

Surprise*-predicates, strong exhaustivity and alternative questions

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Abstract Factive emotive verbs like *surprise* and *disappoint* disallow the strongly exhaustive reading of *wh*-questions and do not embed alternative questions (nor polar questions) (Guerzoni & Sharvit 2007; Lahiri 1991; a.o.). This paper develops a novel account of this correlation by exploiting a property of *surprise*-type verbs so far overlooked in the question literature: their focus-sensitivity. These verbs are treated as degree constructions where the comparison term –the selected type of answer to the question– must be a member of the comparison class *C* shaped by focus. Strongly exhaustive answers of *wh*-questions do not match the comparison class and are thus ruled out. Alternative questions fail to produce a suitable *C* both for strongly and for weakly exhaustive answers and are, hence, entirely disallowed.

Keywords: question, focus, exhaustivity, alternative question, embedding predicates, factive emotive verbs

1 Introduction

When comparing verbs that embed interrogative complements, two restrictions have been noted to apply to factive emotive predicates like *surprise*, *disappoint* and *annoy*.

The first restriction concerns the readings of embedded *wh*-questions (WhQs) in terms of degrees of exhaustivity. *Wonder*- and *know*-V(erbs) allow for the strongly exhaustive reading of a WhQ (Groenendijk & Stokhof 1984), under which the interrogative [*who (out of set S) walks*] is assigned the denotation in (1) and inference (2) is valid. But factive emotive verbs do not allow for the strongly exhaustive reading (Sharvit 2002; Guerzoni & Sharvit 2007; a.o.; *pace* Klinedinst & Rothschild 2011: fn. 18), thus making inference (3) invalid. Instead, they are understood as having a weaker reading, typically identified with Heim’s (1994) weakly exhaustive reading, that correctly makes sentence (5a) false and sentence (5b) true in scenario (4).¹

* I am greatly indebted to the audiences of SALT 25 and of the seminar “Advanced Topics in Semantics” at the University of Konstanz. Special thanks to Irene Heim, María Biezma, Luka Crnič, Sven Lauer and Doris Penka for useful comments and discussion. Thanks to David Krassnig for L^AT_EX support. Remaining errors are mine.

¹ On the exact nature of this weaker reading, see discussion in George 2013, who advocates for the

- (1) $\llbracket \text{who}_S \text{ walks} \rrbracket(w_0) = \lambda w. \bigcap \{p : \exists x \in S[p = \lambda w'. \text{walk}(x, w')] \wedge p(w_0)\} =$
 $\bigcap \{p : \exists x \in S[p = \lambda w'. \text{walk}(x, w')] \wedge p(w)\}$
- (2) John knows who_S called. VALID
 John knows who_S didn't call.
- (3) It surprised John who_S called. INVALID
 It surprised John who_S didn't call.
- (4) Scenario: For everybody that actually called (e.g., a, b and c), John expected them to call. But John also expected someone else to call (e.g., d) who in fact didn't call.
- (5) a. It surprised John who called. \Rightarrow FALSE in (4)
 b. It surprised John who didn't call. \Rightarrow TRUE in (4)

The second restriction concerns the (un-/)embeddability of different question types. While *wonder-* and *know-Vs* embed WhQs, alternative questions (AltQs) and polar questions (PolQs), *surprise-Vs* allow WhQs but disallow AltQs and PolQs (Grimshaw 1979; Lahiri 1991; Guerzoni 2003; a.o.).

- (6) John wonders / knows / was surprised at who visited Mary. WHQ
- (7) John wonders / knows / * was surprised at whether Paul_{L*H-} or Bill_{H*L-} visited Mary. ALTQ
- (8) John wonders / knows / * was surprised at whether Paul visited Mary. POLQ

Interestingly, the (in)ability to embed AltQs and PolQs correlates with the (im)possibility of interpreting a WhQ strongly exhaustively: All and only the verbs that disallow AltQ/PolQs generally disallow the strongly exhaustive reading of WhQs (Guerzoni 2007:§2).²

The present paper investigates the ban of *surprise-Vs* against strongly exhaustive readings of WhQs and against AltQs, leaving the details of a potential extension to PolQs for future research. The goal is to develop a novel unified account of the two restrictions by exploiting one so far overlooked property of *surprise-Vs*: their focus-sensitivity. We will first implement the idea in a simplified version and then

mention-some reading, and the reply by Spector and Égré (2014: fn24), who advocate for the weakly exhaustive reading. As for the so-called intermediate exhaustive reading, Uegaki (2015) presents suggestive evidence that it is disallowed with *surprise-Vs*. The analysis to be developed in this paper bans any reading stronger than Heim's weakly exhaustive reading with *surprise-Vs*.

² *Realize-Vs* have been argued to pattern like *surprise-Vs* (Guerzoni & Sharvit 2007). As we will see in Section 5, though a plausible analysis exists for *realize-Vs* (Guerzoni 2003), previous analyses for *surprise-Vs* are problematic.

elaborate on it in a more refined version. We will also provide a brief criticism of previous approaches, thus arguing that the new account is called for.

The rest of the paper is organized as follows. Section 2 provides background on *surprise*-Vs with declarative complements, showing that a focus-sensitive lexical entry for these verbs is needed. Section 3 presents the simplified version of the proposal and Section 4 spells out some refinements. Section 5 turns to previous approaches in the literature. Section 6 concludes.

2 *Surprise*-Vs with declarative complements and focus-sensitivity

Building on ideas from Stalnaker (1984), Heim (1992) develops a conditional-based analysis of desire predicates like *want* extendable to factive emotive verbs like *surprise*. In a nutshell, α *wants* ϕ is true in a world w iff, for every world $w' \in \text{Dox}_\alpha(w)$: every ϕ -world maximally similar to w' is more desirable to α in w than any non- ϕ -world maximally similar to w' . With the auxiliary definitions of $\text{Sim}_w(p)$ and the desirability/expectability order $>_{\alpha,w}^{\text{D/E}}$ in (9–10), Heim's (non-dynamic version of the) lexical entry for *want* is spelled out in (11) and extended to *surprise* in (12).³

- (9) $\text{Sim}_w(p) = \{w' \in W : w' \in p \text{ and } w' \text{ resembles } w \text{ no less than any other world in } p\}$
- (10) a. For any $w, w', w'' \in W$,
 $w' >_{\alpha,w}^{\text{D/E}} w''$ iff w' is more desirable/expectable to α in w than w''
- b. For any $w \in W, X \subseteq W, Y \subseteq W$,
 $X >_{\alpha,w}^{\text{D/E}} Y$ iff $w' >_{\alpha,w}^{\text{D/E}} w''$ for all $w' \in X, w'' \in Y$
- (11) $\llbracket x \text{ wants } p \rrbracket = \lambda w_0. \forall w \in \cap \text{Dox}_x(w_0) [\text{Sim}_w(p) >_{x,w_0}^{\text{Des}} \text{Sim}_w(\neg p)]$
 (Heim 1992)
- (12) $\llbracket p \text{ surprises } x \rrbracket = \lambda w_0. \forall w \in \cap \text{Dox}_x(w_0) [\text{Sim}_w(\neg p) >_{x,w_0}^{\text{Exp}} \text{Sim}_w(p)]$

Villalta (2008), building on Dretske 1975, shows that desire verbs like *want* and factive-emotive verbs like *surprise* are focus-sensitive: The proposition p in the complement clause is not always compared to $\neg p$, but to (a relevant subset of) the alternative propositions arising from the focus structure of the complement clause. To see this, consider scenario (13) and the utterances (14) and (15) as made out of the blue, with focus intonation marked in capitals. The same sentence is judged true, as in (14), or not true, as in (15), depending on its focus structure. If all that mattered was the comparison between $\text{Sim}_w(p)$ and $\text{Sim}_w(\neg p)$, the sentence should be judged equally true in both utterances.⁴

³ For simplicity, we ignore the factive presupposition of factive emotive verbs.

⁴ Rubinstein (2012) contends that Villalta's (2008) evidence for a set of alternatives beyond $\{p, \neg p\}$ is inconclusive. However, Rubinstein considers only Villalta's (2008:476ff) picnic scenario, which

- (13) Scenario: Lisa knew that syntax was going to be taught. She expected syntax to be taught by John, since he is the best syntactician around. Also, she expected syntax to be taught on Mondays, since that is the rule.
- (14) It surprised Lisa that John taught syntax on TUESdays. \Rightarrow TRUE in (13)
- (15) It surprised Lisa that JOHN taught syntax on Tuesdays. \Rightarrow NOT TRUE in (13)

To derive focus sensitivity, Villalta adds to the lexical entry (18) an extra argument: the free variable C . This free variable is related to the embedded declarative CP via the squiggle operator \sim , as in (16), which, given (17), forces C to be a subset of the focus semantic value of the embedded declarative CP, $\llbracket \text{CP}_{\text{decl}} \rrbracket_f$. This produces the at-issue content in (18).⁵

- (16) $\llbracket [\text{CP}] \sim C \text{ surprises}_C \text{ NP} \rrbracket$
- (17) $\llbracket \alpha \sim C \rrbracket_o$ is defined only if $C \subseteq \llbracket \alpha \rrbracket_f$; if defined, $\llbracket \alpha \sim C \rrbracket_o = \llbracket \alpha \rrbracket_o$ (Rooth 1992)
- (18) $\llbracket p \text{ surprises}_C x \rrbracket =$ [TO BE REVISED]
 $\lambda w_0. \forall w \in \cap \text{Dox}_x(w_0) : \forall q \in C [q \neq p \rightarrow [\text{Sim}_w(q) >_{x, w_0}^{\text{Exp}} \text{Sim}_w(p)]]$

Furthermore, Villalta conceives these verbs as degree constructions with C as the comparison class. Our rendition of this idea is given in (19a), which (roughly) states that p reaches a degree d of unexpectedness for x that surpasses the threshold θ of the comparison class C (cf. *tall*).⁶ Crucially, in degree constructions in general, the comparison class C must include the comparison term: (20) is infelicitous if John is not one of the candidates and so is (21) if Mia is not a three-year old (Heim 1999; Schwarz 2010). We argue that the same holds here: The ordinary semantic value of the CP-argument of *surprise* is presupposed to be a member of the comparison class C , as defined in the presupposition (19b).

- (19) $\llbracket p \text{ surprises}_C x \rrbracket$ [FINAL VERSION]
 a. Assertion: $\lambda w_0. \forall w \in \cap \text{Dox}_x(w_0) : \exists d [\text{Unexpected}_{x, w_0}(\text{Sim}(p), d) \wedge d > \theta(\{\text{Sim}_w(q) : q \in C\})]$
 b. Presupposition: $\lambda w_0. p \in C$

admittedly has certain flaws, but not the case in (13–15). With only the set $\{p, \neg p\}$ at our avail, it is not clear how the contrast between (14) and (15) can be derived.

⁵ Villalta (2008) implements the focus-sensitivity of *surprise*-Vs as conventional association with focus. We will follow her in this respect, though it is not crucial for us whether C is conventionally (as with *only*) or non-conventionally (as with *always*) associated with focus in the case of *surprise* plus a declarative CP (Beaver & Clark 2003). What will be crucial for our analysis is that, with *surprise* plus interrogative CP, C is conventionally associated with focus. See fn. 9.

⁶ Further refinements of (19a) are needed. For example, when plural sums are considered, the threshold θ should perhaps be calculated based on the members of C that do not properly entail or are entailed by p .

(20) Among the candidates, JOHN is the tallest. (# if John \notin \llbracket *the candidates* \rrbracket).

(21) Mia, a little girl / #teenager, is tall for a 3-year old.

The addition of (19b) will be essential to derive the ban of *surprise*-Vs against strongly exhaustive readings of WhQs and against AltQs.

3 Proposal

Our point of departure is the minimal pair in (22):

(22) a. It surprised / disappointed Amy [which one of the two finalists won the competition].

b. * It surprised / disappointed Amy [whether the younger finalist or the older finalist won the competition].

In a context where, of the two finalists *a* and *b*, *a* is younger and *b* is older, the embedded WhQ in (22a) and the embedded AltQ in (22b) yield the same semantic output: They both presuppose that at least one and at most one out of {*a*,*b*} won (Dayal 1996; Biezma & Rawlins 2012) and they both denote, at a given world *w*, the singleton containing whichever one of the propositions “that *a* won” and “that *b* won” is true in *w*. Nevertheless, combining *surprise* with this semantic output produces a grammatical sentence in the case of (22a) but leads to ungrammaticality in (22b). This suggests that the decisive factor does not lie on the output denotation per se, but on the way such denotation was built. In other words, something in the inner composition of WhQs makes them compatible with *surprise*-Vs while something in the inner composition of AltQs makes them ill-suited complements of *surprise*-Vs.

What feature of *surprise*-Vs might bear on some internal difference between WhQs and AltQs? We saw that *surprise*-Vs are focus-sensitive: They have a comparison class argument *C* whose value must match the focus semantic value $\llbracket X \rrbracket_f$ of some constituent *X* down the tree. The key idea of our proposal is that WhQs are built using focus alternatives arising from wh-phrases (Beck 2006) and thus provide the right $\llbracket X \rrbracket_f$, whereas AltQs are built via ordinary alternatives arising from disjunction (Alonso-Ovalle 2005; Simons 2005; Biezma & Rawlins 2012) and thus do not provide the appropriate $\llbracket X \rrbracket_f$ at any point in the tree.

In the next two subsections, we apply this idea to WhQs and AltQs embedded under *surprise*-Vs.

3.1 Banning strongly exhaustive WhQs under *surprise*-predicates

The first ingredient of our analysis is the focus-sensitivity of *surprise*-Vs. Consider the interrogative clause (23) and assume that *who* ranges over the domain {*r*(α)},

t(obi)} and –for simplicity– that the wh-phrase is in the singular (=‘which person’). When embedded under *surprise_C*, we need to adjoin $\sim C$ to some constituent down the tree. This is done in (24). Note that the selected constituent is not the immediate sister $[Ans\ Q\ [IP\ \dots]]$ of *surprise_C*, but the inner IP node. Given the purely anaphoric relation between *C* in *surprise_C* and *C* in $\sim C$, this is allowed by the grammar. The felicity condition of a constituent $\alpha\sim C$ is given in (25):⁷

(23) Who_{SING, {r(alph), t(obi)}} (/ Which person_{r,t}) called surprised John.

(24) LF: $[[[Ans\ [CP\ Q\ [IP\ \mathbf{who}_{\{r,t\}}\ \mathbf{called}]\sim C]]\ \text{surprised}_C\ \text{John.}]$

- (25) a. $[[\alpha\sim C]]_o$ is defined only if $C \subseteq [[\alpha]]_f$; if defined, $[[\alpha\sim C]]_o = [[\alpha]]_o$
 b. $[[\alpha\sim C]]_f$ is defined only if $C \subseteq [[\alpha]]_f$; if defined, $[[\alpha\sim C]]_f = [[\alpha]]_f$

Our second ingredient is that wh-phrases are inherently focus-marked. Wh-phrases introduce a set of alternatives as their $[[\cdot]]_f$ (Beck 2006).⁸ This gives us the partial semantic computations in (26a–26c) and (27a–27c).

(26) a. $[[who]]_o = \#$

b. $[[who\ called]]_o = \#$

c. $[[[who\ called]\sim C]]_o = \#$

d. $[[Q\ IP\sim C]]_o = \lambda w_0. \lambda p. p \in [[IP\sim C]]_f \wedge p(w_0) = 1$
 =e.g. $\lambda w_0. \{t\ \text{called}\}$

(27) a. $[[who]]_f = \{x_e : x\ \text{is human}\} = \{r, t\}$

b. $[[who\ called]]_f = \{r\ \text{called}, t\ \text{called}\}$

c. $[[[who\ called]\sim C]]_f = [[who\ called]]_f$ if $C \subseteq [[who\ called]]_f$; otherwise $\#$

d. $[[Q\ IP\sim C]]_f = \{[[Q\ IP\sim C]]_o\}$

To that, we add the question operator *Q*, whose job is to take the non-singleton set of alternatives provided by its syntactic sister –in this case $[[IP\sim C]]_f$ –, build a

⁷ Two notes: First, in Subsection 4.2, once some refinements have been added to the proposal, we will consider and rule out other adjunction sites for $\sim C$. Second, we take (25a) from Rooth (1992) but deviate from him with respect to (25b). While for Rooth (1992) the squiggle operator \sim closes off the focus semantic value of its sister, as in (i), we assume that the closing off is not performed by \sim but by the relevant focus-sensitive operator, e.g., *only* in (ii).

(i) $[[\alpha\sim C]]_f = \{[[\alpha\sim C]]_o\}$

(ii) $[[\text{only}_C [IP\ \dots\ \sim C]]_o = \lambda w. \forall p [p(w) = 1 \wedge p \in C \rightarrow p = [[IP]]_o]$
 $[[\text{only}_C [IP\ \dots\ \sim C]]_f = \{[[\text{only}_C [IP\ \dots\ \sim C]]_o\}$

⁸ We will also follow Beck (2006) in assuming that wh-phrases lack an ordinary semantic value. This is not crucial to rule out strongly exhaustive WhQs under *surprise-Vs*, but it nicely derives intervention effects. See also fn. 13.

question meaning out of it, make this question meaning be the $\llbracket \cdot \rrbracket_o$ of its mother node and close off or “reset” the focus alternatives of the mother node. This is shown in (26d–27d).

Now, before the question meaning in (26d) can combine with *surprise* in (19), it must combine with an answer operator: the weakly exhaustive Ans_{WK} in (28) or the strongly exhaustive Ans_{STR} in (29) (where $\llbracket \text{Q} \rrbracket_K(w)$ is the Karttunen-style question denotation (Karttunen 1977)). We will try both possibilities in turn.

$$(28) \quad \text{Ans}_{\text{WK}}(Q, w) = \cap \llbracket \text{Q} \rrbracket_K(w)$$

$$(29) \quad \text{Ans}_{\text{STR}}(Q, w) = \lambda w' [\text{Ans}_{\text{WK}}(Q, w) = \text{Ans}_{\text{WK}}(Q, w')]$$

Inserting Ans_{STR} produces LF (30). The semantic computation of this LF gives us two results. On the one hand, the step (27c) requires that C be a subset of $\llbracket \text{who called} \rrbracket_f$, which equals $\{r \text{ called}, t \text{ called}\}$, as indicated in (31a). On the other, the final denotation of the constituent $[\text{Ans}_{\text{STR}}[\dots]]$ will be an exhaustive proposition, as exemplified in (31b). These two results together lead to a violation of the presupposition (19b): The proposition (31b) serving as the comparison term is required to be a member of the comparison class C , but clearly it is not. As a result, the LF (30) is ruled out and strongly exhaustive readings of WhQs are forbidden under *surprise-Vs*.

$$(30) \quad * [[\text{Ans}_{\text{STR}} [\text{CP Q} [\text{IP who called}]\text{-C}] \text{surprised}_C \text{John}]$$

$$(31) \quad \text{a. } C \subseteq \{t \text{ called}, r \text{ called}\}$$

$$\text{b. } \llbracket \text{Ans}_{\text{STR}} [\dots] \rrbracket =_{\text{e.g.}} \text{“that } t \text{ and nobody else called”}$$

Inserting weakly exhaustive Ans_{WK} yields the LF (32). The first result arising from the semantic computation is as before: (33a). But, by using Ans_{WK} , the final denotation of $[\text{Ans}_{\text{WK}}[\dots]]$ is now a non-exhaustive proposition, as illustrated in (33b). This time the presupposition (19b) is satisfied: The proposition (33b) serving as the comparison term is a member of the comparison class C . As a result, the LF (32) is ruled in and weakly exhaustive readings of WhQs are allowed under *surprise-Vs*.

$$(32) \quad [[\text{Ans}_{\text{WK}} [\text{CP Q} [\text{IP who called}]\text{-C}] \text{surprised}_C \text{John}]$$

$$(33) \quad \text{a. } C \subseteq \{t \text{ called}, r \text{ called}\}$$

$$\text{b. } \llbracket \text{Ans}_{\text{WK}} [\dots] \rrbracket =_{\text{e.g.}} \text{“that } t \text{ called”}$$

We have run our analysis for singular wh-phrases for simplicity, but the account generalizes to semantically number-neutral wh-phrases like *who*. If we take sentence (34), the comparison class C will be (35a) and the two comparison terms will be,

e.g., (35b–35c). As before, the comparison term arising from Ans_{STR} violates (19b) whereas the one arising from Ans_{WK} satisfies it.⁹

- (34) $\text{Who}_{\{r(\text{alph}),t(\text{obi}),s(\text{imon})\}}$ called surprised John.
- (35) a. $C \subseteq \{t \text{ called}, r \text{ called}, s \text{ called}, t \ \& \ r \text{ called}, \dots, t \ \& \ r \ \& \ s \text{ called}\}$
 b. $\llbracket \text{Ans}_{\text{STR}} [\dots] \rrbracket =_{\text{e.g.}}$ “that t and nobody else called”
 c. $\llbracket \text{Ans}_{\text{WK}} [\dots] \rrbracket =_{\text{e.g.}}$ “that t called”

3.2 Banning AltQs under *surprise*-predicates

As before, our first ingredient in the analysis of AltQs under *surprise*-Vs is the focus-sensitivity of these predicates, which requires us to adjoin $\sim C$ to some constituent down the tree. This is done for sentence (36) in the LF (37):

- (36) * Whether Ralph or Tobi called surprised John.
- (37) * $\llbracket \text{Ans}_{[\text{CP } Q \text{ } [\text{IP} (\text{whether}) \text{ Ralph or Tobi called}]} \sim C \rrbracket$ surprised_C John.]

The second ingredient concerns the source of the alternatives. In AltQs, the set of alternatives arises from disjunction, which crucially introduces alternatives as ordinary semantic value (Alonso-Ovalle 2005, 2006; Simons 2005), not as focus semantic value.¹⁰ These ordinary alternatives combine point-wise with other denotations up the tree until they encounter the Q -operator (Biezma & Rawlins 2012). The job of the Q -operator is parallel to the previous case: It takes the non-singleton set of alternatives provided by its syntactic sister –in this case $\llbracket \text{IP} \sim C \rrbracket_{\text{o}}$ –, it builds a question meaning out of it, it establishes this question meaning as the $\llbracket \cdot \rrbracket_{\text{o}}$ of its mother node and it closes off or “resets” the focus alternatives of the mother node. This is shown in (38–39).

- (38) a. $\llbracket \text{Ralph or Tobi} \rrbracket_{\text{o}} = \{r, t\}$
 b. $\llbracket \text{Ralph or Tobi called} \rrbracket_{\text{o}} = \{r \text{ called}, t \text{ called}\}$
 c. $\llbracket [R. \text{ or } T. \text{ called}] \sim C \rrbracket_{\text{o}} = \llbracket R. \text{ or } T. \text{ called} \rrbracket_{\text{o}}$ if $C \subseteq \llbracket R. \text{ or } T. \text{ called} \rrbracket_{\text{f}}$; otherwise #.

9 In the case of *surprise* plus an interrogative clause, C is mandatorily shaped by the focus semantic value (arising from the *wh*-phrase) of the embedded IP. This is shown in (iii): Regardless of where we place an accent, (iii.b) does not have the reading (iii.a) has. We take this to mean that, when embedding an interrogative clause, *surprise* associates with focus conventionally.

(iii) a. It surprised Lisa when John taught syntax.
 b. It surprised Lisa who taught syntax on Tuesdays.

10 The disjuncts in AltQs typically carry accent (Bartels 1999; Pruitt & Roelofsen 2013), but this accent may be analyzed as indicating, for example, contrastive foci (Han & Romero 2004).

- d. $\llbracket Q \text{ IP}\sim C \rrbracket_o = \lambda w_0. \lambda p. p \in \llbracket \text{IP}\sim C \rrbracket_o \wedge p(w_0) = 1$
 $\quad \quad \quad =_{\text{e.g.}} \lambda w_0. \{t \text{ called}\}$
- (39) a. $\llbracket \text{Ralph or Tobi} \rrbracket_f = \{\{r, t\}\}$
 b. $\llbracket \text{Ralph or Tobi called} \rrbracket_f = \{\{r \text{ called}, t \text{ called}\}\}$
 c. $\llbracket [R. \text{ or } T. \text{ called}]\sim C \rrbracket_f = \llbracket R. \text{ or } T. \text{ called} \rrbracket_f$ if $C \subseteq \llbracket R. \text{ or } T. \text{ called} \rrbracket_f$;
 otherwise #.
 d. $\llbracket Q \text{ IP}\sim C \rrbracket_f = \{\llbracket Q \text{ IP}\sim C \rrbracket_o\}$

Now we have to combine $\llbracket Q \text{ IP}\sim C \rrbracket_o$ with an Ans operator. Inserting the strongly exhaustive operator Ans_{STR} gives us the LF (40). The semantic computation of this LF produces two results. First, due to (38c–39c), C must be a subset of $\llbracket \text{Ralph or Tobi called} \rrbracket_f$, which in turn equals the singleton $\{\{\text{“that t(obi) called”}, \text{“that r(alph) called”}\}\}$. This gives us (41a). Second, the denotation of $\text{Ans}_{\text{STR}}[\dots]$ is “that t(obi) and nobody else called”, as indicated in (41b). This leads to a violation of presupposition (19b), since the proposition (31b) serving as the comparison term cannot possibly be a member of the comparison class C , which is not a set of propositions but a set of sets of propositions.

- (40) * $\llbracket [\text{Ans}_{\text{STR}} [_{\text{CP}} Q [_{\text{IP}} \text{Ralph or Tobi called}]\sim C] \text{ surprised}_C \text{ John}] \rrbracket$
- (41) a. $C \subseteq \{\{\text{“that t(obi) called”}, \text{“that r(alph) called”}\}\}$
 b. $\llbracket \text{Ans}_{\text{STR}}[\dots] \rrbracket = \text{“that t(obi) and nobody else called”}$

Since presupposition failure was induced not by the wrong shape of the comparison term but by the wrong shape of the comparison class C , inserting the weakly exhaustive Ans_{WK} will not do any better. The LF is given in (42) and the semantic results in (43a–43b). Again, the proposition “that t(obi) called” cannot possibly belong to the set of sets of propositions in (43a), thus leading to the violation of presupposition (19b).

- (42) * $\llbracket [\text{Ans}_{\text{WK}} [_{\text{CP}} Q [_{\text{IP}} \text{Ralph or Tobi called}]\sim C] \text{ surprised}_C \text{ John}] \rrbracket$
- (43) a. $C \subseteq \{\{\text{“that t(obi) called”}, \text{“that r(alph) called”}\}\}$
 b. $\llbracket \text{Ans}_{\text{WK}}[\dots] \rrbracket = \text{“that t(obi) called”}$

In sum, regardless of which answer operator we insert, AltQs fail to provide the right kind of comparison class argument C for surprise_C , due to the lack of appropriate focus alternatives. They are, thus, disallowed under *surprise* predicates.¹¹

11 The proposed analysis of the ban of *surprise*-Vs against AltQs can be extended to PolQs if we assume that, in PolQs too, the set of alternatives arises from the $\llbracket \cdot \rrbracket_o$ of some disjunctive element, e.g., elliptical *or not* (Guerzoni & Sharvit 2014).

4 Refinements of the proposal

The relatively simple apparatus in Section 3 captures the essence of our analysis of the ban of *surprise*-Vs against strongly exhaustive WhQs and against AltQs. But we have to see how it meshes with other aspects of the grammar of questions and focus. As it turns out, in its current form it is too naive in at least one respect. We have made the Q -morpheme an unselective binder of all wh-phrases in its scope. But the empirical fact is that Q can selectively bind targeted wh-phrases, thus allowing for the configurations (44a-44b), witness (45–46) (Beck 2006). Furthermore, sentences like (47) have been taken to suggest that the squiggle operator \sim is selective too and, thus, that the configuration (44c) is permitted as well (Rooth 1996). We will follow Wold (1996), who builds on Kratzer (1991), and make \sim a selective binder too.

- (44) a. $[Q_i \dots [Q_j [\dots wh_i \dots]]\dots]$ Baker sentences
 b. $[\sim_i C \dots [Q_j [\dots F_i \dots]]\dots]$ Focus out of question
 c. $[\sim_i D \dots [\sim_j C [\dots F_j \dots F_i \dots]]\dots]$ Multiple Focus
- (45) Who wonders / knows / was surprised at where we bought what?
 (ok with *who* and *what* interpreted as bound by the matrix Q)
- (46) John only wonders / knows / is surprised at who BILL invited.
 (ok with *BILL* associated with *only*)
- (47) I only introduced MARILYN to John Kennedy.
 I also only introduced Marilyn to BOB Kennedy.
 (ok with *Marilyn* associated with *only* and with *BOB* associated with *also*)

This section presents a first step towards recasting the analysis advanced in Section 3 in a framework where Q_i and \sim_j bind wh-phrases and foci selectively.

4.1 Basics

We assume that syntactic structures contain two kinds of indices: referential indices, encoded as subscripted numbers 1, 2, 3, etc., and alternative indices, represented as subscripted 1_{ALT} , 2_{ALT} , 3_{ALT} , etc. Correspondingly, we assume two kinds of assignments g and h . Assignment g applies only to referential indices (and it will be mostly inoperative in the examples below); assignment h applies to alternative indices (and it will be crucial to build the required set of alternatives). Both assignments are used as interpretation parameters in the interpretation function for the ordinary semantic value, $\llbracket \cdot \rrbracket_o^{g,h}$, and for the focus semantic value, $\llbracket \cdot \rrbracket_f^{g,h}$.

Further, we assume the following sample denotations. (48-51) are from Beck (2006). $\llbracket or_{5ALT} \rrbracket_o^{g,h}$ in (52) is our innovation.¹² The idea behind (52a) is that *or*

¹² Though see Guerzoni & Sharvit (2014) for a treatment of $\llbracket or_n \rrbracket_o$ similar to (52a).

introduces –as before– alternatives as ordinary semantic value, but these alternatives are now introduced via the alternative index 5_{ALT} and thus can be pulled out selectively via the assignment h . As for $\llbracket or_{5ALT} \rrbracket_f^{g,h}$ in (52b), it gives us the traditional meaning of disjunction; no alternatives will be created here via the assignment h . Combining the lexical entries for or_{5ALT} with the proper names *Ralph* and *Tobi*, we obtain (53).

- (48) a. $\llbracket John \rrbracket_o^{g,h} = j$
 b. $\llbracket John \rrbracket_f^{g,h} = j$
- (49) a. $\llbracket call \rrbracket_o^{g,h} = \lambda x_e. \lambda w_s. call(x, w)$
 b. $\llbracket call \rrbracket_f^{g,h} = \lambda x_e. \lambda w_s. call(x, w)$
- (50) a. $\llbracket JOHN_{5ALT} \rrbracket_o^{g,h} = j$
 b. $\llbracket JOHN_{5ALT} \rrbracket_f^{g,h} = h(5)$
- (51) a. $\llbracket who_{5ALT} \rrbracket_o^{g,h} = \#$
 b. $\llbracket who_{5ALT} \rrbracket_f^{g,h} = h(5)$
- (52) a. $\llbracket or_{5ALT} \rrbracket_o^{g,h} = \lambda x_e. \lambda y_e. \lambda P_{\langle e, st \rangle}. \lambda w_s : h(5) = x \vee h(5) = y. P(h(5))(w)$
 b. $\llbracket or_{5ALT} \rrbracket_f^{g,h} = \lambda x_e. \lambda y_e. \lambda P_{\langle e, st \rangle}. \lambda w_s. P(x)(w) \vee P(y)(w)$
- (53) a. $\llbracket Ralph or_{5ALT} Tobi \rrbracket_o^{g,h} = \lambda P_{\langle e, st \rangle}. \lambda w_s : h(5) = r \vee h(5) = t. P(h(5))(w)$
 b. $\llbracket Ralph or_{5ALT} Tobi \rrbracket_f^{g,h} = \lambda P_{\langle e, st \rangle}. \lambda w_s. P(r)(w) \vee P(t)(w)$

Finally, the felicity conditions for the selective \sim_j are stated in (54):

- (54) a. $\llbracket \alpha \sim_j C \rrbracket_o^{g,h}$ is defined only if $g(C) \subseteq \{ \llbracket \alpha \rrbracket_f^{g, hx/j} \mid x \in D_e \}$;
 if defined, $\llbracket \alpha \sim C \rrbracket_o^{g,h} = \llbracket \alpha \rrbracket_o^{g,h}$
- b. $\llbracket \alpha \sim_j C \rrbracket_f^{g,h}$ is defined only if $g(C) \subseteq \{ \llbracket \alpha \rrbracket_f^{g, hx/j} \mid x \in D_e \}$;
 if defined, $\llbracket \alpha \sim C \rrbracket_f^{g,h} = \llbracket \alpha \rrbracket_f^{g,h}$

Equipped with these semantic values, we go back to WhQs and AltQs.

4.2 Back to WhQs under *surprise-predicates*

As we saw, the Q -operator has to retrieve a non-singleton set of alternatives from its syntactic sister. In the new implementation, this set is retrieved via the assignment h . Since wh-phrases have no ordinary semantic value but only a focus semantic value, Q_i will retrieve this set from the focus semantic value of its sister, as defined in (55):

- (55) Q_i in WhQ (roughly as in Beck 2006)
 $\llbracket Q_i Y \rrbracket_o^{g,h} = \lambda w_0. \lambda p. p \in \{ \llbracket Y \rrbracket_f^{g,hx/i} \mid x \in D_e \} \wedge p(w_0) = 1$
 $\llbracket Q_i Y \rrbracket_f^{g,h} = \llbracket Q_i Y \rrbracket_o^{g,h}$

Putting together the selective Q_i -morpheme, the felicity condition of the squiggle operator \sim_j and the lexical entries above, sentence (56) has the LF in (57) and the partial semantic derivation in (58–59):

- (56) Who_{r(alph),t(obi)} called surprised John.
(57) [[Ans_{CP} Q₅ [IP who₅ called]₅ C]] surprised_C John]
(58) a. $\llbracket who_5 \rrbracket_o^{g,h} = \#$
b. $\llbracket who_5 \text{ called} \rrbracket_o^{g,h} = \#$
c. $\llbracket [who_5 \text{ called}] \sim_5 C \rrbracket_o^{g,h} = \#$
d. $\llbracket Q_5 [who_5 \text{ called}] \sim_5 C \rrbracket_o^{g,h}$
 $= \lambda w_0. \lambda p. p \in \{ \llbracket [who_5 \text{ called}] \sim_5 C \rrbracket_f^{g,hx/5} \mid x \in D_e \} \wedge p(w_0) = 1$
 $=_{\text{e.g.}} \lambda w_0. \{ \lambda w_s. \text{call}(tobi, w) \}$
(59) a. $\llbracket who_5 \rrbracket_f^{g,h} = h(5)$
b. $\llbracket who_5 \text{ called} \rrbracket_f^{g,h} = \lambda w. \text{call}(h(5), w)$
c. $\llbracket [who_5 \text{ called}] \sim_5 C \rrbracket_f^{g,h}$
 $= \lambda w. \text{call}(h(5), w)$ if $g(C) \subseteq \{ \llbracket who \text{ called} \rrbracket_f^{g,hx/5} \mid x \in D_e \}$; otherwise #
d. $\llbracket Q_5 [who_5 \text{ called}] \sim_5 C \rrbracket_f^{g,h} = \llbracket Q_5 [who_5 \text{ called}] \sim_5 C \rrbracket_o^{g,h}$

Step (59c) forces $g(C)$ to be a subset of $\{ \llbracket who \text{ called} \rrbracket_f^{g,hx/5} \mid x \in D_e \}$, which in turns equals $\{ \lambda w. \text{call}(ralph, w), \lambda w. \text{call}(tobi, w) \}$: (60). This is the same comparison class C that we obtained in the simplified implementation. Inserting Ans_{STR} and Ans_{WK} will have, hence, the same effects as in Section 3: Ans_{STR} will lead to a violation of (19b) and, thus, strongly exhaustive readings of WhQs will be ruled out when embedded under *surprise*-Vs, whereas Ans_{WK} will satisfy the presupposition and, thus, weakly strongly WhQs will be allowed in these environments.

- (60) $g(C) \subseteq \{ \lambda w. \text{call}(ralph, w), \lambda w. \text{call}(tobi, w) \}$

Let us note that, once the Q -morpheme and the squiggle operator have been made selective, it becomes clear that the squiggle could not have been adjoined any higher in the syntactic tree. More concretely, while the adjunction site in (57) is permissible, the ones in (61–62) are not. This is because \sim_i needs to build the set $\{ \llbracket Y \rrbracket_f^{g,hx/i} \mid x \in D_e \}$ out of its sister Y . For it to yield the intended set, the index i should not be bound off in Y yet, which means that Y has to be under Q_i .

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(61) LF: * [Ans [CP Q_i [IP **who_i called**]]~_iC] surprised_C John.

(62) LF: * [Ans [CP Q_i [IP **who_i called**]]~_iC surprised_C John.

In sum, a system has been defined with Q_i and \sim_j as selective binders that allows for the grammatical configurations in (45–47) and derives the desired contrast between strongly and weakly exhaustive readings of WhQs under *surprise*-Vs.¹³

4.3 Back to AltQs under *surprise*-predicates

In the case of AltQs, the non-singleton set of alternatives retrieved by the Q -operator via assignment h comes from the ordinary semantic value of its syntactic sister, since the focus value of the sister only provides a singleton. This is defined in (63):

(63) Q_i in AltQ
 $\llbracket Q_i Y \rrbracket_o^{g,h} = \lambda w_0. \lambda p. p \in \{ \llbracket Y \rrbracket_o^{g,h/x^i} \mid x \in D_e \} \wedge p(w_0) = 1$
 $\llbracket Q_i Y \rrbracket_f^{g,h} = \llbracket Q_i Y \rrbracket_o^{g,h}$

Sentence (64) has the LF representation (65), whose partial semantic derivation is given in (66–67):

(64) * Whether Ralph or Tobi called surprised John.

(65) * [Ans [CP Q [IP (**whether**) **Ralph or Tobi called**]]~C] surprised_C John.]

(66) a. $\llbracket \text{Ralph or}_{5ALT} \text{Tobi} \rrbracket_o^{g,h}$
 $= \lambda P_{\langle e, st \rangle}. \lambda w : h(5) = r \vee h(5) = t. P(h(5))(w)$
 b. $\llbracket \text{Ralph or}_{5ALT} \text{Tobi called} \rrbracket_o^{g,h}$
 $= \lambda w : h(5) = r \vee h(5) = t. call(h(5), w)$
 c. $\llbracket [\text{Ralph or}_{5ALT} \text{Tobi called}] \sim_5 C \rrbracket_o^{g,h}$
 $= \lambda w : h(5) = r \vee h(5) = t. call(h(5), w)$
 if $g(C) \subseteq \{ \llbracket \text{Ralph or}_{5ALT} \text{Tobi called} \rrbracket_f^{g,h/x^5} \mid x \in D_e \}$; # otherwise

13 Note, furthermore, that the intervention configuration (iv) is correctly ruled out, even though \sim_j is a selective binder. This is because the operator Op_C linked to $\sim_j C$ (e.g., *only*, *even*) needs to operate both on the ordinary value and on the focus value of its syntactic sister, $[XP \sim_j C]$. Since this sister contains a WhP wh_i that has not yet been bound off, $\llbracket XP \rrbracket_o$ is undefined, and so is $\llbracket Op_C XP \sim_j C \rrbracket_o$ as well as $\llbracket Op_C XP \sim_j C \rrbracket_f (= \{ \llbracket Op_C XP \sim_j C \rrbracket_o \})$. The undefinedness of $\llbracket Op_C XP \sim_j C \rrbracket_f$ percolates up the tree, making $\llbracket YP \rrbracket_f$ undefined as well. Finally, Q_i has to combine with $\llbracket YP \rrbracket_f$, leading to undefinedness. This leaves LF (v) without an ordinary semantic value, in violation of Beck's principle (v).

(iv) * $[Q_i [Y_P \dots Op_C [X_P \dots wh_i \dots] \sim_j C]]$ Intervention effects

(v) Principle of Interpretability:

An LF must have an ordinary semantic interpretation.

- d. $\llbracket Q_i [Ralph\ or_{5ALT}\ Tobi\ called] \sim_5 C \rrbracket_o^{g,h}$
 $= \lambda w_0. \lambda p. p \in \{ \llbracket [R. or_{5ALT}\ T. called] \sim_5 C \rrbracket_o^{g,h/x5} \mid x \in D_e \} \wedge p(w_0) = 1$
 $=_{e.g.} \lambda w_0. \{ \lambda w_s. call(tobi, w) \}$
- (67) a. $\llbracket Ralph\ or_{5ALT}\ Tobi \rrbracket_f^{g,h}$
 $= \lambda P_{\langle e, st \rangle}. \lambda w. P(r)(w) \vee P(t)(w)$
- b. $\llbracket Ralph\ or_{5ALT}\ Tobi\ called \rrbracket_f^{g,h}$
 $= \lambda w. call(r, w) \vee call(t, w)$
- c. $\llbracket [Ralph\ or_{5ALT}\ Tobi\ called] \sim_5 C \rrbracket_f^{g,h}$
 $= \lambda w. call(r, w) \vee call(t, w)$
 if $g(C) \subseteq \{ \llbracket Ralph\ or_{5ALT}\ Tobi\ called \rrbracket_f^{g,h/x5} \mid x \in D_e \}$; # otherwise
- d. $\llbracket Q_i [Ralph\ or_{5ALT}\ Tobi\ called] \sim_5 C \rrbracket_f^{g,h}$
 $= \llbracket Q_i [Ralph\ or_{5ALT}\ Tobi\ called] \sim_5 C \rrbracket_o^{g,h}$

Crucially, steps (66c)/(67c) ask us to take the focus semantic value of $[Ralph\ or_{5ALT}\ Tobi\ called]$ in (67b) and make a set of alternatives out of it via $h^{x/5}$. The resulting set equals $\{ \lambda w_s. call(r, w) \vee call(t, w) \}$. The comparison class C is then required to be a subset of that set, as indicated in (68). It is clear that, regardless of whether we insert Ans_{STR} or Ans_{WK} , the comparison terms that we obtain – illustrated in (69a) and (69b), respectively – do not belong to the comparison class C , thus violating presupposition (19b). This rules out AltQs under *surprise-Vs* entirely.

$$(68) \quad g(C) \subseteq \{ \lambda w_s. call(r, w) \vee call(t, w) \}$$

- (69) a. $\llbracket Ans_{STR}[\dots] \rrbracket =$ “that t(obi) and nobody else called”
 b. $\llbracket Ans_{WK}[\dots] \rrbracket =$ “that t(obi) called”

In sum, the results of the simplified analysis concerning AltQs can be maintained while treating Q_i and \sim_j as selective binders and, thus, allowing for the configurations (45–47).¹⁴

14 It is known that AltQs also show intervention effects, witness (vi) (Beck & Kim 2006). If the internal composition of AltQs that we have proposed is on the right track, this means that so-called intervenors disrupt not only the percolation of focus alternatives but also of ordinary alternatives. That this may be the case is suggested by data on negative polarity items, which have been argued to introduce a set of alternatives as ordinary semantic value (see e.g. Kratzer & Shimoyama 2002) and fail to be licensed when certain operators intervene, e.g., *always* in (vii) (Linebarger 1987). (But see also Beck 2006 for different take on them.)

- (vi) a. Hat Peter Maria oder Susanne eingeladen? ok as AltQ
 has Peter Maria or Susanne invited
 ‘Did Peter invite Maria or Susanne?’

5 Previous Approaches

5.1 Guerzoni (2007)

Guerzoni (2007) is concerned with *surprise*-type verbs and *realize*-type verbs. Her goal is to explain, in a unified account, why these verbs disallow strongly exhaustive readings of WhQ as well as PolQs.

Her analysis has two main ingredients. First, embedded PolQs compete with the more informative declarative clauses expressing the possible answers, as in (70b-70c). Using the less informative sentence triggers the implicature that the speaker is uncertain about each of the more informative alternatives.

- (70) a. Mary X_{verb} **whether** Susan was at the party.
b. Mary X_{verb} **that** Susan was at the party.
c. Mary X_{verb} **that** Susan wasn't at the party.

Second, *surprise*-verbs and *realize*-verbs, contrary to *know*-verbs like *find out*, are speaker-factive, as defined in (71) (Guerzoni & Sharvit 2007). See the acceptability contrast between *find out* and *realize* in (72) illustrating this point.

- (71) In the construction $[NP_{\text{su}} V Q]$, V is speaker-factive iff the sentence presupposes that the speaker knows the complete true answer (Ans_{WK} or Ans_{STR}) to Q.
- (72) Context: Mary doesn't know who was at the party that she missed the night before. Her friend John wasn't there either. Mary picks up the phone, calls John and starts inquiring...
- a. M: Hi John, so have you found out who was at the party?
b. # M: Hi John, have you realized who was at the party?
c. J: No, sorry, I haven't yet found out who was there.
d. # J: No sorry, I haven't yet realized who was there.

These two ingredients derive the ban of *surprise*- and *realize*-Vs against PolQs as follows. On the one hand, given speaker factivity, the speaker of (73) must know the complete true answer to the question *Was Susan at the party?*. On the other, given

b. * Hat nur Peter Maria oder Susanne eingeladen? * as AltQ
has only Peter Maria or Susanne invited
'Did only Peter invite Maria or Susanne?'

(vii) * I didn't always buy anything.

the competition in (70), it is conversationally implicated that the speaker is uncertain about the truth of each of the following more informative sentences: *Mary realized that Susan was at the party* and *Mary realized that Susan wasn't at the party*. This systematically produces a contradiction and PolQs are thus ruled out under *surprise-* and *realize-Vs*. Similarly, strongly exhaustive readings of WhQs produce a clash between the presupposed and entailed content of the sentence, on the one hand, and (primary) conversational implicatures, on the other.

(73) * John realized whether Susan was at the party.

With these components, Guerzoni (2007) delivers an attractive analysis of the ban against strongly exhaustive WhQs and against PolQs for *realize-*predicates. Furthermore, her explanation can be extended to rule out AltQs. However, while speaker factivity seems empirically motivated for *realize-*verbs, it is dubious for *surprise-*verbs (as the author concedes herself), witness the acceptability of (74B):

(74) A: Hi John, do you know who was at the party?
B: No, but this much I can tell you: It surprised Bill who was there.

5.2 Nicolae (2013a,b)

Nicolae (2013a,b) is mostly concerned with the licensing of negative polarity items (NPIs) in questions. In developing an analysis of this phenomenon, she sketches a potential explanation of the incompatibility of *surprise-Vs* with strongly exhaustive WhQs and with AltQs.

Her account makes use of two ingredients. First, strong exhaustivity in WhQs is due to a phonologically null exhaustifying operator *only* within the question nucleus, as in (75). This ingredient, which is optional in WhQs and produces the strong/weak ambiguity, is supported by NPI data. AltQs are said to involve an instance of this null exhaustifying operator in the question nucleus obligatorily, as in (76).

- (75) a. (NP V) who failed the exam.
b. LF: [who [Q [**only** t_F failed the exam]]]
- (76) a. (NP V) whether John or Bill failed the exam.
b. LF: [∃ John or Bill [Q [**only** t_F failed the exam]]]

Second, *surprise-Vs* are said to be by and large Strawson-downward entailing.

The co-occurrence of an exhaustified question nucleus and an embedding downward-entailing verb leads to a clash, since the exhaustifying operator is not allowed if leading to global weakening (Maximize Strength in Chierchia, Fox & Spector

2012). This clash makes strongly exhaustive WhQs and AltQs incompatible with *surprise*-verbs.

An appealing feature of the analysis is that it relates the two restrictions at issue to the NPI licensing data. However, this approach predicts a contrast between factive emotive verbs that are downward entailing (e.g., *be angry about*) and those that are upward entailing (e.g., *be happy about*). The former should not embed strongly exhaustive WhQs nor AltQs, while the latter should be able to. This prediction is not borne out: *Be happy about*, just like *surprise* or *be angry about*, disallows the strongly exhaustive reading of WhQs, as shown in (77–78), and is incompatible with AltQs, as shown in (79).

- (77) Scenario: Out of our guests (say, a, b, c and d), a, b and c came to the party and John is unhappy about it; but d did not come and John is happy about it.
- (78) a. John is happy about who came to the party. \Rightarrow NOT TRUE in (77)
 b. John is happy about who didn't come to the party. \Rightarrow TRUE in (77)
- (79) * John is happy about [_{AltQ} whether Mary_{L*}H₋ or Sue_{H*}L₋ came to the party].

5.3 Uegaki (2015)

The goal of Uegaki's (2015) paper is to derive the distribution of weakly, intermediate and strongly exhaustive readings of WhQs from the interaction between the semantics of the embedding verb and general pragmatic pressures.

The ban of *surprise*-Vs against strongly exhaustive WhQs is derived as follows. The basic reading of an interrogative clause is the weakly exhaustive reading. From here, one can get to the intermediate reading via the exhaustification operator X defined in (80), and, from there, one can generate the strongly exhaustive reading via global strengthening. Crucially, since X negates only logically stronger alternatives, the application of X will be vacuous whenever the embedding verb is non-monotonic.

$$(80) \quad \llbracket X\varphi \rrbracket := \lambda w. \llbracket \varphi \rrbracket(w) \wedge \forall p \in \llbracket \varphi \rrbracket^{\text{Alt}} [p \subset \llbracket \varphi \rrbracket \rightarrow p(w) = 0]$$

The crucial assumption is that *surprise*-Vs are non-monotonic. Hence, the application of the exhaustification operator X is vacuous, the intermediate reading of WhQs cannot be derived and neither can be the strongly exhaustive reading.

The paper offers an interesting integrated account of the readings of WhQs available under an array of embedding predicates. Nevertheless, some worries remain. First, it is not clear that *surprise*-predicates are non-monotonic (see e.g. von Stechow 1999). Second, certain embedding verbs are downward monotonic, like Spanish *ignorar* 'not-know' or English *forget*, exemplified in (81). Since (81) allows for the strongly exhaustive reading, the exhaustification operator X must have

applied. As the reader can determine for herself, if we exhaustify as in (82a), we obtain a contradiction (see also Uegaki 2015: fn.13). If we exhaustify as in (82b), we obtain the intermediate reading (and then the strongly exhaustive reading). But this involves decomposing the lexical verb *ignorar* ‘not-know’ into two scopally separable components –negation and ‘know’– so that *X* can be placed in between. Unfortunately, in contrast to cases like German *kein* ‘no’ and English *no* in (83), where the two components are separable (Jacobs 1982; Penka 2011), there is no evidence that two such components can be separated in *ignorar*. For example, (84a) does not have the reading (84b). Finally, the proposed analysis affords no clear extension to the ban against AltQs.

- (81) Juan ignora quién vino.
 Juan not-know who came
 ‘John doesn’t know who came.’
- (82) a. X [J not-know [who came]]
 b. not [X [J knows [who came]]]
- (83) a. The company need fire no employees. (Potts 2000)
 b. “The company is not obligated to fire any employees.”
- (84) a. Juan necesita / puede ignorar quién vino.
 Juan needs / can not-know who came
 ‘Juan needs / can fail to know who came.’
 b. “It is not obligatory / possible that Juan knows who came.”

6 Conclusions and outlook

A novel analysis has been developed that explains why *surprise*-predicates disallow strongly exhaustive readings of WhQs and do not embed AltQs. These verbs are focus-sensitive and have a degree construction semantics relating a comparison term –the proposition arising from the complement clause– to a comparison class *C* shaped by focus (Villalta 2008). As in degree constructions in general, the comparison term is presupposed to be a member of the comparison class *C*. In WhQs, this presupposition is violated when the proposition arising from the complement interrogative is the strongly exhaustive answer but not when it is the weakly exhaustive answer. In AltQs, this presupposition is violated regardless of which of the two answers we select. This idea has received a first tentative implementation in a system where both the *Q*-operator and the squiggle operator \sim selectively bind their wh/focus associates.

We leave for future research an extension of the present analysis to PolQs as well as a closer comparison between the behavior of *surprise*-Vs and *realize*-verbs.

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