = λw.x left in w | x ∈ D}

Now compare the question in (41), which differs minimally from the focus example in that the wh-phrase takes the place of the focused item. The standard theory of question semantics (Hamblin, 1973; Karttunen, 1977) associates the question with the denotation in (42): the set of possible answers to the question. A sample set is given in (42a), more general versions in (42b) and (42c).

(41) Who left?

(42) a. {that John left, that Bill left, that Amelie left,...}
     b. {that x left | x ∈ D}
     c. {p: p = λw.x left in w | x ∈ D}

Obviously, the focus semantic contribution of (38) is identical to the ordinary meaning of (41). The wh-phrase, like the focused element, triggers the introduction of alternatives—in that respect, their semantic roles are the same. In contrast to the focused item, the wh-phrase makes no other semantic contribution. It has nothing corresponding to the ordinary semantics of the focused element. The suggestion will be that both wh-phrases and focus make use of the semantic mechanism that introduces alternatives. Evaluation of focus will clash with a wh-phrase because the wh-phrase has no ordinary semantics.

3.2 The system (informal version)

In order to discuss what happens in the compositional interpretation of an intervention effect structure, we need to provide a system of compositional interpretation for association with focus on the one hand and questions on the other hand. We begin with focus. An example is (43a), which will be associated with the structure in (43b).

(43) a. Only John left.
     b. [only [$_\phi$ John$_F$ left]]

The contribution of the focused NP is as specified in (44); $[\![\alpha]\!]^o$ is the ordinary semantic value of α and $[\![\alpha]\!]^f$ is the focus semantic value of α (cf. Rooth, 1985, 1992). In the example, that is a set of alternative individuals. Compositional interpretation integrates both into the larger structure, yielding (45) for the category labelled ϕ in (43).

(44) a. $[\![John_F]\!]^o = John$
     b. $[\![John_F]\!]^f = D = \{John, Bill, Amelie,...\}$

(45) a. $[\![\phi]\!]^o = \lambda w.$ John left in w
     b. $[\![\phi]\!]^f = \{p: p = \lambda w.x$ left in w $|x \in D\} = \{$that John left, that Bill left, that Amelie left,...$\}$

The semantics of *only* makes use of both of these semantic objects, in the way indicated in (46). *Only* says that out of all the alternative propositions introduced by its sister, the single true one is the one corresponding to the ordinary semantic value of the sister ((46a)). Moreover, the focus alternatives have thereby fulfilled their purpose, and the focus semantic value of the whole structure is reduced to a singleton containing the ordinary semantics ((46b)). Applied to our example, we derive the semantics in (47)—the intuitively appropriate truth conditions of the sentence.

(46) a. $[\![$ only $\phi]\!]^o = \lambda w.$ for all p such that $p(w) = 1$ & $p \in [\![\phi]\!]^f : p = [\![\phi]\!]^o$
     b. $[\![$only $\phi]\!]^f = \{[\![$ only $\phi]\!]^o\}$

(47) $[\![$ [only [$_\phi$ John$_F$ left]] $]\!]^o$
     $= [\lambda w.$ for all p such that $p(w) = 1$ & $p \in \{p':p' = [\lambda w.x$ left in w$]|x \in D\}$:
       $p = [\lambda w.$John left in w$]]$
     $= [\lambda w.$ for all x such that x left in w: $x = John]$

We turn to the interrogative next; its structure is given in (48b) with the Q operator in the position of the interrogative complementizer.

(48) a. Who left?
     b. [Q [$_\phi$ who left]]

The crucial step is (49). We assume that while a wh-phrase has a well-defined focus semantic value as in (49b), it makes no ordinary semantic contribution. Hence its ordinary semantic value is undefined ((49a)). Both interpretive properties project to the larger structure that contains the wh-phrase. The category labelled ϕ in (48b) has a part that does not have a well-defined ordinary semantics, hence its ordinary semantic value is also undefined. Its focus semantic value is the set of alternatives given in (50b).

(49) a. $[\![$who$]\!]^o$ is undefined
     b. $[\![$who$]\!]^f = D$

(50) a. $[\![\phi\,]\!]^o$ is undefined
     b. $[\![\phi\,]\!]^f = \{$p: p$= \lambda$w.x left in w $|$x$\in$D$\}$

That set of alternatives is already the semantic object we want to be the ordinary semantics of the question. It is the task of the question operator Q to lift the focus semantic value of its sister to the level of the ordinary semantics. This gives us the desired semantics for the example.

(51) a. $[\![$ Q ϕ $]\!]^o = [\![\phi\,]\!]^f$
     b. $[\![$ Q ϕ $]\!]^f = \{[\![$ Q ϕ $]\!]^o\}$

(52) $[\![$ [Q [$_\phi$ who left]] $]\!]^o = [\![$ [$_\phi$ who left] $]\!]^f = \{$p: p$= \lambda$w.x left in w $|$x$\in$D$\}$

3.3 The intervention effect

Now we have all the ingredients required to look into intervention effects. Remember that we are concerned with (53a) and the structure in (53b).

(53) a. * Only John invited who?
     b. [Q [$_\varphi$ only [$_\phi$ John$_F$ invited who]]]

Given the system just developed, compositional interpretation is predicted to go through the steps in (54). The category labelled ϕ contains an element whose ordinary interpretation is undefined, hence the whole structure does not have an ordinary interpretation either. Similarly, the category labelled φ cannot have a well-defined ordinary semantics. But the definition of the semantics of 'only' then causes it to have an undefined focus semantic value as well. The focus semantic value of φ would be the input to the question operator; since it is not defined, the whole structure does not have an interpretation.

(54) $[\![\phi]\!]^o$ is undefined.
     $[\![\varphi]\!]^o$ is undefined, hence $[\![\varphi]\!]^f$ is undefined.
     $[\![(53)]\!]^o$ is undefined.

We assume that a structure that cannot be assigned an interpretation is not grammatical:

(55)   Interpretability: An LF must have an ordinary semantic value.

Hence, intervention effect data are predicted to be ungrammatical due to being uninterpretable. The general reasoning is this: The evaluation of focus interferes with the interpretation of wh-phrases, because wh-phrases, like focus, introduce alternatives. Unlike focus, wh-phrases make no ordinary semantic contribution. A structure containing a wh-phrase must be rescued from uninterpretability by a c-commanding Q-operator, which lifts alternative semantic values to ordinary semantics. An intervening focus sensitive operator interferes, because it uses both the ordinary and the focus semantic interpretation of its sister. It then neutralizes the focus semantic value to the ordinary semantics. Since the wh-phrase has no ordinary semantics, both the ordinary semantic value and the focus semantic value will be undefined, and not even the Q operator can save the structure. We make the general prediction in (56). Obviously, this is essentially a reformulation of Kim's (2002) empirical generalization we refer to above. Note that there is no constraint that is stipulated in order to derive the intervention effect in this system; the effect is predicted from the way the interpretation component is designed.

(56)   A wh-phrase may not have a focus sensitive operator as its closest
        c-commanding operator.
        *[Q[...[Op[$_\phi$ ... wh ...]] ...]]

We need to briefly comment on the role of overt movement. When the position in which a wh-phrase is interpreted is above the focus sensitive operator, no problem arises for interpretation. This is illustrated with the Korean example (17c) from Sect. 2, here repeated as (57a). As we have seen, overt movement (here, scrambling) of the wh-phrase across the problematic intervener circumvents the intervention effect. This is predicted by the semantic system developed here. The trace left by the wh-phrase is an ordinary variable. As such, it does not interfere with the formation and evaluation of alternative sets. The crucial category ϕ has well-defined ordinary and focus semantic values, which happen to contain a variable. Above the intervener, the variable will be bound and alternatives will be introduced by the wh-phrase.

(57) a.   Nwukwu-lul$_i$ Mina-man t$_i$ chotayha-ess-ni?
           who-Acc   Mina-only   invite-Past-Q
           'Who did only Mina invite?'
     b.   [Q [nwukwu-lul$_i$ [$_\phi$ Mina-man t$_i$ chotayha-ess-ni]]]
           $[\![\phi]\!]^o$ = that only Mina invited x; $[\![\phi]\!]^f$ = {that only Mina invited x}

3.4 The ~ operator

There is a small complication we have to mention regarding association with focus. Standardly, it is not assumed that 'only' directly accesses ordinary and focus semantic values, as we have described it above. The standard structure for

association with focus is not (58a), but (58b), where the ~ operator from Rooth (1992) mediates between 'only' and the focus.

(58) a. [only [John$_F$ left]]
    b. [only$_C$ [~C [John$_F$ left]]]

Rooth's theory is that the ~ operator evaluates all foci. That is, whenever the contribution of focus is used in the semantics, the ~ is involved. There are just two focus evaluating operators in our framework then: Q and ~. Accordingly, the structure for our prototypical intervention effect is (59b), where there is also an intermediate layer with the ~ operator.

(59) a. * Only John invited who?
    b. [Q [only$_C$ [~C [John$_F$ invited who]]]]

We will not discuss in detail the role and contribution of the ~ operator. For our purposes, it is sufficient to look at the formal properties of the definition of its semantics, given below.

(60) a. $[\![\sim\!C\ \phi\ ]\!]^\circ = [\![\phi\ ]\!]^\circ$ if $[\![C]\!]^\circ \subseteq [\![\phi\ ]\!]^f$, undefined otherwise.   (Rooth, 1992)
    b. $[\![\sim\!C\ \phi\ ]\!]^f = \{[\![\sim\!C\ \phi\ ]\!]^\circ \}$

The ~ shares the properties of the lexical entry for 'only' in (46) above that trigger the intervention effect: it uses both the ordinary and the focus semantic value of its sister, and it resets the focus semantic value of the whole structure to a singleton containing the ordinary semantic value. Those properties created the undefinedness problem for (53b) above, and will do the same in (59b).

The ~ operator, recall, is the operator that always evaluates focus. We can thus rephrase our general prediction as stated in (61). Regarding the class of problematic interveners, we follow Beck (2006) in assuming that quantifiers as well as focus sensitive operators can be accompanied by a ~. This means empirically that they can give rise to an evaluation of focus in their scope — a prediction that has been examined at length in the discussion of focus-affected interpretations of quantifiers (compare Herburger, 1993; Krifka, 1990; Rooth, 1996; among many others). Crosslinguistically, the prediction amounts to clause (61b) below; the reader is once more referred to Beck (2006) for extensive discussion.

(61) a. A wh-phrase may not have the ~ operator as its closest c-commanding operator.
       *[Q[...[~C [$_\phi$ ... wh ...]] ...]]
    b. Problematic Interveners in a given language are the expressions that are accompanied by a ~ operator.

This is the analysis of intervention effects in wh-questions that we will adopt in this paper. We should note that while the simplified version introduced here suffices for everything we will be concerned with, it would have some unwelcome consequences

for the larger picture.[1,2] The real proposal in Beck (2006) is technically different for that reason, and the reader is once more referred to that paper for the full story.

3.5 The general view of intervention effects

In principle, we expect that the ~ operator acts as an intervener whenever an alternative semantics is used. This is because the properties of the ~ that cause the intervention effect in wh-constructions - unselectivity and resetting of focus semantic value — should create a similar minimality effect in other focus related constructions.

(62) *General Minimality Effect MIN:*
      The evaluation of alternatives introduced by an XP cannot skip an intervening ~ operator.

      $$*[Op_1[...[\sim C[_\phi \ ... \ XP_1 \ ...]] \ ... \ ]]$$

When XP$_1$ is not a wh-phrase, this effect would not necessarily be observed as uninterpretability, that is, ungrammaticality. Rather, it would consist in the absence of a certain interpretation, namely the one where the alternatives introduced by XP$_1$ are evaluated by Op$_1$. Beck (2006) suggests that instances of MIN surface in the interpretation of multiple focus and negative polarity. We will suggest that disjunctions give rise to further instances of MIN.

4 Compositional interpretation of alternative questions and the intervention effect

It will be our goal to derive the intervention effect in AltQs in a parallel manner to the intervention effect in wh-questions. We consider two compositional analyses

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[1] The main difficulty is evaluation of a focus contained in an interrogative sentence by an operator outside the interrogative, as in (i). This type of example led Beck (2006) to propose a selective version of the Q operator, implemented via variable binding.

(i) I only wonder who SALLY invited.
     = there is no individual x, x≠Sally, such that I wonder who x invited.

[2] An anonymous reviewer points out to us that an interesting application of the theory might be data in which the focus of a focus sensitive element is a wh-phrase, such as (the relevant readings of) (i) and (ii). However, there is enough variation between languages, speakers and focussing particles in this area that we will refrain from an investigation on the present occasion. See Sauerland and Heck (2003) for some discussion of 'exactly'.

(i) a. *Only who did you meet?
     b. *Who did you only meet?

(ii) a. ?? | Wen | hast | Du | nur | getroffen? | [German] |
        |-------|------|------|---------|------------|----------|
        | *who* | *have* | *you* | *only* | *met* | |

     b. ?? | Genau | wen | hast | Du | getroffen? |
        |-----------|-------|--------|-------|------------|
        | *exactly* | *who* | *have* | *you* | *met* |

     c. | Wen | hast | Du | genau | getroffen? |
        |-------|--------|-------|-----------|------------|
        | *who* | *have* | *you* | *exactly* | *met* |

proposed for AltQs: the one developed in Romero and Han (2003) and the one suggested in von Stechow (1991). Both straightforwardly permit the extension of the above analysis of intervention to AltQs. According to our knowledge, there is no other competing theory of the compositional interpretation of AltQs. We discuss the two analyses in turn.

4.1 Deriving the effect in the framework of Romero and Han (2003)

4.1.1 The analysis of alternative questions

Our goal is to associate the interrogative in (63a) with the semantic object in (63b).

(63) a. Did Pfrondorf win or lose?
      b. {that Pfrondorf won, that Pfrondorf lost}

Romero and Han (2003) propose that this interpretation is derived from the structure in (63'), where an invisible wh-element has been adjoined to the disjunctive phrase (note that we have adapted Romero and Han's theory somewhat to our framework; but their essential ideas regarding compositional interpretation are translated intact).

(63') $[_{CP}$ Q $[_{\phi}$ Pfrondorf [wh $[_{DisjP}$ win or lose]]]]

Romero and Han assume that the contribution of the disjunctive phrase is as in (64); the same is suggested in von Stechow (1991). They further suggest that the hidden wh-element has the semantics of a choice function; in our framework, this suggestion amounts to (65).

(64) $[_{DisjP}$ win or lose] $\rightarrow$ {$[\![$win$]\!]$, $[\![$lose$]\!]$}
$$= \{[\lambda w.\ \lambda x.x \text{ win in } w],\ [\lambda w.\ \lambda x.x \text{ lose in } w]\}$$

(65) a. $[\![$wh $[_{DisjP}$ win or lose] $]\!]^{o}$ is undefined
      b. $[\![$wh $[_{DisjP}$ win or lose] $]\!]^{f} = \{f\{[\![$win$]\!]$, $[\![$lose$]\!]\} \mid CH(f)\}$
      c. $f \ll \tau,t>,\tau>$ is a choice function, $CH(f)$, iff for all P in $dom(f)$: $P(f(P))$

The larger structures that contain this disjunctive wh-phrase are interpreted in the now familiar way as indicated in (66). (67) is the final step in which the question operator lifts the focus semantic value of its sister ϕ to the level of the ordinary semantics. This yields the desired interpretation for the example.

(66) $[\![\phi\ ]\!]^{o}$ is undefined
      $[\![\phi\ ]\!]^{f} = \{p{:}p = \lambda w.\text{Pfrondorf has the property selected by } f$
      from {$[\![$win$]\!]$, $[\![$lose$]\!]\}$ in $w \mid CH(f)\}$

(67) $[\![(63a)\ ]\!]^{o} = \{p{:}p = \lambda w.\text{Pfrondorf has the property selected by } f$
      from {$[\![$win$]\!]$, $[\![$lose$]\!]\}$ in $w \mid CH(f)\}$
      $= \{p{:}p = \lambda w.\text{Pfrondorf won or } p = \lambda w.\ \text{Pfrondorf lost}\}$
      $= \{\text{that Pfrondorf won, that Pfrondorf lost}\}$

There is one further aspect of Romero and Han's analysis of AltQs that is relevant for the explanation of the intervention effect, and that is the question of what exactly the disjunction is. We have already seen that the disjunction in AltQs can take various shapes. (68) is an example where two sentential categories are coordinated—let's say IPs.

(68) a. Did the program execute or the computer crash?
b. {that the program executed, that the computer crashed}
c. [Q [$_\phi$ wh [$_{DisjP}$ [the program execute] or [the computer crash]]]]

Nothing much changes for the semantics, except that the choice function now applies to a set of propositions.

(69) a. ⟦wh [$_{DisjP}$ the program execute or the computer crash] ⟧^{o} is undefined
b. ⟦wh [$_{DisjP}$ the program execute or the computer crash] ⟧^{f} =
{f{⟦the program execute⟧, ⟦the computer crash⟧} | CH(f)}

(70) ⟦(68a) ⟧^{o} = ⟦ϕ ⟧^{f} =
{p:p is the proposition selected by f from {⟦the program execute⟧,
⟦the computer crash⟧} | CH(f)}
= {that the program executed, that the computer crashed}

Here is one of our standard examples for AltQs:

(71) a. Did John drink tea or coffee?
b. {that John drank tea, that John drank coffee}

In this case, we have a choice between several structures that differ in terms of the size of the disjuncts. All three of (72a–c) would be possible semantically.

(72) a. [Q [$_\phi$ John drink [wh [$_{DisjP}$ tea or coffee]]]]
b. [Q [$_\phi$ John [wh [$_{DisjP}$ [drink tea] or [~~drink~~ coffee]]]]]
c. [Q [$_\phi$ wh [$_{DisjP}$ [John drink tea] or [~~John drink~~ coffee]]]]

Romero and Han (2003) argue that the disjuncts are relatively large, on the basis of focus effects in AltQs. They derive the intonation pattern of AltQs from the assumption that they involve ellipsis. See Romero and Han (2003) and also Han and Romero (2004a, b) for details and arguments. According to them, then, our example could involve the structures in (72b) or (72c), but not the one in (72a). The analysis of (72c) could proceed as in (73). This point will become relevant below.

(73) a. [Q [$_\phi$ wh [$_{DisjP}$ [John drink tea] or [~~John drink~~ coffee]]]]
b. ⟦wh [$_{DisjP}$ John drink tea or John drink coffee] ⟧^{f} =
{f{⟦John drank tea⟧, ⟦John drank coffee⟧} | CH(f)}
c. {p:p is the prop. selected by f from {⟦J. drank tea⟧, ⟦J. drank coffee⟧}
| CH(f)}
= {that John drank tea, that John drank coffee}

4.1.2 Explaining the intervention effect in alternative questions

The sentence in (74a) below is an English example of the intervention effect in AltQs. A plausible structure for the example, according to Romero and Han's theory, would be (74b).

(74) a. ?* Did only Mary introduce Sue to Bill or (to) Tom?
      b. $[Q[_\varphi$ only$_C$ [~C$[_{IP}$ Mary
          [wh $[_{DisjP}$ [intro. Sue to Bill] or [~~intro. Sue~~ to Tom]]]]]]]]

This structure is predicted to be uninterpretable, hence ungrammatical, through the same reasoning that applied to the wh-cases:

(75) $\llbracket$wh$\rrbracket^o$ undefined ==> $\llbracket$IP$\rrbracket^o$ is undefined
          $\llbracket$IP$\rrbracket^f = \{f\{\llbracket$intro. S. to Bill$\rrbracket, \llbracket$intro. S. to Tom$\rrbracket\}(M.) \mid CH(f)\}$
      $\llbracket$ [~C IP] $\rrbracket^o$ is undefined   ==> $\llbracket$ [~C IP] $\rrbracket^f$ is undefined
                                            ==> $\llbracket\varphi\rrbracket^o$ is undefined, $\llbracket\varphi\rrbracket^f$ is undefined
                                            ==> $\llbracket$ (74) $\rrbracket^o$ is undefined.

Another example is the preposed negation case; structure and steps of compositional interpretation are illustrated below.

(76) a. ?* Didn't Sue read 'Pluralities' or 'Barriers'?
      b. $[Q [_\varphi$ NOT [~C $[_\phi$ wh $[_{DisjP}$ [Sue read 'Pluralities'] or [~~Sue read~~ 'Barriers']]]]]]

(77) $\llbracket$wh$\rrbracket^o$ is undefined   ==> $\llbracket\phi\rrbracket^o$ is undefined
                                    ==> $\llbracket\varphi\rrbracket^o$ is undefined and $\llbracket\varphi\rrbracket^f$ is undefined
                                    ==> $\llbracket$ (76) $\rrbracket^o$ is undefined.

The general prediction that we make is:

(78) [wh DisjP] may not have the ~ operator as its closest c-commanding operator.
      * $[Q ... [$~C $[_\phi ... [$wh $[_{DisjP}$ A or B]]...]]]$

Thus the explanation of the intervention effect in AltQs reduces to our explanation for the intervention effect in wh-questions, simply because AltQs are analysed as a special type of wh-question. The combination of Romero and Han's (2003) theory with Beck's (2006) analysis of intervention makes the desired predictions.

4.2 Deriving the effect in the framework of von Stechow (1991)

We need to take another look at our example from above. We associated (68a) with the structure in (68c), in which a wh-element adjoined to DisjP.

(68) a. Did the program execute or the computer crash?
      b. {that the program executed, that the computer crashed}
      c. $[Q [_\phi$ wh $[_{DisjP}$ [the program execute] or [the computer crash]]]]$

Let's reconsider the wh disjunctive phrase. In our general framework for the compositional interpretation of wh-questions, we need to assume (79). The wh choice function is active at the level of focus semantic values.

(79) a. $[\![$ wh $[_{DisjP}$ the program execute or the computer crash$]$ $]\!]^o$ is undefined
 b. $[\![$ wh $[_{DisjP}$ the program execute or the computer crash$]$ $]\!]^f$
   $= \{f\{[\![DisjP]\!]^f\} \mid CH(f)\}$
   $= \{\lambda w.$ the program executed in w, $\lambda w.$ the computer crashed in w$\}$

This implies that the disjunctive phrase itself makes the semantic contributions in (80). But then, the reader will notice that the disjunctive phrase itself already has the focus semantic value that we need in order to derive the desired meaning for the question. In a translation into our framework for the interpretation of questions, the wh-element from Romero and Han (2003) thus becomes superfluous. We might as well assume the structure in (81) without such a wh-element.

(80) a. $[\![DisjP]\!]^o = [\lambda w.$ the program executed in w or the computer crashed in w$]$
 b. $[\![DisjP]\!]^f = \{\lambda w.$ the program executed in w, $\lambda w.$ the computer crashed in w$\}$

(81) $[Q$ $[_{DisjP}$ [the program executed] or [the computer crashed]$]]]$

This is in fact the analysis of AltQs proposed in von Stechow (1991). The ordinary semantic contribution of a disjunction is the classical analysis of *or*, and the focus semantic constribution is the formation of an alternative set containing the two ordinary meanings of the disjuncts, which is used by the question operator to derive the meaning of the question.

4.2.1 Explaining the intervention effect without the wh-element

Our next question has to be: how would we account for the intervention effect in AltQs if there is no wh-element? The new structure for (82a) is (82b), without the wh-element. Compositional interpretation goes through the steps in (83).

(82) a. ?* Did only Mary introduce Sue to Bill or (to) Tom?
 b. $[Q[_\varphi$ only$_C$ $[\sim C[_{IP}$ Mary$_F$ $[_{DisjP}$ [intro. Sue to Bill] or [~~intro. Sue~~ to Tom]$]]]]]$

(83) a. $[\![DisjP]\!]^o = [\lambda x. \lambda w.$ x intro. Sue to Bill in w or x intro. Sue to Tom in w$]$
   $[\![DisjP]\!]^f = \{\lambda x. \lambda w.$ x intro. Sue to Bill in w, $\lambda x. \lambda w.$ x intro. Sue to Tom in w$\}$
 b. $[\![IP]\!]^o = [\lambda w.$ M intro. Sue to Bill in w or M intro. Sue to Tom in w$]$
   $[\![IP]\!]^f = \{\lambda w.$ M intro. Sue to Bill in w, $\lambda w.$ M intro. Sue to Tom in w, $\lambda w.$ N intro. Sue to Bill in w, $\lambda w.$ N intro. Sue to Tom in w,...$\}$
 c. $[\![\sim C\ IP\ ]\!]^o = [\![IP]\!]^o$ (if $g(C) = [\![IP]\!]^f$)
   $[\![\sim C\ IP]\!]^f = \{\ [\![IP]\!]^o\ \}$
 d. $[\![\varphi]\!]^o = \lambda w.$ the single true proposition in $[\![IP]\!]^f$ is $[\![IP]\!]^o$
   $[\![\varphi]\!]^f = \{[\![\varphi]\!]^o\}$
 e. $[\![$ (82) $]\!]^o = \{[\![\varphi]\!]^o\}$ ==> this is not a question meaning!

The IP now has a perfectly well-defined ordinary semantic interpretation. The ~ operator will inherit that (if the focus anaphor C has the appropriate value: the focus semantic value of IP). But it will also reset the focus semantic value of the structure with the ~ to the singleton containing the ordinary semantics of IP. At the level of the category φ we still have a singleton set as the focus semantic value. This is raised by the Q operator to the ordinary semantic value of the question.

We suggest that a singleton set is not appropriate as a question meaning in the Hamblin/Karttunen framework. A question denotes a set of alternatives, and a singleton is not an appropriate set of alternatives in the case of a question any more than in the case of focus (cf. Rooth, 1992). We think that this constraint might be derived from the pragmatics of matrix questions and the semantics of question embedding verbs. But it is also possible to hard-wire it into the semantics of the Q operator, as in (84).

(84) $[\![Q \phi]\!]^o$ is only defined if $[\![\phi]\!]^f$ has two or more members. If defined:
 a. $[\![Q \phi]\!]^o = [\![\phi]\!]^f$
 b. $[\![Q \phi]\!]^f = \{[\![Q \phi]\!]^o\}$

On this view of the compositional semantics of AltQs, the intervention effect follows because the Q operator has no alternatives left to evaluate. AltQs would no longer be an instance of the wh-intervention effect, but they would be an instance of the general minimality effect MIN for focus evaluation (62), repeated below.

(85) [DisjP] may not have the ~ operator as its closest c-commanding operator.
 * [Q[...[~C [$_\phi$ ... [$_{DisjP}$ A or B] ...]] ...]]
 previously: because of uninterpretability
 now: because the ~ robs the Q operator of alternatives, and a non-question results.

(62) *General Minimality Effect MIN:*
 The evaluation of alternatives introduced by an XP cannot skip an intervening ~ operator.
 *[Op$_1$[...[~C[$_\phi$ ... XP$_1$ ...]] ...]]

We conclude that the AltQ intervention effects follows from Beck's (2006) analysis of intervention under both proposals for the interpretation of AltQs. The next section discusses the issue of whether AltQs should be seen as having a wh-element in them or not. In Sect. 6, we come back to the focus semantic values of disjunctions and investigate the general plausibility of the assumption in (80), which both versions of the analysis of AltQs need to make.

5 Are AltQs wh-questions?

Even though both an analysis of AltQs as containing a wh-element and an analysis whithout one are in principle compatible with our goal of deriving the intervention effect, it would be interesting to decide between the two. The decision would affect our view of the role of the disjunction in alternative questions, as well as our understanding of the intervention effect in questions. Regarding the first issue, observe that on von Stechow's (1991) proposal, the disjunctive phrase acts in itself exactly like a wh-phrase without being one. This ought to affect our understanding of

disjunction in general. Regarding the second issue, we note that under von Stechow's semantic analysis the intervention effect in AltQs would point towards a rather more general nature of intervention effects (independent of wh-elements). This section is devoted to potential arguments for analyzing AltQs as a special kind of wh-question. Our perspective is that since the analysis without the wh-element is simpler, the burden of proof is on the wh-analysis.

5.1 Is the disjunctive phrase a wh-phrase?

We discuss three potential arguments for the wh-status of the disjunctive phrase: selection, multiple questions, and scope marking.

5.1.1 Selection

This consideration was brought to our attention by Regine Eckardt (p.c.). There are question embedding verbs like *surprise* that can take a wh-question as their complement, but not a Y/NQ.

(86) a.   I was surprised who attended.
      b.   *I was surprised whether Bill attended.

If AltQs were wh-questions, they should be acceptable as complements to such verbs, but they are not:

(87) a.   *I was surprised whether Bill or George attended.
      b.   I was surprised which of Bill and George/which of the two attended.

Selection thus provides an argument against the assumption that AltQs are a special kind of wh-question.

5.1.2 Scope marking

Several languages including German offer the possibility of constructing a long-distance wh-dependency with the help of a so-called scope marking construction (compare Lutz, Müller, & von Stechow, 2000). An element in the matrix indicates the scope of the question, while an embedded clause contains the interrogative element. In German, the embedded clause must contain a wh-phrase and cannot contain an element indicating a Y/NQ:

(88) a. Was   glaubt   Ede,   welchen   Kurs   Doris   unterrichtet   hat?
          what   *believes* *Ede*   *which*   *course* *Doris* *taught*   *has*
          'Which course does Ede believe Doris taught?'
      b. *Was   glaubt   Ede,   ob   Doris   Syntax   unterrichtet   hat?
          what   *believes* *Ede*   *whether* *Doris* *syntax* *taught*   *has*
          'Does Ede believe that Doris taught syntax?'

If AltQs are wh-questions, they should occur in the German scope marking construction; if they are not wh-questions, it seems more probable that they should not. Unfortunately the evidence is a bit unclear. Some examples appear to be fairly good, while others are degraded.

(89) a. ? Was   glaubt   Ede, ob   Doris Syntax oder Semantik
         what   *believes* *Ede* *whether* *Doris* *syntax or semantics*
         unterrichtet hat?
         taught   *has*
         'Which of syntax and semantics does Ede believe Doris taught?'
     b. Was   glaubst Du, ob   Pfrondorf gewonnen oder
         what   *believe you whether* *Pfrondorf*   *won   or*
         verloren hat?
         lost   *has*
         'Do you believe that Pfrondorf won or that Pfrondorf lost?'

The data are not as unequivocally acceptable as one would expect under a wh-phrase analysis of the disjunctive phrase, so it seems fair to say that no clear argument in favour of the wh-status of AltQs can be gleaned from scope marking.

5.1.3 Multiple AltQs

A final consideration concerns the fact that wh-phrases occur in multiple questions. Hence if the disjunctive phrase were a wh-phrase, there should be (i) multiple AltQs containing two disjunctive phrases, and (ii) mixed multiple questions containing a wh-phrase and a disjunctive phrase.[3]

(90) a. Who taught what?
     b. Did Fritz or Doris teach syntax or semantics?
     c. Who taught syntax or semantics?

It is clear that sentences of the required form are acceptable, but less clear that they have the relevant interpretation. In order to simplify the empirical considerations, we will embed our prospective multiple questions under the predicates *list* and *compare*. These predicates embed (roughly) questions with multiple singular wh-phrases but not questions with a single singular wh-phrase (see Schwarz, 1993 for a more detailed description). They also do not embed simple AltQs.

(91) a. * Arnim listed which linguist taught syntax last year.
     b.   Arnim listed which linguist taught which class last year.
     c. * Arnim listed whether Fritz or Doris taught syntax last year.

(92) a. * Arnim compared which linguist taught syntax last year.
     b.   Arnim compared which linguist taught which class last year.
     c. * Arnim compared whether Fritz or Doris taught syntax last year.

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[3] Regarding the first possibility, Bartels (1999, p. 112) suggests that this is not possible for data like (i). As for the second option, Gullì (2003, p. 204 fn. 173) seems to consider (ii) a possible instance. Neither author offers extensive discussion.

(i) #   DO I turn RIGHT or LEFT here?
        = Do I or don't I turn right or left here?

(ii)   I don't give a damn where he's gone or where he hasn't gone,...

If the disjunctive phrase functioned like a wh-phrase, embedding of our prospective multiple questions should be acceptable. Once more, however, the data have a questionable status (with some variation between speakers).

(93) a. ?(?) Arnim listed which linguist taught syntax or semantics last year.
      b. ?(?) Arnim listed whether Fritz or Doris taught syntax or semantics last year.

(94) a. ?(?) Arnim compared which linguist taught syntax or semantics last year.
      b. ?(?) Arnim compared whether Fritz or Doris taught syntax or semantics last year.

Certainly, such examples are not as clearly acceptable as a wh-phrase analysis of the disjunctive phrase would lead us to expect. We conclude that our considerations in this subsection have failed to produce convincing evidence in favour of a wh-phrase analysis of disjunctive phrases.

5.2 Movement in alternative questions?

This subsection raises the question of whether there is wh-movement in AltQs. If we found characteristics of wh-movement in AltQs (as argued by Larson, 1985), that would constitute evidence for the presence of a wh-element. Specifically, we raise the questions in (96), supposing the prospective structure in (95).

(95) [wh [$_{DisjP}$ A or B]]

(96) a. Does the wh-part of (95) move overtly?
      b. Does (95) undergo covert phrasal movement?
      c. Is there feature movement of a wh-feature in AltQs?

The prospective landing site would be in each case the vicinity of the interrogative complementizer. Some further explanation: a positive answer to (96a) leads basically to Larson's (1985) theory, in which *whether* or a phonologically empty element playing the same role as *whether* moves to SpecCP. We will reexamine his evidence. (96b,c) instead pursue the idea that there is covert movement in AltQs. Following Pesetsky (2000), we discuss two different kinds of covert movement: covert 'phrasal' movement is phonologically invisible movement of a syntactic constituent that has semantic effects, and feature movement is movement of just a syntactic feature with no interface effects (phonological or semantic). For the option of covert phrasal movement (96b), we discuss the possibility that the entire phrase in (95) moves, because this possibility has observable semantic effects while moving just the wh-element would not, and would thus be indistinguishable from feature movement. Thus we think that the three possibilities raised in (96) are the conceptually interesting alternatives regarding movement in AltQs. Our answer to all three of these questions will be negative. Note that neither version of the analysis presented in Sect. 4 assumes movement of any kind. We will maintain and support this aspect of our analysis. The issue is important for the theory of intervention: there are movement-based accounts of intervention effects, for which the behaviour of AltQs will be shown to be problematic.

5.2.1 No overt movement

Larson (1985), and following him Han and Romero (2004b), suggests that there are movement constraints visible in the syntax of English AltQs. Some of his examples are given below. (97a) is ambiguous between (98a) and (98b), while (97b) with the Complex NP island only permits the Y/N-question interpretation (98a). Thus it seems that availability of an AltQ analysis is sensitive to island constraints.

(97) a. the decision whether to believe that Bill resigned or retired (ambig.)
     b. the decision whether to believe the claim that Bill resigned or retired (unamb.)

(98) a. The decision is between believing that Bill resigned or retired or not believing that Bill resigned or retired.
     b. The decision is between believing that Bill resigned or believing that Bill retired.

Example (99) involves a wh-island. Larson reports that an interpretation as a Y/N-question is strongly preferred. Thus it looks as if some part of the disjunctive phrase has to move overtly to the position of the interrogative complementizer, thereby being responsible for island effects. For Larson, that element is *whether*. *Whether* originates at the left edge of the disjunction and moves to the interrogative complementizer position.

(99) I know whether Bill wonders who resigned or retired.

(100) a. {that Bill wonders who resigned or retired,
         that Bill doesn't wonder who resigned or retired} (preferred)
      b. {that Bill wonders who resigned, that Bill wonders who retired} (marginal?)

We have collected an additional set of relevant data that shed doubt on the idea that the constraint observed in (97b) and (99) is an island constraint. It is possible to find rather good examples of AltQs in which the interrogative complementizer and the disjunctive phrase are separated by an island. A German example in which the disjunctive phrase is inside an adjunct island is given in (101a). The sentence is acceptable as an AltQ. A comment on the judgement '?' which we assign to this sentence: (101a) is perhaps not the optimal way to express the intended question. One would probably prefer the versions in (102a) and (102b). In (102a), the entire adjunct clauses are disjoined, and (102b) is at least compatible with an ellipsis analysis in which the disjuncts are quite large. However, (101a) is still acceptable, and importantly, there is a very clear contrast between (101a) and (101b). (101b) is an instance of overt wh-movement out of the same adjunct clause. The contrast shows that (101a) should not involve overt movement of any part of the disjunctive phrase. The contrast in (101c) vs. (101d) shows the same—(101c) is actually impeccable, while (101d) is terrible.

(101) Adjunct Island:
      a. ? Freust   du   dich   (mehr), wenn du Anne oder
           be_pleased you Refl (more)   when you Anne or
           Lena siehst?
           Lena see
           'Are you more pleased when you see Anne or Lena?'

b. * Wen   freust   du dich (mehr), wenn du siehst?
   whom   be.pleased you Refl (more) when you see
   'Who are you more pleased when you see?'

c. Fährst du   nach   Griechenland, um   dort zu wandern
   go   you to   Greece   in order there to hike
   oder zu segeln?
   or   to sail
   'Are you going to Greece in order to hike or sail there?'

d. * Was fährst du nach Griechenland, um   dort zu tun?
   what go   you to   Greece   in order there to do
   'What are you going to Greece in order to do there?'

(102) a. Freust   du dich (mehr), wenn Du Anne siehst oder
    be_pleased you Refl (more) when you Anne see   or
    wenn du   Lena siehst?
    when you Lena see
    'Are you more pleased when you see Anne or when you see Lena?'

b. Freust   du   dich (mehr), wenn Du Anne siehst oder
   be_pleased you Refl (more) when you Anne see   or
   [_ Lena _]?
   Lena
   'Are you more pleased when you see Anne or when you see Lena?'

The English versions (103) seem parallel to our German examples and were judged well-formed.

(103)   a. Are you more pleased when you see Anne or Lena?
       b. Are you going to Greece in order to sail or hike there?

Similar pairs are constructed below with a relative clause island and a subject clause. The contrasts between the AltQ and overt movement are clear. We report the English data for simplicity.

(104) a.   Do you need a person who speaks Dutch or German?
       b. ? Are you looking for someone whose parents live on an
            island that is close to Australia or Africa?
       c. * What do you need a person who speaks?
       d. * Which country are you looking for someone
            whose parents live on an island that is close to?

(105) a.   Does it disturb you more that he lied to his mother or (to) his teacher?
       b. ?? Who does it disturb you more that he lied to?

We are not actually quite certain of the judgement for the wh-island below. The AltQ interpretation does not seem to be impossible, but merely dispreferred.

(106) Q: Do you want to know whether Anna or Lena is playing?
      A: Anna (= I want to know whether Anna is playing).

In sum, we have found several clear cases in which an AltQ interpretation is available despite an island separating the disjunctive phrase from the interrogative complementizer. Important in particular is the clear contrast between regular wh-movement and AltQs. We think that the contrast holds crosslinguistically; consider, for example, Korean (107). Overt movement (in this case, scrambling) out of a syntactic island is ungrammatical, but the AltQ interpretation was judged better by our informants.

(107) Relative Clause:
    a. ? Mira-ka   [Seoul-lo   animyen   Pusan-ulo   ka-nun]
         Mira-Nom   Seoul-to   if.not   Pusan-to   go-Rel
         kicha-lul   chacko   iss-ni?
         train-Acc   looking for   is-Q
        'Is Mira looking for a train which goes to Seoul or to Pusan?'
    b. * Seoul-lo$_i$ Mira-ka [t$_i$ ka-nun]   kicha-lul chacko   iss-ta.
         Seoul-to   Mira-Nom   go-Rel   train-Acc looking for is-Dec
        'To Seoul$_i$, Mary is looking for a train which goes t$_i$.'

We conclude that it would be problematic to assume that there is overt movement of any part of the disjunctive phrase in AltQs. This leaves us with the question of what goes wrong in the AltQs reported to be impossible by Larson (1985). We suggest that the complex NP example (97b) involves an intervener. Note that there is an important difference between our complex NP examples and Larson's, the determiner of the complex NP being an indefinite in our data but a definite article in Larson's. Guerzoni (to appear) argues that the definite article causes an intervention effect for elements in its restrictor. She investigates intervention effects in NPI licensing. A relevant datum would be the contrast between (108a) and (108b).

(108) a.   Nobody found a teacher who had any religious holiday absence forms.
    b. * Nobody found the teacher who had any religious holiday absence forms.

                                         (~Guerzoni)

Thus we think that (97b) shows an intervention effect like (108b) here, not an island effect. Note that our relative clause example becomes much worse as an AltQ when the indefinite is replaced with a definite description (thanks to Peter Sells for his empirical help with this subsection and in particular for example (110)).[4]

(109) Relative Clause:
    a.   Do you need a person who speaks Dutch or German?
    b. ?? Do you need the employee who speaks Dutch or German?

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[4] The same interfering factor shows up in Han and Romero's (2004b) evidence from Hindi for apparent island constraints in AltQs.

(110) NP Complement:
    a.   It all depends on whether we put out a story that Bill retired or resigned.
    b. * It all depends on whether the general public believes the claim that Bill retired or resigned.

There remains the wh-island case. We are not completely sure what to say about that, because the judgement is not so clear. The AltQ (106) seems fairly acceptable, and it is not clear from Larson's discussion whether he judges the AltQ interpretation to be really completely impossible, or just dispreferred. We leave this matter open (should a constraint ruling out AltQs out of questions turn out to be desirable, we would like to refer to Shimoyama (2001), who argues that there are minimality effects in questions that are not plausibly analysed as movement effects and instead reminiscent of intervention).

Thus we conclude that it would be problematic to posit that AltQs involve overt movement. The data brought forth to argue for this should receive a different analysis, perhaps as intervention effects. We suggest that no part of (wh) DisjP moves overtly.

5.2.2 No obligatory covert phrasal movement

Our next question is whether AltQs involve covert phrasal movement, where a syntactic constituent moves invisibly to affect interpretation. Constraints on covert movement are not generally assumed to be identical to the constraints on overt movement (for example, lack of Subjacency effect for covert wh-movement (Huang, 1982) and clause boundedness of QR (May, 1985; Rodman, 1976) vs. no such constraint for overt wh-movement). Therefore we will not presuppose that the evidence from the previous subsection prejudges the issue. We would like to ask whether there is any motivation that there is covert phrasal movement in AltQs, assuming that the phrase that would move covertly would be the whole disjunctive phrase. We consider two types of evidence: scope and *there*-insertion contexts (compare Pesetsky, 2000; Guerzoni, to appear, for relevant discussion of the properties of covert phrasal movement).

One type of accepted evidence for covert movement consists of instances in which a phrase takes wider scope than its overt position would indicate. In this light, consider the AltQ in (111a). The question has the interpretation indicated in (111b).

(111) a. Does Tina need a hammer or a screwdriver?
      b. {that it is necessary that T. has a hammer (any hammer),
          that it is necessary that T. has a screwdriver (any screwdriver)}

We are interested here in the scope of the indefinites inside the disjunctive phrase. (We are not interested in the 'scope' of the wh-element or the disjunction itself, because their interpretive contribution is fixed by the in situ mechanism we employ to derive the question meaning.) The natural interpretation of this example is one in which the indefinites take narrow scope relative to the modal verb. This interpretation can be straightforwardly derived from the structure in (112) (assuming for the moment the wh-analysis of the disjunctive phrase), where the disjunctive phrase stays below the modal.

(112) [Q [need [φ [wh[$_{\text{DisjP}}$ a hammer or a screwdriver]] [Tina has t$_i$]]]]
$[\![φ]\!]^f$ = {that Tina has f({$[\![$a hammer$]\!]$, $[\![$a screwdriver$]\!]$}) | CH(f)}
= {that Tina has a hammer, that Tina has a screwdriver}
$[\![$(111a)$]\!]^o$ = {$[\![$need$]\!]$(that Tina has f({$[\![$a hammer$]\!]$, $[\![$a screwdriver$]\!]$})) | CH(f) }
= {that it is necessary that T. has a hammer,
that it is necessary that T. has a screwdriver}

By contrast, a structure in which the disjunctive phrase has moved to the vicinity of the interrogative complemetizer naturally leads to an interpretation in which the indefinites take wide scope relative to the modal verb, as illustrated in (113).

(113) [Q [[wh[$_{\text{DisjP}}$ a hammer or a screwdriver]] [need [Tina has t$_i$]]]]
$[\![$(111a)$]\!]^o$
= {f({$[\![$a hammer$]\!]$, $[\![$a screwdriver$]\!]$}) (λx. $[\![$need$]\!]$ (that Tina has x) | CH(f)}
= {that $[\![$a hammer$]\!]$ (λx. $[\![$need$]\!]$ (that Tina has x),
$[\![$a screwdriver$]\!]$ (λx. $[\![$need$]\!]$ (that Tina has x)}
= {that there is a hammer that Tina needs,
that there is a screwdriver that Tina needs}

We are not sure to what degree the interpretation in (113) is available for this example—we think that generally such interpretations do exist; see, for example, (114).

(114) Context: A and B are participants in a class run through student
presentations. Each student is assigned a presentation by the teacher.
A: Did you have to present a paper or a book?

The crucial point for us is that the reading in (112) is available. The availability of the narrow scope reading argues against an analysis in which the disjunctive phrase obligatorily undergoes covert phrasal movement towards the interrogative complementizer: scope effects that could be derived from such an analysis are in fact missing. Thus there is no reason to think that the disjunctive phrase obligatorily moves. Several other examples that show the same thing are given below, (115) in English and (116) in Korean. In these data, any wide scope effects we might expect from obligatory covert phrasal movement are absent. We conclude that scope gives us no argument that there is obligatory covert phrasal movement. Our analysis is compatible with optional QR-like covert phrasal movement of the disjunctive phrase, and that seems right.

(115) a. Do you want to bake a cherry cake or a cheese cake?
b. Do you have to paint two or three pictures?
(116) a. John-un   cacwu thongsalonca-lul chotayha-ess-ni animyen
John-Top often   syntactician-Acc invite-Past-Q   if.not
uymilonca-lul   chotayha-ess-ni?
semanticist-Acc   invite-Past-Q
'Did John often invite a syntactician or a semanticist?'

b. John-un   cacwu   uymilonca-lul   chotayha-ess-ta.
   John-Top   often   semanticist-Acc   invite-Past-Dec
   'John often invited a semanticist.'
   (It could be different semanticists every time)

A slightly different type of evidence that points in the same direction comes from *there*-insertion contexts. (117a) is a well-formed AltQ in English. We suggest that the structure that is input to interpretation is the one in (117b). The structure in (117c), in which the disjunctive phrase moved towards SpecCP, would be problematic: Heim (1987) suggests that *there*-insertion contexts are incompatible with an individual variable in the place of the associate of *there*. So once more we are better off with a theory that does not force the disjunctive phrase to move.

(117) a.   Is there a horse or a donkey (in the garden)?
       b.   [Q [there is [wh[$_{DisjP}$ a horse or a donkey]]]]]
       c.   [Q [[wh[$_{DisjP}$ a horse or a donkey]]$_i$ [there is t$_i$]]]]
       d.   * there is x   (Heim, 1987)

Thus we have come to the conclusion that in a theory in which wh-elements can be interpreted in situ, obligatory covert phrasal wh-movement in AltQs is unmotivated: all effects that could be derived from this movement are missing. We suggest that (wh) DisjP does not have to move towards the interrogative complementizer position, although it may undergo QR.

5.2.3 No feature movement

The last kind of movement we want to discuss is feature movement. According to Pesetsky (2000), feature movement (F-movement) has the following properties: (i) no island effects, (ii) no scope effects, (iii) intervention effects.

This is of course precisely the set of facts we identified in AltQs. Note that the only empirically operative property of F-movement that we are aware of is sensitivity to intervention. There is no other property of F-movement that would have empirically testable effects. But sensitivity to intervention is derived semantically under our analysis and in Beck (2006); that is, we give a semantic reconstruction of the term feature movement. For the purpose of describing intervention, it thus becomes unnecessary as a theoretical notion. Nonetheless, we want to ask the question of what an F-movement analysis of intervention effects in AltQs would have to look like. We will see that it is not attractive to apply such an analysis to AltQs. The reason is ultimately that in contrast to wh-questions, the whole apparatus of movement does not seem applicable in AltQs, as shown by the data discussed above.

Pesetsky (2000) proposes to increase the inventory of covert (i.e., phonologically invisible) movement operations by assuming both covert phrasal movement and F-movement. F-movement applies when a syntactic constraint enforces movement, but phrasal movement does not happen. This permits him, among other things, to differentiate between English D-linked and non-D-linked wh-phrases: non-D-linked wh-phrases undergo phrasal movement, and show movement effects like superiority. D-linked phrases can undergo F-movement instead and do not show superiority effects. The wh-phrase in situ in (118b) underwent F-movement: an analysis in which it underwent (covert) phrasal movement would violate superiority—cf.

(118a)—which is here construed as a rule that says that the highest wh-phrase is moved overtly (i.e., pronounced in the moved position).

(118)   a. *   What did who read?
         b.   Which book did which student read?

This distinction in turn permits Pesetsky to distinguish (119a)—an intervention effect—from (119b)—no intervention effect. He argues that covert phrasal movement is not sensitive to intervention effects. The wh-phrase in situ in (119b) undergoes covert phrasal movement, hence (119b) is fine. The D-linked wh-phrase appearing in situ in (119a), on the other hand, does not undergo covert phrasal movement (cf. the fact that it successfully violates superiority), but it undergoes F-movement. Pesetsky suggests that F-movement is sensitive to intervention, hence (119a) is bad.

(119)   a. ?*   Which book didn't which student read?
         b.   Who didn't read what?

We should add that Pesetsky does not actually provide an analysis of what intervention is. He merely uses it as a diagnostic. When F-movement applied, we expect intervention effects to arise. But there are cases of intervention that fall outside the scope of his theory, like separation constructions, which are intervention sensitive for reasons other than F-movement. (For the general cause of intervention effects, Pesetsky refers to Honcoop (1998), who claims that a quantifier may not be separated from its restriction by another operator; but see Beck (2006) for arguments against Honcoop's analysis and in favour of replacing it with the present proposal.)

     Let's now try to transfer the F-movement analysis to AltQs. Our reasoning starts as follows:

(120)   Intervention effects arise always in AltQs
         ==> there must always be F-movement in AltQs
         ==> there must be   .
             (i) a [wh] Comp, and
             (ii) something preventing phrasal movement of [wh DisjP]

Part (ii) is because (covert) phrasal movement is not sensitive to intervention, cf. the well-formed (119b). (ii) is the problematic aspect: what prevents phrasal movement? We will be guided by Pesetsky's discussion; he discusses two reasons why phrasal movement might be excluded. One applies in Japanese/Korean, German etc. wh-in-situ constructions, the other in English D-linked questions. In both contexts, wh-intervention effects arise.

     With respect to Japanese/Korean and German intervention effects, Pesetsky argues that phrasal movement is excluded for reasons of space. The interrogative specifier could not host the phrase concerned (the wh-phrase in situ). With respect to intervention effects in D-linked questions in English, phrasal movement of the relevant wh-phrase should have been overt but wasn't. Phrasal movement would violate the pronunciation rule for moved wh-phrases, but F-movement would not.

The first explanation is not applicable to English AltQs. English has multiple specifier positions according to Pesetsky and should thus be able to host the wh disjunctive phrase in AltQs. It is also problematic to try to extend the explanation for D-linked wh-questions in English to the case of AltQs. This is because the relevant pronunciation rule does not apply—there is no requirement on the wh disjunctive phrase to have been moved overtly (i.e., be moved, and pronounced in the moved position).

We tried to think of an alternative reason why phrasal movement is not possible in AltQs, but could not come up with anything plausible. Note that under our analysis there are no semantic problems (e.g., incompatibility of the elements that would end up in the interrogative specifier; an element like *whether* would either be semantically harmless or correspond to the question operator, and would thus be quite compatible with a moved disjunctive phrase).

Trying to extend an F-movement analysis of intervention to AltQs, we see no obvious way to block covert phrasal movement (which we need to do to predict an intervention effect). We conclude that intervention effects in AltQs are not usefully analysed in terms of F-movement. Like separation constructions, they would fall outside the scope of Pesetsky's (2000) proposal that intervention effects occur when F-movement is involved.

5.3 Consequences

Our conclusion is that the available evidence speaks against analyzing AltQs as a wh-construction. The disjunctive phrase does not give rise to the effects that a wh-phrase triggers. This includes in particular movement characteristics. This conclusion has consequences for the analysis of intervention effects, for the role of *whether* in AltQs, and for our understanding of the semantics of disjunction.

5.3.1 Intervention effects

An important empirical connection we would like to note is that if AltQs had a wh-element that moved overtly, we would not expect an intervention effect. This is shown by data like Korean (121), in which a wh-phrase moved overtly past the intervener avoids the intervention effect. As we saw above, the Korean fact follows from the theory advocated here. The wh-phrase introduces alternatives above 'only', and no intervention effect is predicted. Since the prospective wh-part would presumably be the part of the disjunctive phrase to move overtly, we have converging evidence for our claim that there is no overt movement in AltQs: the fact that AltQs exhibit intervention effects is one more reason to think that there is no overt wh-movement.

(121) Nwukwu-lul$_i$ Mina-man t_i chotayha-ess-ni?
       who-Acc   *Mina-only*   *invite-Past-Q*
       'Who did only Mina invite?'

Next, covert movement was the core ingredient in our own earlier analyses of intervention effects (Beck, 1996; Beck & Kim, 1997). We suggested that a

wh-question like Korean (122a) be associated with the structure in (122b) at Logical Form. Then there was a syntactic constraint excluding such structures.

(122)   Beck (1996), Beck and Kim (1997):
   a. ?* Mina-man   nwukwu-lul   chotayha-ess-ni?
          Mina-only   *who-Acc*   *invite-Past-Q*
          'Who did only Mina invite?'
   b. $[_{CP}$ nwukwu-lul$_i$ [$C_{[+Q]}$ [Mina-man t_i^{LF} chotayha-ess-ni]]]
   c. *   [wh$_i$ [... [Op[... t_i^{LF} ...]]...]]

At the time, covert movement of the wh-phrase was motivated by interpretability. The procedure for the compositional interpretation of questions that was generally adopted then had a wh-phrase move past the interrogative complementizer in order to be interpretable. Since then, it has become much more doubtful, for syntactic reasons, that wh-phrases always move covertly, and alternative interpretation procedures have been developed that do not rely on such movement (see, e.g., Reinhart, 1998). Our own compositional interpretation component from Sect. 3 does not rely on movement of wh-elements either. Thus covert phrasal movement of wh-items is no longer motivated by issues of interpretability. We have argued above that under these revised assumptions about interpretation, there is no independent evidence (say, from scope) that there is covert phrasal wh-movement in AltQs. Its absence is incompatible with an LF movement analysis of intervention effects (e.g., Beck, 1996; Beck & Kim, 1997).

Feature movement in turn exists fruitfully in a system in which other kinds of movement are observable. We think that we failed in our attempts to use F-movement here because the whole tool kit of movement does not seem to be useful in the analysis of AltQs. There is simply no compelling evidence that we are aware of that movement is involved in AltQs. This is an important difference between AltQs and wh-questions.

In this connection it is also relevant that the intervention effect in AltQs seems stable across languages, while there is some variation in how the intervention effect in wh-questions surfaces, for example between English and German. Beck (2006), following Pesetsky (2000), suggests that the latter phenomenon is related to the inventory of movement strategies that applies in a given language. In English wh-questions, movement can rescue a potential intervention configuration, hence the effect is more limited than in German. This seems to play no role in AltQs. In English AltQs, movement can never come to the rescue. If AltQs were a special kind of wh-question, we would expect the intervention effect in English AltQs to be as limited as the intervention effect in English wh-questions, but this is not the case. Regarding the nature of intervention effects, we conclude that AltQs show that intervention effects cannot in general be analysed as movement effects. AltQs, we have argued, do not involve movement, but do show intervention effects. Thus intervention effects in AltQs support the analysis of intervention in Beck (2006) in terms of interpretability.

5.3.2 The syntax of AltQs and whether

In the literature on *whether-or*-questions (i.e., AltQs) and *either-or*-constructions, it is claimed that *either* marks the left edge of the disjunction (argued for in the recent literature in particular by Schwarz, 1999), and that *whether* originates in the same

position, but is subsequently moved to SpecCP (as argued in particular by Han and Romero, 2004b), both following Larson (1985). We have argued against the movement aspect of this proposal. This leads to the view that *whether* (as well as its null counterpart Q in matrix questions) is base-generated in its overt position, presumably fulfilling some formal requirement on marking the question. Our analysis of AltQs does not posit any formal connection between *whether* and the disjunction. We do not think, in particular, that *whether* marks the edge of the disjunction. This can be argued for independently of our concerns on the basis of the following contrast, originally due to Schwarz (1999).

(123)   a. ?? Either this pissed Bill or Sue off.
      b.   Did this piss Bill or Sue off?
             I wonder whether this pissed Bill or Sue off.

Han and Romero's (2004b) combined movement/ellipsis analysis of *whether/Q ... or* constructions can handle the asymmetry in (123). They argue that the difference between *whether/Q ... or* and *either ... or* is that *whether/Q* is a wh-phrase, and so *whether/Q* can undergo movement, while *either* cannot. This means that while *either* marks the left edge of the disjunction in *either ... or* constructions (as proposed by Schwarz 1999), the trace of *whether/Q* marks the left edge of the disjunction in *whether/Q ... or* constructions. Han and Romero claim that the contrast between (123a) and (123b) can be attributed to the degree of right-node raising of the particle. They propose the following derivations with ellipsis for (123a) and (123b), respectively.

(123')   a. either [$_{IP}$ this pissed Bill e$_j$] or [$_{IP}$ ~~this pissed~~ Sue e$_j$] off$_j$.
      b. Q$_i$ did this t$_i$ [$_{VP}$ piss Bill e$_j$] or [$_{VP}$ ~~piss~~ Sue e$_j$] off$_j$?

Either is base-generated at its surface position at the left edge of the disjunction and does not move. So (123a) involves an IP disjunction. Following Schwarz (1999), Han and Romero claim that the option of right-node raising of the particle above IP, as in (123'a), is difficult, if not completely unavailable. The AltQ (123b), on the other hand, has the derivation in (123'b). The covert Q-operator is base-generated adjacent to the VP disjunctive phrase and moves to SpecCP. And the particle undergoes right-node raising only above VP, which is available to all speakers as exemplified in (124a) (with the corresponding derivation under an ellipsis account in (124b)):

(124)   a. This either pissed Bill or Sue off.
      b. This either [$_{VP}$ piss Bill e$_j$] or [$_{VP}$ ~~piss~~ Sue e$_j$] off$_j$.

On our analysis, to explain the contrast between (123a) and (123b), we can assume with Schwarz (1999) that *either* marks the left edge of the disjunction and (123a) is marked due to right-node raising of the particle to IP. And we can further assume that *whether* does not necessarily mark the left edge of the disjunction. This means that we can have a disjunction of VPs as in (123'b), and the particle undergoes right-node raising only above VP. The only difference between Han and Romero's analysis and our analysis is that we don't have the *wh/Q*-trace adjacent to VP in (123'b) because we don't assume *whether/Q*-movement. So the contrast in (121) can be accounted for in our analysis, as well. Thus we suggest that the contrast does not

argue for a movement analysis, but rather shows that *whether* in contrast to *either* does not mark the left edge of the disjunction.

5.3.3 Disjunctions

We have, through arguing against an analysis of AltQs as wh-constructions, convinced ourselves that a compositional analysis of AltQs following von Stechow (1991) is to be preferred. Such an analysis implies that the disjunction itself is responsible for making available alternatives to the semantics, which the Q operator can evaluate to derive a question meaning. Disjunctions are thus argued to have an alternative semantics. This leads us to expect that alternatives should surface on other occasions when disjunctions occur. It is the purpose of the next section to explore this.

6 More on the disjunction

6.1 The focus semantic contribution of disjunctions

Remember from Section 4 that we need the semantics in (80) for the disjunctive phrase in order to derive the right semantics for the example in (68):

(68) a. Did the program execute or the computer crash?
      b. {that the program executed, that the computer crashed}
      c. [Q [$_{\text{DisjP}}$ [the program execute] or [the computer crash]]]

(80) a. $[\![\text{DisjP}]\!]^{\text{o}} = [\lambda w.$ the program executed in w or the computer crashed in w]
      b. $[\![\text{DisjP}]\!]^{\text{f}} = \{\lambda w.$ the program executed in w, $\lambda w.$ the computer crashed in w}

A question that arises at this point is what evidence we have for the claim that the focus semantic value of a disjunction is a set that contains the contents of the two disjuncts. More precisely, is there further evidence that disjunctions[5] give rise to an alternative set that consists of the ordinary meanings of the disjuncts, as indicated in (125) (for the case in which A and B are propositions)?

(125) a. $[\![[A_{\text{F}} \text{ or } B_{\text{F}}]]\!]^{\text{o}} = [\![A]\!]^{\text{o}} \cup [\![B]\!]^{\text{o}}$
       b. $[\![[A_{\text{F}} \text{ or } B_{\text{F}}]]\!]^{\text{f}} = \{[\![A]\!]^{\text{o}}, [\![B]\!]^{\text{o}}\}$

First, there is the simple observation that (126b) is a felicitous answer to (126a) with the indicated focus (i.e., the same one we find in AltQ disjunctions). The meaning of the question is (127a). The constraint on focus-answer congruence (Rooth, 1992) says roughly that the focus semantic value of the answer has to be identical to the meaning of the question. Our supposed focus semantic value of (126b) is (127b). While this does not fit the constraint on congruent answers completely, it is still a

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[5] Or at least, disjunctions with the kind of focus assignment we are interested in here.

much better match than the probable alternative (127c). This suggests that 'or' does have a special effect on focus semantic values.

(126) a. Who did Hans invite?
       b. Hans invited Anna$_F$ or Sally$_F$.

(127) a. {that Hans invited x | x ∈ D}
       b. {that Hans invited x | x = Anna or x = Sally}
       c. {that Hans invited x or y | x,y ∈ D}

(128) $[\![\text{Question}]\!]^o = [\![\text{Answer}]\!]^f$

Secondly, we note that Aloni (2003) (and also Simons, 2004) adopts an analysis of free choice 'or' in modal contexts like (129) that is based on an alternative semantics. She associates the argument of *may* with the set of alternatives in (130). The semantics of *may* makes use of those alternatives to derive the intuitive semantics of the example. See Aloni (2003) for details. Importantly for us, she uses the same focus semantic value for the disjunction that is relevant for our purposes. This supports (125) as the focus semantic contribution of disjunctions on independent grounds.

(129) John or Mary may come.
       ==> John may come and Mary may come.

(130) a. [may [$_\phi$ John or Mary come]]
       b. $[\![\phi]\!]^f$ = {that John comes, that Mary comes}

A final potential application we see is free disjunctions with *either*, as discussed in Zimmermann (2000). Zimmermann (partly inspired by the free choice *or* mentioned above) proposes a non-classical semantic analysis of *or*, according to which (131a) means (131b).

(131) a. It is raining or it is snowing.
       b. It is possible that it is raining and it is possible that it is snowing.
       c. It is possible that it is raining and it is possible that it is snowing and there are no other relevant possibilities.

Further grammatical mechanisms may strengthen the meaning to (131c). Zimmermann calls this effect 'closure'; it is parallel to the exhaustification of answers to questions (cf. Groenendijk and Stokhof, 1984)—in the example it would be the exhaustification of the background question "What might be the case?". Closure in this sense can arise from falling intonation, and, as Zimmermann suggests, from the use of *either*:

(132) Either it is raining or it is snowing.

We propose that *either* functions as a focus sensitive operator that derives closure on the basis of the focus semantic value of its sister disjunction.

(133) a. r := λw. it is raining in w
          s := λw. it is snowing in w
       b. $[\![\text{it is raining or it is snowing}]\!]^o$ = r∪s
          $[\![\text{it is raining or it is snowing}]\!]^f$ = {r,s}

(134) $[\![$ either it is raining or it is snowing $]\!]^o$ = may r & may s & $\neg\exists p[p\cap r = \{\}$
        & $p\cap s = \{\}$ & may p]
        it may rain and it may snow and there is no genuinely different
        possibility of what may be the case.

(135) $[\![$ either XP $]\!]^o$ = for all q in $[\![XP]\!]^f$: may q & $\neg\exists p[$ for all q in $[\![XP]\!]^f$
        : $p\cap q = \{\}$ & may p]

We leave open whether the ordinary semantics of disjunction without *either* is
already as in (131b) or the classical semantics as used in our (133b), with some extra
step deriving (131b). If we maintain the classical semantics for the ordinary semantic
contribution of a disjunction, we also need to say something about how the ordinary
meaning affects the semantics of the whole *either-or* disjunction. All of these are left
for future work. Our proposal is this: that *either* is an operator that has access to the
alternatives that the disjunction gives rise to, and evaluates those alternatives to
derive the closure effect. This is in keeping with the suggestion in Hendriks (2003)
that *either* is a focus sensitive operator.

It remains to be seen how these suggestions fare in general for the purposes of
focus interpretation. A detailed examination of disjunction and its interaction with
focus is beyond the scope of this paper. We express our hope, based on the data
mentioned above, that our assumptions about *or* in interaction with focus alterna-
tives will turn out to be reasonable.

6.2 Other intervention effects with disjunctions?

Larson (1985) investigates both *whether... or...* and *either... or...*, and once inter-
vention effects in AltQs are recognized, the following observation on *either...or...*
from Larson seems immediately relevant: As illustrated in (136), taken from
Schwarz (1999), *either* cannot be separated from the disjunction by an intervening
negation. We add to this the fact in (137), as well as (138).

(136)   a. (?) John didn't eat either rice or beans.
        b. ??   John either didn't eat rice or beans.
        c. ??   Either John didn't eat rice or beans.

(137)   a.   Only John ate either rice or beans.
        b. ?*   Either only John ate rice or beans.

(138)   * Either he REALly IS going out with MarTIna or with SUE.
                                                    (Han & Romero 2004a)

This certainly looks like an intervention effect: negation, 'only', and so forth cannot
intervene between *either* and the disjuncts. An intervention effect would be pre-
dicted by a focus semantic analysis of *either...or*, where *either* evaluates the alter-
natives introduced by the disjunction. That is of course what we have just proposed.
(136b,c) can be seen as instantiations of the minimality constraint on focus evalua-
tion MIN (62), which is repeated below. On our analysis, the relevant structure for

(136c) would look as in (139) in the relevant respects, where the disjunctive phrase is below the ~ triggered by negation and the alternatives it introduces are trapped there.

(139)   [either [NOT [~C [$_{DisjP}$ John eat rice or John eat beans]]]]

(62)   *General Minimality Effect MIN:*
       The evaluation of alternatives introduced by an XP cannot skip an intervening ~ operator.
       *[Op$_1$[...[~C[$_\phi$ ... XP$_1$ ...]] ...]]

Schwarz (1999) has a different explanation for (136); he excludes (136b,c) as a violation of the condition that *either* mark the left edge of the disjunction. More empirical work is needed to decide between these two options.

Other potential intervention effects should obtain whenever the alternatives introduced by a disjunctions are evaluated. Let's try this out on the other case of disjunction in which an alternative semantic analysis has been proposed: free choice 'or' as in (140) (many thanks to Ede Zimmermann, p.c. for this suggestion). The free choice reading available in (140) becomes unavailable with the addition of the intervener *nobody* in (141). An analysis of the effect in terms of the general minimality effect is sketched in (142). The modal *may* wants to evaluate the alternatives introduced by the disjunction, but those get trapped below the ~ triggered by *nobody*.

(140)   You may show him the paper or the book.
        ==> you may show him the paper and you may show him the book.

(141)   You may show nobody the paper or the book.
        =/=> you may show nobody the paper and you may show nobody the book.

(142)   a. [may [nobody$_x$ [~[$_\phi$ you show t$_x$ the paper or the book]]]]
        b. $[\![\phi]\!]^f$ = {you show x the paper, you show x the book}

Again, more work would need to be done for a proper investigation of intervention effects in free choice contexts. Even so, the data observed in this subsection point towards an analysis of 'or' in which it is designated to introduce alternatives, and occurs in constructions in which alternatives are evaluated at a particular point in the semantics. In that it would be similar to the role assigned to certain indefinites by Kratzer and Shimoyama (2002). AltQs would then be just one instance of a much larger phenomenon. We note a promising area for future research.

7. Some further issues

In this section, we point out some issues raised by our suggestions that we cannot pursue in depth. We come back to the syntax of AltQs, we relate our analysis of the effect of negation in AltQs to that of Han and Romero (2001, 2004a), and we point out some empirical predictions concerning intervention effects across languages.

7.1 The size of the disjuncts

A question that has already come up is how large, exactly, the disjuncts are. We do not have a theory of that, but what we have proposed has some consequences for the issue that future theories will need to take into account. Consider in this context once more an example in which the disjunctive phrase appears to be fronted past the intervener:

(143) Hat   den   Jonas   oder   die   Ida   nur   Maria   eingeladen?
       has   the   Jonas   or   the   Ida   only Maria   invited
       'Did only Maria invite Jonas or Ida?'

The obvious analysis, syntactically speaking, would be one in which the disjunctive phrase has moved across the intervener. This would associate the sentence with the structure in (144). That structure receives the desired interpretation and is correctly predicted to be grammatical.

(144) [$_{CP}$ Hat [$_{IP}$ [$_{NP}$ den Jonas oder die Ida]$_i$ [$_{IP}$ nur Maria t$_i$ eingeladen]]]?

A problem is the assumption that there is no ellipsis at all in this structure, in view of the fact that Han and Romero (2004a, b) and Romero and Han (2003) use ellipsis to derive the characteristic AltQ focus pattern. It might be possible to save this aspect of their theory by assuming that (144) involves some sort of Right Node Raising—versions of such a derivation are sketched below. The analysis becomes rather more complex.

(145) a. Hat [$_{IP}$ [den Jonas$_i$ [~~nur Maria t eingeladen~~]] oder [die Ida$_i$ [nur Maria t$_i$ eingeladen]]]
       b. Hat [[$_{IP}$ [den Jonas$_i$ _] oder [die Ida$_i$ _]] [nur Maria t$_i$ eingeladen]]

Thus German (and Hungarian) movement data suggest that DisjP is smaller than in Han and Romero's (2004a, b) analysis, but this is not conclusive. Conversely, one could reexamine the ellipsis analysis to see if it is strictly necessary to assume ellipsis in such AltQs. Perhaps a notion of contrast would suffice instead. After all, there are AltQs with no ellipsis, such as (146); see once more Han and Romero (2004b) for discussion.

(146) Did the program execute or the computer crash?

Next, we turn to the matter of ellipsis in our regular intervention effect AltQs. We repeat one of the relevant examples below, together with the structures that permit us to derive the intervention effect.

(147) a. ?? Did only Mary introduce Sue to Bill or (to) Tom?
       b. [Q[$_\varphi$ only$_C$ [~C[$_{IP}$ Mary [$_{DisjP}$ [intro. Sue to Bill] or [~~intro. Sue~~ to Tom]]]]]
       c. [Q[$_\varphi$ only$_C$ [~C[$_{IP}$ Mary intro. Sue [$_{DisjP}$ [to Bill] or [to Tom]]]]]]

There is also a structure that would not work, although it would be compatible with Romero and Han's (2003) semantic analysis of AltQs—the one in (148), in which the intervener is contained in both disjuncts and elided in the second. This structure does

not instantiate the intervention effect structure predicted to be uninterpretable by our theory, and if it were a possible structure for the sentence, we would expect it to be acceptable.

(148)   [Q [$_{DisjP}$ [only$_C$ [~C[$_{IP}$ Mary [intro. Sue to Bill] or
        [~~only$_C$ [C[$_{IP}$ Mary [intro Sue~~ [to Tom]]]]]

Note in this connection that we know from examples in which the potential intervener is overtly part of the disjuncts, that no intervention effect arises. This is illustrated below for English and German.

(149)   a.   Hat   [nur die   erste Mannschaft   gewonnen] oder
             has   only the   first team   won   or
             [nur   die   zweite _]?
             only   the   second
             'Did only the first team win or only the second?'
        b.   Hat [nur der Peter gespielt] oder   [auch der Fritz _] ?
             has only the Peter played   or   also the Fritz
             'Did only Peter play, or Fritz too?'
        c.   Did nobody sing or nobody dance?

This means that the intervener puts a roof on the size of the disjuncts, in that an analysis must be excluded in which the intervener is part of the disjuncts and has been elided (such as (148) above). We can follow Han and Romero's (2004a, b) argument that there is ellipsis in AltQs, but it must be constrained how large the ellipsis can be. Ideally, restrictions on ellipsis should predict the impossibility of (148) (for example Han and Romero's, 2004a *Focus Deletion Constraint*: Focus-marked constituents at LF (or their phonological locus) cannot delete at Spell-Out). We refer the reader to Han and Romero for a much more extensive discussion of the syntax of AltQs. Whatever the theoretical solution, intervention effects in AltQs impose the requirement on the syntactic analysis of AltQs that the disjunctions cannot be too large.

A related matter is an observation by Han and Romero (2001, 2004a) that preposed negation blocks an AltQ interpretaton, but non-preposed negation does not. They assume a structure for the non-preposed case as in (150c).

(150)   a.   Didn't John drink tea or coffee?   [Y/NQ only]
        b.   Did John not drink tea or coffee?   [Y/NQ, AltQ]
        c.   [Did [wh [$_{DisjP}$ [John not drink tea] or [~~John not drink~~ coffee]]]]

This proposal is compatible with our theory of the effect of preposed negation. The structure in (150c) is not expected to lead to an intervention effect. We can replicate Han and Romero's contrast in German in the following way:

(151) a. Hat nicht Hans   Kaffee   oder   Tee   getrunken?   [Y/NQ only]
          has not   Hans   coffee   or   tea   drunk
          'Didn't Hans drink coffee or tea?'
      b. Hat Hans keinen Kaffee oder keinen Tee getrunken? [Y/NQ, AltQ]
          has Hans no   coffee or   no   tea drunk
          'Did Hans not drink coffee or tea?'

    c. Hat nicht Bayern gewonnen oder Pfrondorf verloren? [Y/NQ only]
       has not   Bayern won   or   Pfrondorf lost
       'Didn't Bayern win or Pfrondorf lose?'
    d. Hat Fritz nicht teilgenommen oder nicht bestanden? [Y/NQ, AltQ]
       has Fritz not participate   or   not   passed
       'Did Fritz not participate or (not) pass?'

We see that the well-formed cases have negation inside the disjuncts. A question arises in connection with the examples in (136b,c), however. Let us consider (136c), repeated here as (152).

(152)   ?? Either John didn't eat rice or beans.

We have argued above that the structure in (152'') is excluded (as an intervention effect, or as a violation of the left edge restriction on *either*). Schwarz (1999) argues that the structure in (152') is also excluded because negation cannot be elided in disjunctions. Hence the ungrammaticality of (136c/152) is accounted for.

(152')   ??   Either [John didn't eat rice] or [~~John didn't eat~~ beans].

(152'') ??   Either John didn't [eat rice] or [~~eat~~ beans].

However, Han and Romero's (2001, 2004a) explanation for the grammaticality of (150b) relied on the possibility of eliding negation (see the structure in (150c)). It is not clear to us how this contrast between (136c) and (150b) should be explained. This is part of the larger question of what ellipsis processes are at work in AltQs (vs. *either-or*).

Han and Romero (2001, 2004a) give an explanation for the preposed (vs. non-preposed) negation data in AltQs that is based on their *Focus Deletion Constraint*. Preposed negation is focused, non-preposed negation is not. But note that the negation in (136c) is not preposed. So under Han and Romero's analysis, we would expect that the negation in (136c) can be deleted.

They extend their focus-based explanation to other data in which it looks like a focus intervenes, for instance (153) below.

(153)   *Did LOLA buy flowers for JOANNA or PAQUITA?

                                               (Han & Romero, 2001)

We would like to point out that the explanation does not extend to cases of intervention which involve focus sensitive (not focused!) interveners. Even if, for example, the preposed negation fact can be made to follow from focus, it would also be excluded by the mechanism that generally derives intervention effects, which is needed anyway. Thus Han and Romero's (2001, 2004a) predictions overlap with ours in the case of preposed negation. For an analysis of the intervention effect created by just a focused element (without an element like 'only'), see Beck (2006). Note also, though, that we are completely sympathetic to the suggestion that focus based constraints are operative in AltQs.

7.2 Intervention effects in AltQs and wh-questions crosslinguistically

A final empirical point we want to make concerns crosslinguistic predictions about intervention effects in AltQs. We expect that in a given language, the intervention

effect in AltQs should show parallels to the intervention effect in wh-questions. The available data lead to a few specific predictions in this regard. For one thing, Han and Romero's (2001) crosslinguistic data on preposed negation lead us to expect that those languages should all also show wh-intervention. Conversely, wh-intervention languages from Beck (2006) should also show AltQ intervention (for the same interveners and, where testable, under the same structural conditions). We leave this as a project for future research.

(154) Spanish (Han & Romero, 2001):
 a. ¿Juan   no   bebió   café   o   té?
    Juan   neg   drank   coffee or   tea
    'Did Juan not drink coffee or tea?'   [Y/NQ, AltQ]
 b. ¿No   bebió   Juan   café   o   té?
    Neg   drank   Juan   coffee or   tea
    'Didn't Juan drink coffee or tea?'   [Y/NQ only]

(155) Turkish (Beck, 1996):
 a. * Kimse   kimi   görmedi?
      anyone who-Acc   see-Neg-Past
 b.   Kimi   kimse   görmedi?
      who-Acc anyone   see-Neg-Past
    'Whom did nobody see?'

8. Summary and conclusions

We have collected a set of crosslinguistic AltQ data which are, prima facie unexpectedly, not acceptable. Their common characteristic is that a focusing or quantificational element occurs between the disjunctive phrase and the interrogative complementizer. We have subsumed these data under the general intervention effect exhibited by questions. For this purpose we have adopted von Stechow's (1991) analysis of AltQs and Beck's (2006) analysis of intervention effects. Intervention effects in AltQs provide support for aspects of both of these theories. We argued for an in situ analysis of the disjunctive phrase and for the role of focus alternatives in the explanation of the intervention effect, both of which confirm the analysis in Beck (2006). Our explanation of the intervention effect has interesting consequences for our understanding of the semantic role of 'or' in natural language, as an alternative introducing element.

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