

Q-adverbs as Selective Binders: The Quantificational Variability of Free Relatives and Definite DPs

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0 Introduction

If one considers sentences like (1a, b) below, it seems to be pretty obvious that adverbial quantifiers like *always*, *usually*, *sometimes*, *never* etc. quantify over abstract entities like time intervals or situations (de Swart (1993), von Stechow (1994)): (1a) is intuitively true if all situations where Mary is tired are situations where she drinks a cup of coffee, while (1b) seems to be true if at least more than half of the situations where Mary is tired are situations where she drinks a cup of coffee.

- (1) a. When Mary is tired, she always drinks a cup of coffee.
b. When Mary is tired, she usually drinks a cup of coffee.

(2a, b) get similar interpretations, the only difference being that in contrast to the sentences in (1), the set of situations quantified over is not explicitly given in the form of a *when*-clause, but has to be inferred on the basis of the accentuation pattern as well as on the basis of clause-internal and contextual information (Rooth (1985), de Swart (1993), von Stechow (1994), among many others).

- (2) a. John always drinks a lot of beer.
b. John usually drinks a lot of beer.

Therefore, those sentences are underspecified if they are presented without an explicit context: In order for (2a) to be true, for example, it is not necessary that all situations in the whole universe are situations where John drinks a lot of beer, or that John drinks a lot of beer in all situations where he is included. Rather, if it is read with the main accent on *beer*¹, (2a) is true if there is some set of situations that include John (for example the set of situations where he is at a party) such that all of those situations are situations where he drinks a lot of beer. If it is read with the main accent on *John*, on the other hand, (2a) is true if there is some contextually specified set of situations where people drink lots of beer such that in all of those situations John is one of them.

¹ This presumably causes the whole VP *drinks a lot of beer* to be interpreted as focussed (s. Selkirk (1995)). I will discuss the influence of information structure on the interpretation of adverbially quantified sentences in chapters 2 and 3.

In this dissertation I will deal with an interpretative effect that sometimes occurs in adverbially quantified sentences that contain DPs other than proper nouns: Some of those sentences do not seem to quantify over situations or eventualities, but over individuals. This effect (which has been discussed systematically for the first time in Lewis (1975)) is usually associated exclusively with adverbially quantified sentences that contain singular indefinites and bare plurals, and has been a central topic in formal semantics since the seminal work of Kamp (1981) and Heim (1982). Since Berman (1991), it is generally referred to as *Quantificational Variability Effect (QVE)*, because the quantificational force of the respective singular indefinite or bare plural seems to depend on the quantificational force of the Q-adverb contained within the same clause. This is evidenced by the sentences in (3) below, which intuitively can be paraphrased by (4a) and (4b), respectively:

- (3) a. A dog is usually intelligent.
b. Dogs are usually intelligent.
c. A dog is sometimes intelligent.
d. Dogs are sometimes.
- (4) a. Most dogs are intelligent.
b. Some dogs are intelligent.

The existence of QVEs is a major challenge for the hypothesis that natural languages are strictly compositional (in the sense of Frege (1892) and Montague (1974)), as it seems to make it impossible to give a unified denotation for both indefinite DPs and Q-adverbs: While the former behave as generalized quantifiers with existential force in some contexts (namely, in episodic sentences that do not contain a Q-adverb), and as predicative expressions in others (namely, in sentences that contain a Q-adverb and in generic sentences), the latter sometimes (as in (1) and (2)) seem to quantify over situations/eventualities, while they in other contexts (like the ones in (3)) seem to quantify over individuals.

Therefore, various proposals have been made in the literature in order to deal with this phenomenon: There is one line of analysis that gives up the assumption that Q-adverbs exclusively quantify over time intervals and situations, but treats them as unselective quantifiers, which may also quantify over individuals. Furthermore, singular indefinites and bare plurals are analysed as predicative expressions, which introduce sets of individuals (Lewis (1975), Kamp (1981), Heim (1982), Diesing (1992), Kratzer (1995); s. also Chierchia

(1995a) for a related, but slightly different view). I will deal with those theories in more detail in chapter 1.

On the other hand, there is a second line of thought, the proponents of which stick to the assumption that Q-adverbs are only able to quantify over abstract entities like situations, and that indefinites are ordinary quantificational DPs with existential quantificational force. According to those theories, QVEs come about as by-products of quantification over (minimal) situations such that each of those situations includes an individual that is the value of the variable bound by the existential quantifier (de Swart (1993), von Stechow (1994), Rooth (1995), Herburger (2000)).

In this dissertation I want to present arguments which show that Q-adverbs are indeed only able to quantify over situations or eventualities. I will however mainly focus on adverbially quantified sentences that contain DPs other than singular indefinites and bare plurals – namely singular and plural definites and free relative clauses (FRs). As we will see, QVEs can also be observed in those sentences, and are therefore a far more general phenomenon than usually assumed. On the other hand, I will show that analysing the above mentioned types of DPs as predicative expressions in analogy to singular indefinites and bare plurals is not a sensible option, as one could then not account for the interpretations those DPs get in other contexts. There is thus no reasonable alternative to explaining QVEs as by-products of quantification over situations/eventualities in these cases.

On the other hand, the above mentioned situation/event semantics approaches to QVEs cannot simply be transferred to sentences containing singular and plural definites, as the semantic contribution those DPs make to the truth conditions of their sentences is different from the ones made by singular indefinites. Furthermore, we will see that sentences containing singular definites are far more restricted in their ability to get QV-readings than sentences containing FRs and plural definites (and also ones that contain singular indefinites and bare plurals). For that reason, my main concern in this dissertation will be to provide an account of adverbial quantification which is able to explain on the one hand why QVEs occur not only in sentences that contain singular indefinites and bare plurals, but also in those that contain singular and plural definites and FRs, and why on the other hand the conditions under which such readings are possible vary with the type of DP involved. Furthermore, I will also present arguments which show directly that QVEs in sentences containing singular indefinites cannot be analysed as the result of (unselective) quantification over individuals. As we will see, QVEs are in all cases most profitably analysed as resulting from the interplay of three factors: The denotation of the DPs involved, the position occupied by those DPs at the level of

Logical Form, and the fact that Q-adverbs unambiguously quantify over situations/eventualities.

In the first part of this dissertation I will concentrate on FRs, as the fact that sentences containing FRs get QV-readings has already been discussed in the literature (Berman (1991, 1994), Dayal (1995), Wiltschko (1999)). In this part, I will show that none of the existing analyses is able to account for the availability of such readings: Neither the ones given in Berman (1991) and Wiltschko (1999), which are based on the assumptions that Q-adverbs are unselective binders and that FRs can be analysed as predicative expressions, nor the proposal sketched in Dayal (1995), which is based on the assumptions that Q-adverbs only quantify over situations, and that FRs have the same denotation as definite DPs. Regarding Dayal (1995), I will show that while her basic assumptions are correct, her specific proposal as to how QVEs come about in such cases cannot be right: They would lead us to expect that FRs pattern with singular definites, which is not borne out by the facts. Rather, I will show that FRs pattern with plural definites, as far as the availability of QVEs is concerned. This leads me to the conclusion that QVEs in the two types of sentences have to be analysed in the same way.

Before offering such an analysis in chapter 3, however, I will first in chapter 2 discuss QVEs in sentences that contain singular definites. I will show that the specific constraints those sentences are subject to can all be reduced to one fact: In order for them to show QVEs, the set denoted by the respective NP-complement of the definite determiner has to vary with the situations quantified over by the Q-adverb contained within the same clause. This has a number of consequences that I will discuss in detail in this chapter. We will furthermore see that similar constraints apply to adverbially quantified sentences containing universally quantified DPs: Also in this case, co-variation of the respective NP-set with the situations quantified over by the Q-adverb is only possible once certain contextual as well as structural requirements are met. Regarding those structural conditions, I will show that they are derivable from the requirement that the respective DP has to be c-commanded by its clause mate Q-adverb at LF in order for the required co-variation to be possible.

In chapter 3, I will finally turn to an analysis of QVEs in sentences that contain FRs and plural definites. I will first have a more detailed look at the structural conditions those sentences have to meet. We will see that those conditions – while being very different from the constraints that adverbially quantified sentences containing singular definites are subject to – are virtually identical to the ones adverbially quantified sentences that contain singular indefinites and bare plurals have to meet. I will argue that this strongly suggests that not only

singular indefinites and bare plurals have to be interpreted in the restriction of Q-adverbs in order for QVEs to obtain², but also plural definites and FRs (while singular definites have to be interpreted in the nuclear scope, as shown in detail in chapter 2). More specifically, I will argue that in order to be interpreted in the restriction of a Q-adverb, a copy of the respective DP must c-command this Q-adverb at LF. Such an assumption is closer in spirit to unselective-binding approaches like Diesing (1992), Kratzer (1995) and Chierchia (1995a), which also take structural conditions into account, than to situation/event semantics approaches like de Swart (1993), von Stechow (1994) and Herburger (2000), according to which the restriction of a Q-adverb is solely determined on the basis of information structure and/or context.

Nevertheless, I will show that there are compelling reasons for the assumption that Q-adverbs are only able to quantify over situations/eventualities. More specifically, I will discuss a newly observed constraint³ that applies to adverbially quantified sentences containing singular indefinites modified by relative clauses as well as to adverbially quantified sentences containing temporally specific FRs and plural definites modified by relative clauses, while it does not apply to adverbially quantified sentences that contain bare plurals modified by relative clauses and temporally non-specific FRs. I will show that this constraint can only be explained reasonably under the assumption that Q-adverbs are exclusive binders of eventuality/situation variables.

So, there is a tension between arguments for an analysis of QVEs that is based on event/situation semantics, and arguments for an analysis that takes the above mentioned structural considerations into account. In order to resolve this tension, I will argue for a slight extension of the inventory of options regarding the way chains are interpreted semantically. Furthermore, I will propose that a simple type shift operation is available that turns the denotation of DPs into situation predicates. With these assumptions in place, we can easily account for QVEs in sentences that contain singular indefinites, but we still do not have an explanation that carries over to sentences containing FRs and plural definites.

Therefore, I will argue for an analysis of QVEs in such sentences that is based on Nakanishi and Romero's (2004) analysis of the semantics of the Q-adverb *for the most part*. More specifically, I will argue that Q-adverbs like the ones discussed in this dissertation are not only able to quantify over sets of atomic situations, but also over the atomic parts of

² This is assumed in unselective binding as well as situation/event semantics approaches to QVEs.

³ The results reported in this section are based on joint work with Cornelia Endriss (Endriss and Hinterwimmer, to appear).

complex situations⁴, and that this assumption in combination with the two assumptions just mentioned is able to account for QVEs in sentences containing FRs and plural definites. Finally, I will offer an explanation for the fact that the above mentioned constraint applies to adverbially quantified sentences containing singular indefinites, plural definites and temporally specific FRs, but not to sentences containing bare plurals and temporally non-specific FRs. This explanation is based on the assumption that the latter type of DPs may in contrast to the former be shifted to existential quantifiers over instances of the sum individual denoted by the respective DPs (cf. Carlson (1977), Krifka et al. (1995), Chierchia (1998) and Dayal (2004) on the interpretation of kind denoting expressions in episodic sentences containing object-level predicates)).

The results of this dissertation are especially noteworthy in light of the following fact: It is well known since Bach et al. (1995) that there are many languages that have adverbial quantifiers, but no quantificational determiners. If it is furthermore true that Q-adverbs are only able to quantify over situations/eventualities, as is argued in this dissertation, the following conclusion suggests itself: Quantification over situations/eventualities is not only more widespread, but also more fundamental than quantification over individuals. This is a very interesting hypothesis, as it is rather counterintuitive: After all, it seems to be far easier to identify individuals than it is to identify situations/eventualities!

One short methodological remark before I proceed: Although I deal with the phenomenon of Quantificational Variability in general, my conclusions are almost exclusively based on English and German data. This is largely due to the fact that the example sentences that had to be constructed in order to test the hypotheses under discussion are necessarily rather complicated, and the judgements required often very subtle. For that reason, I had to restrict my attention to those two languages, as these were the only ones which were spoken by a large enough number of available informants, and with which I was sufficiently familiar myself. In general, I make use of English data throughout this dissertation if there is no relevant contrast between German and English with respect to my concerns. German data will

⁴ Cf. Lahiri (2002) for a related analysis of QVEs in adverbially quantified sentences that contain embedded questions (cf. Berman (1991) for a different analysis of such sentences). According to Lahiri (ibd.), the Q-adverb in a sentence like (i) below (Lahiri (ibd.: 26)) quantifies over the atomic parts of the answer to the question denoted by the CP-complement of *remembers*, where this answer is understood to be a sum of propositions. Sentence (i) can thus be paraphrased as given in (ii) below:

- (i) Sue mostly remembers what she got for her birthday .
- (ii) Sue remembers most parts of the answer to the question *What did I get for my birthday?*

be used only if there is such a contrast, or if some point can be made more clearly on the basis of German data.

Chapter 1:

Quantificational Variability Effects in Sentences that Contain Free Relative Clauses

1 Basic syntactic properties of Free Relatives

In many languages of the world there is a special type of *wh*-clause that is called *Free Relative Clause* or *Free Relative* (henceforth: FR)⁵ because it is not associated with an external head NP. It has the following defining characteristics (cf. Caponigro (2002a, 2002b, to appear)): FRs have an overt CP-structure, they always contain one (and only one) *wh*-word⁶ and a corresponding gap in argument or adjunct position, and they occur in positions that are normally occupied by DPs or PPs and can also be replaced by truth-conditionally equivalent DPs and PPs. In other words, FRs look like embedded single *wh*-questions, but otherwise behave as DPs or PPs. Consider the English examples in (5a, c, e) below:

- (5)
- a. John didn't understand [_{FR} what Lisa told him about formal semantics].
 - b. John didn't understand [_{DP} the things that Mary told him about formal semantics].
 - c. I will hire [_{FR} who you choose].
 - d. I will hire [_{DP} the person you choose].
 - e. Joan kissed Elizabeth for the first time [_{FR} where she had also kissed Paul for the first time].
 - e. Joan kissed Elizabeth for the first time [_{PP} at the place where she had also kissed Paul for the first time].

Although FRs have been analysed as *wh*-CPs by many scholars (cf. Hirschbühler (1978), Groos and van Riemsdijk (1979), Hirschbühler and Rivero (1983), Jacobson (1995)), there are

⁵ Caponigro (2002a, 2002b, to appear), who to my knowledge has conducted the largest survey, reports there to be 29 languages that employ FRs.

⁶ These *wh*-words can also be modified by words like *ever* and its equivalents in other languages, resulting in a meaning (s. Jacobson (1995), Dayal (1997), Iatridou and Varlakosta (1998) and von Stechow (2000) for discussion) that differs from the one of corresponding FRs that contain an unmodified *wh*-word. In this dissertation, however, I will restrict my attention to the type of FRs that contains unmodified *wh*-words.

syntactic facts which show that FRs do not behave like ordinary wh-CPs, but more like DPs or PPs⁷: The first one concerns the relation between the FR-internal fronted wh-word and the element within the matrix clause by which the FR has been selected. It has become well known under the term “case matching effect” (s. Bresnan and Grimshaw (1978), Ingria (1990), Pittner (1991, 1995), Grosu (1994), Müller (1999) and Vogel (2001, 2002, 2003)) and can be described as follows: If the case of the FR-internal fronted wh-word is not identical to the case that would be assigned to a DP which occupies the same position as the FR, the resulting sentence is at least in some cases either degraded or completely unacceptable⁸. Consider the German examples below: (6a) and (6c) are fine, because the case requirements of the matrix verbs (dative and nominative case, respectively) are fulfilled by the fronted wh-pronouns. (6b) and (6d), on the other hand, are both out, because there those requirements are not fulfilled: In (6b) the matrix verb requires dative, while the wh-pronoun is marked for accusative, and in (6d) the matrix verb requires accusative, while the wh-pronoun is marked for nominative.

- (6) a. Paul gibt seine Autoschlüssel, wem er vertraut.
 Paul gives his car keys who-DAT he trusts.
 b. *Paul gibt seine Autoschlüssel, wen er mag.
 Paul gives his car keys who-ACC he likes.
 c. Wer Paul bewundert, wird von ihm gefördert.

⁷ Note that I will in the following restrict my attention to FRs that behave like DPs, as the QVEs that are the main focus of this dissertation mainly obtain in sentences containing “DP-like” FRs.

⁸ Not all languages behave alike with respect to case-matching (s. Grosu (1994) and Vogel (2001, 2002) for a comparison of various languages): While English is usually described as a language where case-matching is strictly required (but see Vogel (2003) for a slightly different view), the situation is more complex in languages like German, which have overt case-marking. There, the status of the respective sentence seems to depend on the relative order among the cases involved on a hierarchy of markedness (Grosu (ibd.), Pittner (1995), Vogel (ibd.)): If the case of the fronted wh-word is more marked than the one that would be assigned to a DP occupying the same position as the FR, the resulting sentence is far more acceptable than in cases where it is the other way around. This is evidenced by the acceptability of sentence (i) below:

- (i) Peter lädt, wem er vertraut, zum Abendessen ein.
 Peter invites who-DAT he trusts for dinner PART.

Furthermore, the effect (in English as well as in German and many other languages, s. Grosu (1994) and Vogel (2001, 2002, 2003)) disappears completely if the fronted wh-word is an inanimate wh-pronoun (i. e. *what* in English and *was* in German). This seems to be due to the fact that in this case the respective case forms are morphologically identical.

Who-NOM Paul admires, gets by him supported.

d. *Paul lädt ein, wer ihm vertraut

Paul invites who-NOM him trusts.

Another purely syntactic difference between FRs and other wh-CPs has been observed by Grosu (1994) (s. also Grosu and Landman (1998)): While extraction of a wh-word out of an embedded wh-question only leads to relatively mild deviance in some languages⁹, extraction out of an FR results in complete ungrammaticality in all languages alike. FRs thus behave like DPs in this respect (cf. Ross (1967) for the observation that extraction out of “complex nominals” leads to ungrammaticality; s. also Szabolsci (to appear) for a recent overview over the literature on weak and strong islands). Below I illustrate this point with German data, as German is a language where wh-island-violations are far less severe than DP-island-violations: (7c), where a wh-pronoun has been moved out of an FR, patterns with (7e), where a wh-pronoun has been moved out of a complex DP, as far as (un)grammaticality is concerned, not with (7a), which exemplifies a wh-island-violation:

- (7) a. ??Was_i weiß Maria nicht mehr, wem sie t_i schuldet?
What_i knows Maria no longer who-DAT she t_i owes?
- b. Maria mag nicht, wem sie Geld schuldet.
Maria likes not who-DAT she money owes.
- c. *Was_i mag Maria nicht, wem sie t_i schuldet?
What_i likes Maria not, who-DAT she t_i owes?
- d. Maria mag den Kollegen nicht, dem sie Geld schuldet.
Maria likes the-DAT colleague-DAT not, who-DAT she money owes.
- e. *Was_i mag Maria den Kollegen nicht, dem sie t_i schuldet?
What_i likes Maria not the-DAT colleague-DAT, who-DAT she t_i owes?

⁹ There is cross-linguistic variation with respect to the degree of deviance wh-island violations lead to (s. Grosu (1994) and Grosu and Landman (1998) for discussion). What remains constant, however, is the fact that DP-island violations are much more severe than wh-island violations, and that FRs pattern with DPs, as far as extractability is concerned.

Finally, in contrast to wh-CPs that get interpreted as questions, FRs may contain only one wh-word as long as the respective sentence does not get pronounced (and interpreted) as an echo question¹⁰:

- (8)
- a. Mary does not understand what Sue told Jack last night.
 - b. *Mary does not understand what Sue told whom last night.
 - c. Mary does not like what Peter likes.
 - d. *Mary does not like what who likes.

Taken together, the above considerations suggest that FRs may indeed – in spite of their surface-appearance as CPs – be DPs. Basically, there are two options to implement this idea: According to the first one, the wh-word does not occupy the specifier position of a CP, but rather behaves as the external head of a DP modified by a relative clause CP, i. e. the wh-word occupies an argument (or adjunct) position within the matrix clause, while the material following it is a relative clause CP the specifier position of which is as well empty as the head position (s. Bresnan and Grimshaw (1978), Larson (1987) and Wiltschko (1999)).¹¹ This is shown schematically in (9a) below, while (9b) gives the syntactic structure that would be postulated for an FR like the one in (8a) under such an analysis:

- (9)
- a. [DP wh [CP e [C' C⁰ [IP]]]]]
 - b. [DP what [CP e [C' C⁰ [IP Sue told Jack last night]]]]]

On the positive side, this analysis would automatically account for the distribution of FRs, and it would offer an obvious explanation for the ban against multiple wh-phrases in FRs, and for the fact that FRs pattern with DPs as far as extractability is concerned. Furthermore, the case-

¹⁰ In German, where wh-pronouns can also be interpreted as weak indefinites, FRs may of course also contain more than one wh-word, as long as all wh-pronouns that remain clause-internally (i. e. that have not been moved to Spec, CP) get interpreted as weak indefinites:

- (i) Paul mag nicht, wem er was schuldet.
 Paul likes not, who-DAT he what owes.
 “Paul does not like whom he owes something”.

¹¹ Note that I have (in the interest of readability) taken the freedom to translate the basic ideas of Bresnan and Grimshaw (1978) into a more recent terminology. Of course, their analysis is formulated in a framework where there are no DPs, but only NPs, and where wh-elements do not occupy the specifier, but rather the head position of CPs.

matching effects discussed above could easily be accounted for if one assumes (as Bresnan and Grimshaw (1978) do) that the *wh*-word has been base generated inside the relative clause CP, and then moved into the external DP: The *wh*-word would then have to fulfil the requirements of the relative clause verb as well as those of the matrix verb.

Nevertheless, this analysis is highly problematic for a variety of reasons: First, we would not expect the existence of languages like German, where at least sometimes the case of the *wh*-word does not have to match the one that is required by the respective matrix clause verb (s. Grosu (1994) and Pittner (1995) for discussion; s. also footnote 6 above). Furthermore, in English it is generally only possible to leave the specifier as well as the head position of an object relative clause CP empty, while in the case of subject relatives, at least one of the two positions must be filled overtly. It would thus be completely unexpected that this restriction should no longer be in effect if the external DP modified by the relative clause CP has a *wh*-word in its specifier (s. Jacobson (1995) and Grosu (1994) for discussion):

- (10) a. The man Mary kissed yesterday was very nice.
b. *The man kissed Mary yesterday was very nice.
- (11) a. Mary likes whom she kisses.
b. Who(ever) kisses Mary is nice.

The situation would be even more puzzling in German, where the specifier position of a relative clause must always be filled overtly:

- (12) a. *Der Mann Maria gestern geküsst hat war sehr nett.
The man Maria yesterday kissed has was very nice.

Finally, from a semantic point of view there are very convincing arguments against an analysis according to which the *wh*-word is the external head of an FR. They will be discussed in detail in section 1.3.

As already mentioned, there is a second option to implement the idea that FRs are DPs: One can also assume that on top of the relative clause CP that gets spelled out overtly there is an empty DP-projection. This has been argued for by Harbert (1983), Suner (1984), Grosu (1994), Pittner (1995), Grosu and Landman (1998) and Caponigro (2002), among others.

According to Harbert (ibd.), Suner (ibd.), Grosu (ibd.), Pittner (ibd.) and Grosu and Landman (ibd.), FRs are DPs the external head of which is the empty element *pro*, which in the generative literature is assumed to be present in finite sentences that contain one or more empty argument position(s) (cf. Rizzi (1986) for a fully developed account of the properties of *pro*). Furthermore, the *wh*-word is assumed to occupy the specifier position of a CP that is contained within this DP¹².

This analysis seems to be very attractive on various grounds: It does not only automatically explain the distribution of FRs, offer an obvious explanation why FRs may only contain one *wh*-word, and why they behave as islands with respect to extraction, but also has at least the potential to account for the existence of case matching effects as well as for the fact that they disappear under some circumstances: According to Rizzi (1986), *pro* is subject to special licensing conditions¹³. It is therefore not implausible to assume that the *pro* present in FRs needs to be licensed via agreement with the *wh*-word occupying the specifier position of the CP that is contained within the DP headed by *pro*. Furthermore, it is also not implausible to assume that languages differ with respect to the details of licensing: While in some languages strict agreement is required, in others it is possible that a “stronger” case feature on the *wh*-word licenses a “weaker” one on *pro* (s. Grosu (1994) and Pittner (1995) for details).

A related, but slightly different analysis has been proposed by Caponigro (2002b): According to him, FRs are DPs headed by a silent determiner, while the respective *wh*-CP is the complement of this determiner. Furthermore, he assumes that the *wh*-element in the specifier of the *wh*-CP has to be moved further into the specifier of the external DP in order to license the empty determiner¹⁴. Therefore, everything said above concerning the licensing of *pro* via agreement with the respective *wh*-word carries over straightforwardly to this analysis. The basic structure assumed by Caponigro (ibd.) is given schematically in (13) below:

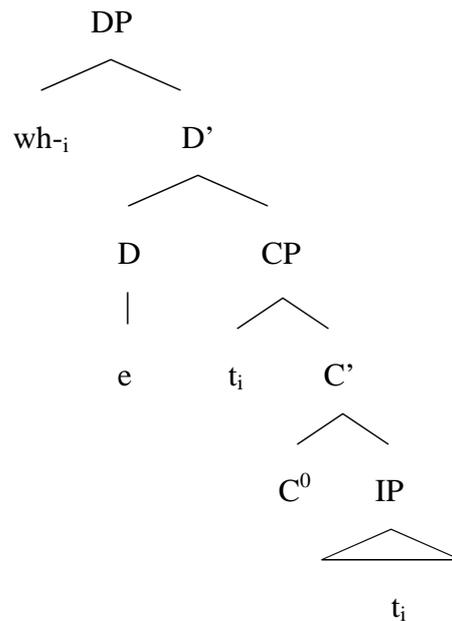
¹² The following fact could be seen as an argument in favour of such an analysis: In English, it is possible to combine the animate pronouns *he* and *she* directly with restrictive relative clauses, as is evidenced by the example below (Elbourne (to appear): 159ff.). Note that while the construction has a somewhat archaic feel to it in present-day English, it is still rather productive.

(i) He/she who is modest will be rewarded.

¹³ This is supposed to be the reason why only some languages (for example, many Romance languages, Japanese, etc.) allow it to be present at all (s. Rizzi (1986) for details).

¹⁴ As he does not say explicitly that this movement is covert, I assume it to be overt.

(13)



This analysis has all the virtues of the “*pro*-analysis” discussed above, and it can furthermore easily be made compatible with the semantic facts discussed in the next section – under the plausible assumption that the movement of the *wh*-word into the specifier of the external DP is semantically vacuous. What also speaks in favour of such an analysis is the fact that many languages allow overtly realized definite determiners to take CPs as their complements (cf. Caponigro (2002) for details). This is also attested for German, as the example below indicates:

- (14) a. Claudia tut das, was sie tun will.
Claudia does the-NEUT-SING, what she do wants.
“Claudia does what she wants to do.”

Interestingly, in German definite determiners can only be combined directly with *wh*-CPs the specifier position of which is occupied by the impersonal *wh*-pronoun *was* (what). If the specifier position of the *wh*-CP is occupied by personal *wh*-pronoun *wer* (who), the resulting combination is ungrammatical. On the other hand, it is always possible to combine a definite determiner with CPs the specifier of which contains a relative pronoun, as long as the gender and number features of the two items match¹⁵:

¹⁵ Note that in German externally headed relative clause CPs contain relative pronouns that are marked for gender and number features. Those relative pronouns differ from the *wh*-pronouns used in German, but are

- (15) a. Maria wird den, der/* wer ihr Rad gestohlen hat, bestrafen.
 Maria will the-MASK-SING, REL-MASK-SING/* who her bike stolen has,
 punish.
 “Maria will punish the one who stole her bike”.
- b. Maria wird die, die/* wer ihr Rad gestohlen hat, bestrafen.
 Maria will the-FEM-SING, REL-FEM-SING/* who her bike stolen has,
 punish.
 “Maria will punish the one who stole her bike”.
- c. Maria wird die, die/* wer ihr Rad gestohlen haben, bestrafen.
 Maria will the-PL, REL-PL/* who her bike stolen have, punish.
 “Maria will punish the ones who stole her bike”.

A possible explanation for this pattern would run as follows: In German, the gender and number features of a relative pronoun always have to agree with the gender and number of the DP the respective relative clause CP is contained in (which are overtly realized on the determiner as well as on the head of the NP, if there is one). This would easily be explained under the assumption that relative clause CPs get selected by the head of the respective DP, and that the covert head of the respective CP is marked for gender and number features which have to be checked by a relative pronoun via movement into Spec, CP.

Now note that the personal *wh*-pronoun *wer* (who) – in spite of being morphologically marked for singular – is semantically underspecified with respect to number, and partly specified with respect to gender features (It is marked as [+ human]).¹⁶ This is evident from the way it is used in constituent questions: (16a) below, for example can be answered by (16b) as well as by (16c).¹⁷

- (16) a. Wer liebt Paul?
 Who loves Paul?

morphologically identical to the definite determiners used in this language, which are also marked for gender and number features.

¹⁶ The same is of course true of *who* in English.

¹⁷ Note that *welch*- (which-) phrases behave differently in this respect: A *welch*-phrase that is morphologically marked for singular can not be answered by a sentence that enumerates a plurality of people (The same is true of *which*-phrases in English).

- b. Maria.
- c. Maria, Klaus und Agnes.

Let us therefore assume that a relative-clause-CP the specifier of which is filled by the wh-word *wer* is underspecified for number. On the other hand, there is no definite determiner available in German that has the required feature make-up (i. e. is marked as [+human], and is underspecified for semantic number): There is only one that is marked as singular masculine (*der*), one that is marked as singular feminine (*die*), and one that is marked as plural, but is completely underspecified with respect to gender features (*die*). Consider the examples below:

- (17)
- a. Der Hund, der Maria gehört, ist dumm.
The-MASC-SING dog, REL-MASC-SING Maria belongs-to, is stupid.
“The dog that belongs to Maria is stupid”.
 - b. Die Hunde, die Maria gehören, sind dumm.
The-PL dogs, REL-PL Maria belong-to, are stupid.
“The dogs that belong to Maria are stupid”.
 - c. Die Katze, die Maria gehört, ist klug.
The-FEM-SING cat, REL-SING-FEM Maria belongs-to, is clever.
“The cat that belongs to Maria is clever”.
 - d. Die Katzen, die Maria gehören, sind klug.
The-PL cats, REL-PL Maria belong-to, are clever.
“The cats that belong to Maria are clever”.

Let us therefore assume that CPs that are marked as [+human], and are furthermore underspecified with respect to number cannot be selected by one of the overt definite determiners that are available in German. For this reason, a covert version of the definite determiner has to be chosen if a CP with the wh-word *wer* in its specifier is to be turned into a definite DP. I assume that this covert definite determiner is completely underspecified for number as well as for gender features (i. e. it is also not marked as [+human]).

Consider next the impersonal wh-pronoun *was* (what), which is marked as [– human], but is also underspecified with respect to semantic number, in spite of being morphologically singular. This is also evidenced by its use in constituent questions: A question like (18a) below, for example, can be answered by (18b) as well as by (18c).

- (18) a. Was hat Klaus Maria verkauft?
 What has Klaus Maria sold-to?
 “What did Klaus sell to Maria?”
- b. Sein Auto.
 His car.
- c. Sein Auto, sein Fahrrad und seinen Fernseher.
 His car, his bike and his TV.

Now the obvious question is of course whether there is a definite determiner in German that is marked as [–human], and is furthermore semantically underspecified for number. At first sight, this does not seem to be the case. There only seems to be a version that is morphologically marked as [+neutral], but is underspecified with respect to semantic gender features, and which is furthermore (morphologically as well as semantically) marked as [+singular]: *Das*¹⁸. And of course, as already mentioned, there is the definite determiner *die*, which is also underspecified with respect to semantic gender features, but is marked for plural. Consider the examples in (19) below:

- (19) a. Das Auto, das Maria fährt, ist teuer.
 The-NEUT-SING car, REL-NEUT-SING, is expensive.
 “The car that Maria drives is expensive”.
- b. Die Autos, die Maria fährt, sind teuer.
 The-PL cars, REL-PL Maria drives, are expensive.
 “The cars that Maria drives are expensive”.

But as soon as we move away from the domain of nouns denoting concrete objects, the facts do not seem to be so clear any more: *Das* can also be the head of definite DPs that are underspecified with respect to semantic number, i. e. *das* can take NPs as complements the heads of which are underspecified in this respect.¹⁹ In order to see this, consider (20a) below: In this case, *das* is the head of a DP that denotes an abstract object which is obviously not

¹⁸ Note that *das*, while being morphologically marked as neutral, is obviously underspecified with respect to semantic gender features, as it can be combined with nouns like *Kind* (child) and *Mädchen* (girl), which are clearly [+human]. On the other hand, the demonstrative pronoun *das* can only refer to inanimate objects.

¹⁹ It can of course not be combined with NPs the heads of which are marked as [+plural]

marked for semantic number, in spite of being morphologically singular. This is evidenced by the fact that it can be continued with (20b), where a plurality of objects is enumerated.

- (20) a. Maria liebt das Schöne:
Maria loves the-NEUT-SING beautiful-NEUT-SING
“Maria loves beautiful things”:
b. Musik, Architektur und Malerei.
Music, architecture and painting.

Further evidence for this claim comes from copula sentences like (21a) below, where a morphologically singular DP headed by *das* can be combined with a DP that is morphologically as well as semantically marked for plural.

- (21) a. Das Schönste, was/das Maria je gehört hat,
The most-beautiful what/ REL-NEUT-SING Maria ever heard has
sind die Streichquartette von Schönberg und die Symphonien von Charles Ives.
are the string quartets of Schönberg and the symphonies of Charles Ives.
“The most beautiful things that Maria has ever heard are the string quartets of
Schönberg and the symphonies of Charles Ives”.

Let us now assume that the reason why an FR-CP the specifier of which contains the wh-pronoun *was* may be the complement of the definite determiner *das* is the following: There is no contradiction between the two items, as far as number and gender features are concerned. While *was* is marked as [– human], *das* is underspecified with respect to semantic gender features, and they both are underspecified with respect to semantic number. Of course, from this it follows that our initial assumption with respect to the feature make-up of *das* was wrong: Also in cases like (19a), where *das* takes an NP as complement that is morphologically as well as semantically marked for singular, it has to be the case that *das* itself is not specified for semantic number features.

This of course raises the question why *das* may nevertheless be combined with NPs that are semantically as well as morphologically marked for singular, while it may not be combined with NPs that are semantically and morphologically marked for plural. I assume that this is due to the interplay of two factors: First, I assume that determiners and NPs have to agree with respect to morphological number marking if they are to be combined. Secondly, I

assume that with respect to semantic number (as well as with respect to semantic gender features; see above), it is only required that there is no contradiction between the number marking of the two items involved, i. e. a determiner which is semantically marked for singular may not be combined with an NP that is semantically marked for plural, and vice versa. It is, however, not excluded that a determiner which is not specified for semantic number may be combined with an NP that is semantically marked for singular or plural (as long as the two items agree with respect to morphological number marking).

Note that this account leaves open two questions: First, why do FR-CPs the specifier of which is filled by *was* not always have to be selected by the overt determiner *das*? And secondly: Why can FRs in English never be selected by an overt definite determiner, taking into account the fact that the English definite determiner *the* is presumably underspecified with respect to number as well as with respect to gender, as it can be combined with all kinds of NPs?

Concerning the first question, remember from above that I assumed that the covert determiner that is present in FRs the specifier of which is filled by *wer* is underspecified not only with respect to number, but also with respect to gender. If this is correct, it is plausible to assume that it can select CPs marked as [+human] as well as ones marked as [-human], as long as the respective CPs are not specified for either singular or plural: It is only required that the gender specification of the NP does not contradict the gender specification of the determiner it gets selected by.

Concerning the second question, I assume that (in)compatibility of number and gender features is not at issue here, but rather that for some purely morpho-phonological reason overt determiners always have to co-occur with an overt NP in English. This is evidenced by the fact that even in cases where in German the combination of definite determiner and CP is clearly the result of NP-ellipsis, a dummy NP like *one* or *ones* has to be present in English. Consider the contrast between (22a) and (22b) below:

- (22) a. Ich mag die Platten von Frank Zappa: Die, die da drüben steht, ist besonders toll.
I like the-PL records of F. Z.: The-PL, REL-PL there over standing-is, is especially great.
- b. I like the records by Frank Zappa: The* (one) that is standing over there is especially great.

For that reason, it is plausible to assume that a covert version of the definite determiner has to be used in English if a *wh*-CP is to be turned into a definite DP. For concreteness, I will assume that this covert definite determiner is the same as the one assumed for German, i. e. it is underspecified with respect to number as well as with respect to gender features.

In this section I have presented syntactic arguments for analyzing FRs as DPs. To be more concrete, I have assumed that they are headed by a covert definite determiner that takes a relative clause CP as its argument (cf. Caponigro (2002b) for a similar view). Further evidence for this claim came from German, as in this language the combination of a definite determiner and a relative clause CP is in principle allowed (in contrast to English). We have seen that in German it is required that the number and gender features of the respective determiners and relative pronouns do not contradict each other. This has the consequence that only CPs the specifier of which is filled by an impersonal *wh*-pronoun may be selected by an overt determiner, while ones that contain a personal *wh*-pronoun have to be selected by a covert determiner which I assume to be completely underspecified with respect to number and gender features. In the next section we will take a closer look at the semantics of FRs.

2 Semantic Properties of FRs

2.1 Semantic arguments for analyzing FRs as definite DPs (Jacobson (1995))

The basic observation of Jacobson (1995) is the following: FRs denote a specific entity if the FR-internal predicate is true of just one entity in the respective universe of discourse, while they get an exhaustive reading if this predicate is true of a plurality of entities, i. e. in this case they denote the maximal sum of entities that fulfil this predicate. Consider the sentences in (23) below: In (23a) the FR most plausibly denotes a specific book, while in (23b) it most plausibly denotes the sum of books on the reading list mentioned.

- (23) a. I read what John recommended to me last evening.
b. I read what was on the reading list (Jacobson (1995): 455).

In order to arrive at a uniform meaning of FRs, Jacobson (ibid.) assumes that all *wh*-CPs are initially of type $\langle e, t \rangle$, denoting sets of entities that fulfil the respective predicate. Furthermore, she assumes that CPs containing the *wh*-pronouns *what* and *who* have a special meaning: They denote (characteristic functions of) singleton sets which contain just the maximal sum individual that fulfils the respective predicate.

Jacobson's (ibid.) view of how the domain of individuals is structured is based on Link (1983). According to Link (ibid.) this domain does not only consist of atomic individuals, but also of plural individuals which are generated by joining atomic individuals. Furthermore, the plural individuals thus generated can themselves be joined, resulting in further plural individuals. The operation of joining two individuals a and b is notated as $a+b$, where join is associative and commutative (thus, $a+\emptyset = a$, and $a+a = a$). Furthermore, inclusion with respect to individuals is informally defined as follows (s. Link (ibid.) for details): If $c = a+b$, then a is included in c (written as $a \leq c$), where inclusion is reflexive, transitive and antisymmetric. From this it follows that each set of plural individuals has one and only one maximal element in it, namely the one that includes all others, while for sets of atomic individuals maximality is only defined if this set is a singleton set: Otherwise, there simply is no element that includes all the others, as no element includes any other apart from itself to begin with. In the case of a set that contains just one element, on the other hand, this element includes itself and therefore counts as the maximal element within that set.

Returning to Jacobson's (1995) analysis of FRs, she assumes that the wh-pronoun what has the denotation given in (24) below:

$$(24) \quad \text{what}' = \lambda P[\lambda X [P(X) \wedge \forall Y(P(Y) \rightarrow Y \leq X)]] \text{ (Jacobson (ibid.) : 473),}$$

where X and Y range over atomic as well as over plural entities.

Now, under the assumption that the sisters of fronted wh-terms denote predicates, we get a singleton set containing the maximal entity that fulfils the respective predicate²⁰. This is illustrated with an example in (25) below:

$$(25) \quad \text{what John ordered}' = \lambda X [\text{ordered}'(X)(j) \wedge \forall Y (\text{ordered}'(Y)(j) \rightarrow Y \leq X)]$$

(Jacobson (ibid.): (473).

As already mentioned, wh-expressions like the one given in (25) are of type $\langle e, t \rangle$, which is of course the wrong type for them to occur in argument position. Furthermore, Jacobson (ibid.) assumes FRs to be CPs, so according to her there is no covert determiner present that may

²⁰ Note that Jacobson works in the framework of Categorical Grammar (Bar-Hillel (1953); cf. Steedman (1996: chapter 2) for a recent overview), where neither movement operations nor chains exist. According to this framework, each term carries with it the information with what other constituents it needs to be combined in order to form a sentence. Accordingly, syntactic computation proceeds in tandem with semantic computation.

turn them into expressions of the right type. Instead, she resorts to the theory of type shifting principles explored in Partee and Rooth (1983) and Partee (1987), according to which the syntactic category NP (in present terms: DP) corresponds to a variety of semantic types that are related via a small universal set of type shifting operations. To be more concrete, NPs (DPs) are born at either of the three types e , $\langle e, t \rangle$ or $\langle \langle e, t \rangle, t \rangle$, and can furthermore be shifted to each one of those types via an adequate type shifting operation if the result is semantically well-formed.

Jacobson (1995) now assumes that the type shifting rule which according to Partee (1987) turns NPs which are born at type $\langle e, t \rangle$ into expressions of type e is also available to CPs of type $\langle e, t \rangle$ which occupy argument positions. This type shifting operation is called *iota type shifting rule* and turns a predicate into an individual if the set of individuals that is characterized by that predicate is a singleton set. If this is the case, we get the individual that is the only member of this set, otherwise the operation is not defined. As is easy to see, the maximality condition built into the meaning of the *wh*-pronoun automatically guarantees that the predicate denoted by an FR characterizes a singleton set. Thus, applying *the iota type shifting rule* on to an object like the one given in (25), we get (26) below:

$$(26) \quad \iota X [\text{ordered}'(X)(j) \wedge \forall Y (\text{ordered}'(Y)(j) \rightarrow Y \leq X)] \text{ (Jacobson (ibd.): 473).}$$

This is just the desired result: The FR *What John ordered* now denotes one specific dish, if John ordered one such dish, and the maximal plurality of dishes ordered by John, if he ordered several dishes.

Note that the analysis just discussed, while getting the meaning of FRs right in a very elegant manner, at first sight does not seem to be compatible with the results reported in section 1.1, according to which FRs are DPs headed by a covert definite determiner. This, however, is no real problem, as the definite determiner is often assumed to do the same thing to a predicate it is applied to as *the iota type shifting rule*: If the set characterized by this predicate is a singleton, it returns the individual contained within this set, otherwise there is no defined result (s. Heim and Kratzer (1998) for a recent implementation of this old idea, which goes back to Frege (1892)). We could thus easily reconcile the results from the last section with the semantic analysis put forth in Jacobson (1995).

I will nevertheless argue for a slightly different analysis, which gives us the same result, but achieves this in a different way (cf. Caponigro (to appear) for a similar view)²¹. First, I think it is preferable to analyze the definite determiner in the way proposed by Link (1983), as this makes it possible to assume that the definite determiner has the same denotation in singular and plural DPs. According to Link (ibd.), the definite determiner unambiguously denotes the σ -operator. This operator, if it is applied to a set denoting expression, returns the maximal element contained within this set, where maximality is defined as above: The maximal element contained within a set is the unique element that includes all other elements contained within the same set. Now, if the denotation of the definite determiner is applied to an expression that denotes a set of atomic elements (as is the case if the definite determiner is combined with a singular NP), the result is only defined if this set is a singleton: It is the only element contained within this set. If the denotation of the definite determiner is, on the other hand, applied to a set of plural entities (as is the case if the definite determiner is combined with a plural NP), it returns the maximal sum individual contained within this set.

Note that under this assumption, it is no longer necessary to build maximality into the meaning of the wh-pronoun itself²². Rather, it becomes possible to analyze FR-CPs in the same way as standard restrictive relative clauses are analyzed in Heim and Kratzer (1998). According to this analysis, wh-pronouns are base generated in argument position, and move from there into the specifier of their clause mate C-head, leaving a trace behind which gets interpreted as a variable of type e , and bears the same index as the fronted relative pronoun. Furthermore, relative pronouns are not assumed to have a meaning of their own. Rather, they trigger the application of a rule called *predicate abstraction*, which is given in (27) below:

(27) *Predicate Abstraction Rule (PA)*

If α is a branching node whose daughters are β_i and γ , where β is a relative pronoun ... , then for any variable assignment a , $[[\alpha]]^a = \lambda x \in D . [[\beta]]^{a[i \rightarrow x]}$. (Heim and Kratzer (ibd.: 114)).

²¹ The only relevant difference between Caponigro's (ibd.) and my view is that he assumes FRs to denote maximal sum individuals not as a result of the presence of a covert definite determiner, but as a result of a covert type shifting operation that turns the predicate denoted by the FR into such an individual.

²² This seems to be desirable anyway, as there is evidence for the existence of non-exhaustive readings of wh-questions (Beck and Rullmann (1999)).

Note that $a[i \rightarrow x]$ reads as “the variable assignment which at most differs from a insofar as all variables which bear the index i get assigned x as value”. This has the effect that the variable occupying the base position of the moved relative pronoun gets bound by the lambda operator inserted as a consequence of the presence of the relative pronoun in Spec, CP. Therefore, the relative clause CP as a whole gets interpreted as a predicate.

Now, this analysis carries over straightforwardly to FR-CPs²³. The only additional assumption that needs to be made is that the trace left behind by the moved wh-pronoun gets interpreted as a variable ranging over atomic as well as plural individuals. Finally, the σ -operator denoted by the covert definite determiner gets applied to the predicate denoted by the FR-CP, and we obtain the same result as Jacobson (1995).

It is pretty obvious that the analysis under discussion is more complicated than the one given in Jacobson (1995), where no movement operation and no lambda abstraction need to be assumed. I think that it is nevertheless preferable for the following reason: If wh-pronouns were base generated in their clause peripheral surface position, it would be hard to explain why they nevertheless are marked for the case that corresponds to the argument slot they occupy with respect to the relative clause internal verb (as is evident in German, where personal wh-pronouns are overtly marked for case). This, however, is easily explained under the assumption that they are base generated in argument position. As I consider the failure to explain where wh-pronouns get their case from to be a serious drawback of Jacobson’s (ibd.) analysis, I opt for the one discussed above, which is based on Heim and Kratzer’s (1998) analysis of relative clauses. Thus, I assume that an FR like the one contained in (28a) below gets interpreted as in (28b) as a result of the semantic derivation sketched in (29):

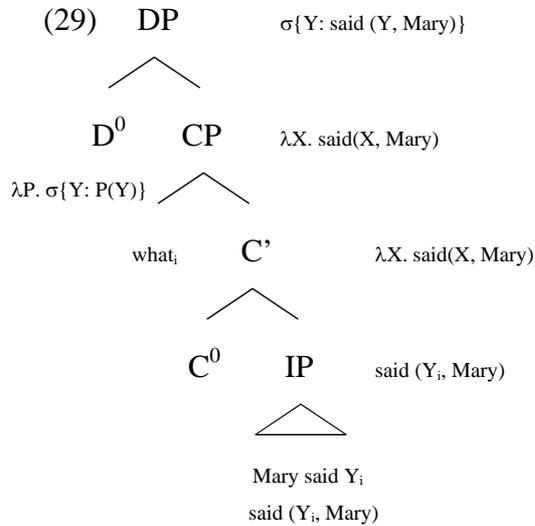
²³ Alternatively, one could follow Heim and Kratzer (ibd.) in their assumption that wh-pronouns get base generated in argument position, and leave an indexed trace behind when they are moved to Spec, CP, and also that a lambda-operator is inserted directly beneath the moved wh-pronoun, which finally binds the variable left behind by the moved wh-pronoun, and nevertheless assume that wh-pronouns have a meaning of their own. They would then have to be interpreted as given below (s. Caponigro (to appear)):

(i) $[[wh-]] = \lambda X \lambda x [P(x) \wedge X(x)],$

where P = animate (who), inanimate (what), etc. (Caponigro (to appear): 10).

This would enable the meaning of the wh-pronoun to be applied to the predicate denoted by its sister constituent, which would give us the same result as above. As nothing hinges on this point with respect to my concerns in this dissertation, I will stick to the original version in Heim and Kratzer (1998).

- (28) a. Peter did not like [_{FR} what Mary said].
 b. $\sigma\{Y: \text{said}(Y, \text{Mary})\}$.



While this analysis captures the meaning of FRs in episodic sentences correctly, it (at least at first glance) seems to run into problems if adverbially quantified sentences containing FRs are considered.

2.2 Semantic arguments for analysing FRs as indefinites

2.2.1 Berman (1994): The problem of quantificational variability

Berman (1994) does not discuss the behaviour of FRs in episodic sentences, nor does he consider the syntactic evidence for analysing FRs as DP. Rather, his focus is on the semantics of adverbially quantified sentences containing FRs. His main observation is the following: FRs in such sentences do not seem to get a uniform reading. Rather, their quantificational force seems to depend on the quantificational force of the respective Q(uantificational)-adverb. Consider the examples (30a) and (30c): While (30a) gets the interpretation in (30b), (30c) gets interpreted as in (30d), in spite of the fact that both sentences contain the same FR.

- (30) a. What Sue paints is often beautiful (Berman (1994): (38c)).
 b. Many things Sue paints are beautiful.
 c. What Sue paints is always beautiful.
 d. All things Sue paints are beautiful.

Now, Berman (ibd.) notes that this behaviour is reminiscent of the behaviour of singular indefinites and bare plurals: If those items are contained within adverbially quantified sentences, they in many cases do not have existential force (while they get existential interpretations in episodic sentences)²⁴. Rather, their quantificational force seems to depend on the quantificational force of the Q-adverb contained within the same clause. This is evidenced by the examples in (31): (31a) and (31b) get interpreted as in (31c), while (31d) and (31e) get interpreted as shown in (31f):

- (31) a. A dog is often smart.
b. Dogs are often smart.
c. Many dogs are smart.
d. A dog is always smart.
e. Dogs are always smart.
f. All dogs are smart.

Berman (ibd.) takes these similarities seriously, and proposes an analysis that is modelled after the analysis of the semantics of bare plurals proposed by Diesing (1992), which is itself based on Lewis (1975), Kamp (1981) and Heim (1982) (s. also Kratzer (1995)). I will therefore quickly discuss the main ingredients of Diesing (1992). Note that Diesing (ibd.) in the part of her book which is relevant for our present concerns exclusively discusses bare plurals, which she takes to be nothing but the plural versions of the corresponding singular indefinites, however. Therefore, her arguments carry over straightforwardly to sentences containing singular indefinites (s. Kratzer (1995), whose analysis is closely related to Diesing (1992), and who also discusses singular indefinites).

According to Diesing (1992), bare plurals are open expressions that introduce free variables which are restricted by the respective nominal predicate. Furthermore, she assumes (following Heim (1982)) that overt Q-adverbs are unselective binders, capable of binding any free variable in their c-command domain, no matter whether it is a situation/event variable or an individual variable. Concerning sentences that do not contain an overt Q-adverb, she

²⁴ The situation is of course more complex in the case of bare plurals, which are interpreted as kind-denoting expressions in sentences that include kind-level-predicates like *be extinct*, *be widespread*, etc (s. Carlson (1977), Krifka et al. (1995) and Chierchia (1998) for details). I will, however, for the moment ignore this point, as it is not relevant at the moment (but see chapter 4 of this dissertation).

assumes that they come in two varieties: Either a covert generic operator with quasi-universal force is present, or a covert existential quantifier is inserted at the level of the verb phrase.

Another main ingredient of Diesing's (ibid.) analysis is the assumption that verbs come in two varieties (s. also Kratzer (1995)): The first class consists of verbs and adjectives that denote permanent states, which hold of a given individual for a large span of its lifetime, often even for its whole time of existence. The second class, on the other hand, consists of verbs denoting activities, accomplishments and achievements, and verbs and adjectives that denote transitory states (s. Vendler (1967) for the distinction between activities, states, accomplishments and achievements). The former are called *stage level predicates* (henceforth: s-level predicates), and the latter are called *individual level predicates* (henceforth: i-level predicates). Examples for s-level predicates are verbs like *run*, *snore*, *sleep*, *build* and adjectives like *hungry* or *tired*, and examples for i-level predicates are adjectives like *intelligent*, *blond* etc.

Now, crucially, Diesing (ibid.) assumes that this semantic distinction corresponds to a syntactic distinction: According to her, only the subjects of s-level predicates are base generated in Spec, VP (s. Koopman and Sportiche (1985) and Kuroda (1988) for the claim that subjects in general are base generated within the verbal projection), receiving their theta-role from the verb. Concerning the subjects of i-level predicates, on the other hand, Diesing (ibid.) assumes that they are base generated in Spec, IP, receiving their theta-role from I^0 , and controlling a PRO in Spec, VP. From this hypothesized state of affairs Diesing (ibid.) now draws the conclusion that the subjects of s-level predicates can in principle occupy one of the following two positions at LF (in English): They may either stay within their surface position (i. e. in Spec, IP), or they may be reconstructed into their VP-internal base position. The subjects of i-level predicates, on the other hand, do not have an option: They can only stay within their base position in Spec, IP.

Furthermore, she proposes that the two arguments of Q-adverbs (and of the silent generic quantifier) are determined on the basis of the following algorithm: Material that is outside of VP at the level of LF gets mapped onto the first argument of the respective Q-adverb, which is called the *restriction* (i. e. it contributes to the domain of quantification of this quantifier), while material that is inside VP at the level of LF gets mapped onto its second argument, which is called *nuclear scope* (s. Heim (1982)).

With these assumptions in place, Diesing (ibid.) is able to account for the following paradigm: While (32a) is three-way ambiguous and can either mean that there are some firemen which are available right now, or that it is a general property of some contextually

given location that some firemen are available at this location, or that being available is a general property of firemen, (32b) only gets a generic reading, according to which firemen are in general intelligent.

- (32) a. Firemen are available.
 b. Firemen are intelligent.

Diesing's (ibd.) explanation runs as follows: As *be available* is an s-level predicate, its subject argument can either stay within its surface position in Spec, IP at LF, or it can be reconstructed into its VP-internal base position. In the former case, the variable introduced by the bare plural can be bound by a covert generic quantifier²⁵, while in the latter case it gets bound by the covert existential quantifier inserted at the VP-level. Furthermore, even in this case the sentence is still ambiguous, as it may contain an additional generic quantifier that binds a situation variable, or only the existential quantifier, which then binds an individual as well as a situation variable. These three readings are given semi-formally in (33) below:

- (33) a. $\text{Gen}_{x,s} [\text{firemen}(x) \wedge \text{in}(x, s)] [\text{available}(x, s)]$
 b. $\text{Gen}_s [C(s)] \exists_x [\text{fireman}(x) \wedge \text{available}(x, s)]$
 b. $\exists_{x,s} [\text{fireman}(x) \wedge \text{available}(x, s)]$

Concerning (32b), on the other hand, the bare plural can only stay within its base position in Spec., IP, which has the consequence that the variable it introduces cannot get caught by existential closure, but can only be bound by a covert generic quantifier. This is shown in (34) below:

- (34) $\text{Gen}_x [\text{firemen}(x)] [\text{intelligent}(x)]$

Diesing (ibd.) draws further evidence for her claim from German, where sentences containing s-level predicates are disambiguated overtly: If singular indefinites and bare plurals occur to the left of certain discourse particles like *ja doch*, they are interpreted generically, while they receive generic readings if they occur to the right of those particles (but see Frey (2001) for

²⁵ In English, sentences containing verbs that are marked for present tense can in principle get a generic as well as an episodic reading. In Diesing's (ibd.) system this is reflected by the fact may contain a covert generic quantifier, while otherwise an existential quantifier is inserted that binds individual as well as event arguments.

counterexamples). Consider the sentences in (35) below: While (35a) can only mean that playing on the street is a general property of children, (35b) can either mean that at the speech time there are children playing on the street, or that it is a property of some contextually given location that there are children playing on the street²⁶:

- (35) a. ... weil Kinder ja doch auf der Straße spielen
because children PART on the street play.
b. ... weil ja doch Kinder auf der Strasse spielen.
because PART children on the street play.

Diesing (ibid.) accounts for this pattern as follows: As she assumes that discourse particles like *ja doch* mark the VP-boundary (see Frey (2001) for a different view), occurring to the left of them for her is evidence that the respective DP has been scrambled out of VP. Furthermore, she assumes that subjects in German (in contrast to English, where this is only possible in Spec., IP) can receive nominative case within their VP-internal base position, which means that there must have been another reason for moving them out of DP: Namely that they are to get an interpretation they would not get otherwise. Therefore, she assumes that in sentences like (35a), the respective bare plurals (or singular indefinites) cannot be reconstructed into their VP-internal position at LF, which has the consequence that the variable they introduce can only be bound by a covert generic operator.

The same reasoning applies to sentences like (35b): As they could in principle have been moved out of VP, the fact that they surface in this position is evidence that they are to be interpreted existentially, and therefore cannot be scrambled out of VP at LF.

Kratzer (1995) proposes an interesting alternative to Diesing's (1992) proposal, which I will quickly introduce right now, as it will become relevant later: According to Kratzer (ibid.), the distinction between s-level and i-level predicates manifests itself in the fact that the former subcategorize for an additional event argument (see Davidson (1967), who was the first to argue for the existence of event arguments), while the latter do not. Furthermore, Kratzer (ibid.) assumes that event arguments are directly represented in the syntax, namely in the form of free, pronoun-like variables that can either get their value from the context, or be bound by overt or covert adverbial quantifiers. According to her, those event variables are always realized as external arguments, where the external argument of a predicate is the only

²⁶ Note that the facts are not as clear as Diesing (ibid.) claims: If the bare plural *Kinder* is de-accented, a generic reading becomes (marginally) available.

one that is not realized within the maximal projection of this predicate (s. Williams (1981)). Assuming that each verbal predicate has an external argument, and that this external argument is always realized in Spec, IP, Kratzer (1995) derives the same generalization as Diesing (1992) concerning the readings available to sentences like the ones in (32) above: As only the subjects of s-level predicates may get reconstructed into Spec, VP at LF, it is only in sentences containing s-level predicates that bare plurals or singular indefinites can get generic readings.

As already said, Berman's (1994) account of how QVEs sentences containing FRs come about is based on the assumptions by Diesing (ibd.) just sketched. More concretely, he assumes that also FRs – which he takes to be CPs syntactically – are open expressions that behave like singular indefinites and bare plurals insofar as they introduce restricted variables that can be bound (unselectively) by a c-commanding overt Q-adverb or a covert generic quantifier. To be more concrete, he assumes that wh-clauses in general are open sentences, where the fronted wh-term gets translated as a restricted variable that fills the argument position corresponding to its IP-internal base position. That is, a wh-CP like the one given in (36a) below denotes the object in (36b):

- (36) a. [_{CP} what_j John eats t_j].
 b. [thing(x) ∧ eat(x, j)].

Furthermore, Berman (ibd.) assumes that wh-CPs that are base generated in argument positions otherwise occupied by DPs (in his terminology: NPs) have to be moved out of their respective base positions at LF in order to resolve a type mismatch that would otherwise obtain: The respective verb needs an object of type *e*, but gets an open proposition, which is of type *t*. More concretely, according to Berman such CPs adjoin to the IP-projection of the clause they are contained in, leaving behind a trace which gets interpreted as a variable of type *e*. In the next step, the Q-adverb is also moved out of its clause-internal base position and gets adjoined to IP directly above the wh-CP (in a QR-like fashion). In order to see how this works, consider sentence (37a) below, and (in (37b)) the LF representation this sentence would get according to Berman (ibd.)²⁷:

- (37) a. John mostly eats what he grows in his vegetable garden (Berman (ibd.):

²⁷ Note that the trace left behind by the Q-adverb needs to be deleted at LF, as there is no plausible interpretation conceivable for it.

(38b)).

- b. [_{IP} Mostly [_{IP}[_{CP} What_i he grows t_i in his vegetable garden]_j [_{IP} John_j [_{VP} t_j eats t_j]]]]].

Now, in order to interpret LFs like the one in (37b) above, Berman (*ibid.*) has to assume a mapping algorithm that is different from the one proposed by Diesing (*ibid.*): He has to assume that in cases like these, the relevant unit is not VP, but IP: Material that is outside of the immediate IP-projection is mapped onto the restriction, while material inside IP is mapped onto the nuclear scope²⁸. Concerning the sentence above, this would give us the semantic representation given in (38) below:

(38) MOST_x [vegetable'(x) & grow-in-garden'(x, j)][eat'(x, j)]

I do not want to go into the many problems that unselective binding approaches to QVEs run into in general (see Heim (1990) and Chierchia (1995a)), nor do I want to discuss the question whether Berman's (*ibid.*) proposal is attractive from a conceptual point of view. Instead, I will focus on the empirical problems Berman's (1994) approach runs into, as they are severe enough to make it untenable in my view: First, it does not allow FRs to be interpreted in the nuclear scope of Q-adverbs, as they always have to be moved out of their IP-internal base position in order to resolve the type mismatch mentioned above. This, however, is empirically problematic, as is evidenced by the German data in (39) below: (39a), where the FR remains

²⁸ Note that in the case at hand it would also be possible to stick to Diesing's (1992) mapping algorithm: One would only have to assume that the subject gets reconstructed into its VP-internal base position. This, however, does not work in general: In cases like the sentence given in (i) below, where the FR itself is the subject of an i-level predicate, the trace left behind by the moved FR would invariably occupy a VP-external position at LF, and we would therefore not get a well-formed semantic representation if the resulting LF would be interpreted according to Diesing's (*ibid.*) mapping algorithm.

- (i) What John buys is usually blue.

It is, however, unclear to me how Berman (*ibid.*) wants to account for Diesing's (*ibid.*) basic observations if his mapping algorithm is the one that is always applied: He would then have to assume that for some mysterious reason the subjects of i-level predicates always have to be adjoined to IP at LF, while for the subjects of s-level predicates this is only an option. Alternatively, he would have to assume that there are two mapping algorithms available (which is of course not a very attractive solution, either): One that is applied if the respective LF contains a wh-CP, and one that is applied in all other cases.

VP-internal, and where a constituent inside the FR receives the main accent of the clause (signalled by capital letters), is rather strange, while (39b), where the FR has been scrambled out of VP, and where the main accent of the matrix clause is realized elsewhere, is fine. (39c), on the other hand, which is structurally identical to (39a), the only difference being that the matrix verb is an s-level predicate, is much better than (39a), albeit a bit strange if it is presented without context:

- (39) a. ... ^{??}weil meistens [wer CHOMSKY liest] Linguist ist.
 because usually [who-Nom Chomsky reads] linguist is.
 b. ... weil [wer Chomsky liest] meistens LINGUIST ist.
 because [who-NOM Chomsky reads] usually linguist is.
 c. ... ^(?)weil meistens [wer CHOMSKY liest] eine gute Idee bekommt.
 because usually [who-NOM Chomsky reads] a good idea gets.

For Berman (1994), the pattern in (39) is very hard to account for. While he could easily explain the oddity of (39a) as being due to the fact that the subjects of i-level predicates may in general not be base generated in Spec, VP (see above), (39c) poses serious problems for him: He would either have to assume that also in German all FRs get adjoined to IP at LF, irrespective of their surface position, or that the type mismatch discussed above already gets resolved at the surface in German via scrambling out of VP²⁹. The problem is that both options make wrong predictions: In the second case, (39c) should be as bad as (39a), because the type mismatch cannot be resolved, as the FR occupies its base position. This, however, is obviously not the case. In the first case, on the other hand, (39c) is correctly predicted to be fine, but it should get one of two QV-readings given in (40) below (depending on whether the event/situation variable introduced by the matrix verb gets bound by the Q-adverb, or by a covert existential quantifier inserted at the VP-level):

- (40) a. $\text{MOST}_{x,s}$ [reads-Chomsky (x) \wedge in (x, s)] [has-a-good-idea (x, s)]
 b. MOST_x [reads-Chomsky (x)] $\exists s$ [has-a-good-idea (x, s)]

According to the first reading, (39c) should be true if most people who read Chomsky have good ideas in most (contextually restricted) events/situations, while the second reading should

²⁹ Alternatively, one could also assume that occupying a VP-external position in German is a prerequisite for being adjoined to IP at LF.

be true if for most people who read Chomsky there is at least one event/situation where they have a good idea. Both readings are, however, clearly wrong. Rather, (39c) intuitively seems to have the following truth conditions: It presupposes that a set of events/situations has been contextually introduced that includes people of various sorts. Furthermore, it is presupposed that the issue who has a good idea in those situations is under discussion. (39c) then asserts that in most of those situations the people who read Chomsky have a good idea.

At first sight, the following alternative to Berman (1994) seems to suggest itself: One could simply assume that FRs behave completely parallel to singular indefinites and bare plurals, i. e. that they are also syntactically DPs, but nevertheless introduce free variables, that they may therefore either occupy their VP-internal base position or a VP-external position at LF (which in German is already visible at the surface), and that they are subject to the same mapping algorithm as singular indefinites and bare plurals.

With these assumptions in place, the pattern in (39) could then be explained as follows: (39a) would be out because the FR in (39a) is not allowed to occupy Spec, VP, given that it is the subject of an i-level predicate and therefore must be realized outside of the maximal projection of this predicate. Furthermore, remember that according to Kratzer (1995), i-level predicates do not introduce event arguments, which means that even if the FR in (39c) would be allowed to occupy Spec, VP, it would have to be mapped onto the nuclear scope of the Q-adverb. This, however, would have the consequence that the latter does not get a variable to bind, which according to Kratzer (ibid.) always leads to ungrammaticality.³⁰ In the case of (39b), on the other hand, neither of those problems occurs, as the FR occupies a VP-external position, and therefore gets mapped onto the restriction of the Q-adverb. Finally, in (39c) the fact that the FR occupies a VP-internal position and therefore gets mapped onto the nuclear scope of the Q-adverb does not do any harm, as the matrix verb is s-level, and therefore introduces an event variable which may be bound by the Q-adverb.

The problem with this approach is that it predicts an existential interpretation for the FR in (39c), because being VP-internal at LF the variable it introduces could only be caught via existential closure. This, however, is not correct, as already hinted at above: While for the sentence to be true it is surely not required that all the people in the whole world who read Chomsky have a good idea at the events quantified over, it nevertheless seems to be required that all the Chomsky readers who are present at those events have a good idea at those events,

³⁰ Note, however, that I will present arguments against unselective binding in general, as we proceed, and that therefore this cannot be the final solution (see chapter 4 of this dissertation, where I present my final analysis of QVEs in sentences containing FRs).

not just some of them. But let us for the moment leave this problem in its unsettled state, and return to Berman's (1994) approach³¹.

A second problem for Berman (*ibid.*) is the following: His account is unable to give a natural explanation for the fact that FRs in episodic sentences are interpreted exhaustively. His only option – as far as I can see – would be to assume that in these cases a covert universal quantifier is inserted. This, however, is highly implausible, as we would then also expect that bare plurals and singular indefinites are able to get exhaustive readings in episodic sentences, which is surely not the case.

On the other hand, it is implausible to assume that in episodic sentences FRs are definite DPs and get interpreted as maximal sum individuals (as argued for in the last section), while in adverbially quantified they are CPs, and get interpreted as open propositions that introduce a free individual variable. This is even more implausible in light of the fact that the case matching effects reported in 1.1, which I took as evidence for the DP-status of FRs, also obtain in adverbially quantified sentences containing FRs, as is evidenced by the ungrammaticality of (40) below: In this sentence, the matrix verb would assign dative case to a DP occupying the argument slot filled by the FR, while the fronted *wh*-pronoun is marked for accusative case.

- (41) *Peter gibt [wen er mag] meistens sein Auto.
Peter gives [who-ACC he likes] usually his car.

I conclude that we therefore have to look for a unified analysis, which is able to account for the QVEs observed in adverbially quantified sentences as well as for the readings FRs get in episodic sentences, and which furthermore allows FRs to be analysed as DPs. For this reason, I will in section 1.2.2.2 and in section 1.3 discuss two approaches which aim at offering such a unified analysis, but which, as we will say, nevertheless fail in the end.

³¹ I will return to the interpretation of sentences like (39c) in chapter 2.

2.2.2 Further arguments for analysing FRs as indefinites: Wiltschko (1999)

Wiltschko (1999) also assumes that FRs are indefinites. But in contrast to Berman (1994), she does not only consider adverbially quantified sentences, but also episodic ones, arguing that also in those contexts evidence can be found for analysing FRs as indefinites.

Syntactically, Wiltschko (1999) assumes that FRs are DPs. To be more concrete, she follows Bresnan and Grimshaw (1978) in their assumption that the *wh*-pronouns contained in FRs are the external heads of the respective construction, while the material following them is analysed as a relative clause CP the specifier of which remains empty. Furthermore, she assumes that those *wh*-pronouns are interpreted as indefinite pronouns, which has the consequence that the indefiniteness of the whole term is a result of the features of its head projecting. As I have already argued against the syntax assumed by Bresnan and Grimshaw (1978) in section (1.1), I will in this section restrict myself to a discussion of the semantic arguments put forth by Wiltschko (1999).

Concerning QVEs in sentences containing FRs, Wiltschko (*ibid.*) assumes that they come about in the same way as QVEs in sentences containing singular indefinites – which is fair enough, since she assumes FRs to be nothing but a special of indefinite DPs. Unfortunately, she does not say explicitly what theory of QVEs in sentences containing indefinites she subscribes to. I will therefore not discuss this point here.

Furthermore, she cites the example given in (42a) below as evidence for the fact that QV-readings are not available to sentences containing singular definites, and claims that this in combination with the fact that both (42b) and (42c) get QV-readings easily shows that FRs are to be analysed as indefinites, not as definites (Wiltschko (*ibid.*: 703 f.)):

- (42) a. ^{??/*}The talk by Peter is always intelligent.
b. A talk by Peter is always intelligent
(= All talks by Peter are intelligent).
c. What Peter says is always intelligent.
(= All talks by Peter are intelligent).

As we will see shortly, it is certainly true that sentences containing singular definites do not get QV-readings as easily and under the same conditions as FRs (although it is not true that they *never* get QV-readings): But apart from that, Wiltschko's (*ibid.*) argument does not go through anyway: It is simply not fair to compare the behaviour of the singular definite in (42a)

to the behaviour of the FR in (42c), because it is highly unlikely that the FR in (42c) denotes a unique object (i. e. a unique talk) in the first place. This is due to the fact that the FR-internal predicate is marked for present tense, which, as is well known (see Dahl (1975, 1985, 1995)) can be interpreted as a generic tense. If this is the case, it does not constrain the eventuality introduced by the respective VP to include the speech time, but rather introduces a rather large interval that reaches into the past as well as into the future, and is only constrained to include the speech time. This, however, only makes sense if either the verb denotes a state that covers a rather large interval (examples are individual level predicates like *be intelligent* and existence-independent predicates like *be famous*), or if an overt or covert adverbial quantifier is present that binds the respective event (or situation) variable, or if the respective VP can be interpreted as introducing a plurality of events itself.

In the case of (42c), it is most likely the third option that is relevant, i. e. a plurality of events of Peter saying something is introduced by the FR-internal VP. But this of course has the consequence that the FR denotes a (maximal) plural object, not a unique object. It is therefore not fair to compare its behaviour to that of the singular definite in (42a), which surely denotes a unique object.

If, on the other hand, an FR is chosen that contains a verb which is unambiguously marked for an episodic tense, and which is furthermore more likely to denote a unique object, the resulting sentence no longer gets a QV-reading, as is evidenced by the examples in (43) below:

- (43) a. *What Peter said last Sunday is always intelligent.
 b. *What Peter is saying right now is always intelligent.

But if (potential) plurality is decisive as far as the availability of QV-readings to sentences containing FRs is concerned, we would of course expect FRs to pattern with plural definites, i. e. replacing the singular definite in (42a) above with a plural definite should result in a grammatical sentence that gets a QV-reading easily. Unfortunately, this is not the case, as is evidenced by (44) below, which is rather strange if it is presented without a context that makes available a set of situations where Peter gives talks³²:

- (44) #The talks by Peter are always intelligent.

³² From now on, I use the symbol ‘#’ in order to indicate that the respective sentence is infelicitous if it is not licensed by a special context.

But interestingly, the German equivalent of (44) is perfectly acceptable, and gets a QV-reading easily:

- (45) Die Vorträge von Peter sind immer intelligent.
The talks by Peter are always intelligent.
(= All talks by Peter are intelligent.)

What are we to make of these facts? While I have to postpone a detailed discussion to chapter 3 (where I will present my analysis of how sentences containing FRs and plural definites get QV-readings), I nevertheless want to draw the reader's attention to the following three facts: First, the English definite DP in (44) cannot denote the plurality of all talks given by Peter, but can only denote a subset of these talks that needs to be specified contextually, while both the FR in (42c) and the German definite DP in (45) most likely denote the maximal sum of all talks by Peter/things said by Peter. Secondly, if one wants to refer to all the talks given by Peter, a bare plural has to be chosen³³, i. e. what can be expressed by using a plural definite in German can only be expressed by using a bare plural in English. Thirdly, if the definite DP in (43) is replaced by a bare plural, the resulting sentence gets a QV-reading easily, as is evidenced by (46) below:

- (46) Talks by Peter are always intelligent.

I therefore draw the following tentative conclusion: It does not seem to be the case that QVEs are in general incompatible with maximality, and that therefore the availability of QV-readings can be taken as an indication for the indefiniteness of the respective term. Therefore, the fact that FRs cannot always be replaced by plural definites in adverbially quantified sentences in English does not automatically show that they are not interpreted as maximal sum individuals. It is also possible that the overt definite determiner in English not only encodes maximality, but also some additional feature that is only compatible with the feature make-up of some, but not all FR-CPs, while the covert definite determiner that has to be employed in the case of FRs for independent reasons as well as the overt definite determiner in German only encode maximality, but not this additional feature.

³³ I will return to the interpretation of bare plurals below and at the end of chapter 3.

That this hypothesis may be on the right track is evidenced by the examples in (47) below: It is perfectly natural to replace the FR in (47a) by a corresponding plural definite, and the resulting sentence (47b) gets a QV-readings as easily as (47a), while replacing it with a bare plural (as in (47c)) or a singular indefinite (as in (47d)) leads to deviance (which is even more obvious in the case of the singular indefinite):

- (47) a. What Peter ate during his trip was always tasty.
(= All things that Peter ate during his trip were tasty.)
b. The things that Peter ate during his trip were always tasty.
(= All things that Peter ate during his trip were tasty.)
c. ?Things that Peter ate during his trip were always tasty.
d. ??A thing that Peter ate during his trip was always tasty.

So, while at first glance FRs and singular indefinites seem to behave alike with respect to adverbial quantification, there are also cases where this correspondence clearly breaks down.

Let us now turn to episodic sentences. Wiltschko (ibid.) claims that what is usually described as the exhaustive reading of FRs in episodic sentences is actually the specific reading indefinite DPs are also capable of getting in such contexts. As Wiltschko (ibid.) does not give any examples to substantiate this claim, I have to construct ones myself, in order to see whether singular indefinites and FRs really behave alike in such contexts. Consider the sentences in (48) below:

- (48) a. At the dinner yesterday evening, Mary ordered what John also ordered.
b. At the dinner yesterday evening, Mary ordered a (certain) drink that John also ordered (namely Scottish whiskey).

Obviously, (48a) and (48b) are not equivalent: While (48b) is also true if John ordered lots of other drinks that Mary did not order, as long as they both ordered one glass of Scottish whiskey, (48a) is only true if Mary ordered *all* the things ordered by John. This is easily explained if the FR in (48a) is a definite DP with a covert definite determiner, while it is entirely mysterious under Wiltschko's (ibid.) assumptions.

Wiltschko (ibid.) gives some other arguments for analysing FRs as indefinites, which, however, are not conclusive, as I will show below. Note, however, that I will not discuss all her arguments, but will restrict myself to a representative selection.

For example, Wiltschko (ibid.) claims that FRs can be interpreted distributively in the scope of universal quantifiers. According to her, this is another argument for analysing FRs not as definites, but as indefinites, because only the former allow such an interpretation. Consider the examples in (49) below, which she cites as evidence for her claim (Wiltschko (ibid.: 704)):

- (49) a. Every student studies a subject that is useful for society.
b. Every student studies the subject that is useful for society.
c. Every student studies what(ever) (subject) is useful for society.

While it is correct that (49b) in contrast to (49a) does not allow a distributive interpretation, the same seems to be true of (49c): According to the native speakers I consulted, (49c) can only be true if either all students study the same subject or if there is something which is common to all subjects that can possibly be studied. On the other hand, both the definite DP in (49b) and the FR in (49c) can be interpreted distributively under the same condition: Namely, if a pronoun is inserted that can be interpreted as a variable bound by the universally quantified DP. This is shown in (50) below:

- (50) a. Every student studies the subject that she considers useful for society.
b. Every student studies what(ever) (subject) she considers useful for society.

I therefore conclude that FRs do not behave differently from definite DPs in the scope of universal quantifiers.

A further argument put forth by Wiltschko (ibid.) is related to the observation that in general only indefinite DPs, but not definite ones can be the direct objects of “once only predicates” (de Swart (1993)) like *kill* if the latter are modified by frequency adverbs like *repeatedly*, as is evidenced by the contrast between (51a) and (51b) below (Wiltschko (ibid.: 708)). Now, Wiltschko (ibid.) claims that the acceptability of examples like (51c) is an argument for analysing FRs as indefinites:

- (51) a. *Mary repeatedly killed the ant.
b. Mary repeatedly killed an ant.
c. Mary repeatedly killed what(ever) was in her way.

Note, however, that (51a) improves drastically if the definite DP is modified by a relative clause like the one in (52) below, which is similar to the FR in (51c).

(52) Mary repeatedly killed the ant that got in her way.

I take this as evidence that the contrast between (51a) and (51c) does not have anything to do with (in)definiteness, but rather derives from the fact that in the case of (51c) a relative clause CP is present that introduces an eventuality/situation variable which can be bound by the adverb *repeatedly*³⁴, while in the case of (51a) there is no such variable. As we will see in chapter 2, the presence of eventuality/situation variables can lead to a relativization of the uniqueness conditions associated with definite determiners in singular definites, and such a relativization is exactly what is required in the context under discussion: It is of course not possible that there are repeated events of killing one and the same individual, but it *is* possible that there are repeated killing events such that for each of those events there is a unique individual that fulfils the respective nominal predicate.

Wiltschko (ibd.) furthermore claims that FRs also behave like indefinites insofar as they are acceptable as objects of verbs of creation like *write*, while according to her definite DPs are not acceptable in such contexts. Consider the sentences in (53) below (ibd.: 705):

- (53) a. John wants to write a book that sells well.
b. *John wants to write the book that sells well.
c. John wants to write what(ever) sells well.

Note, however, that it is not generally true that definite DPs are not acceptable as the objects of verbs of creation, as is evidenced by the acceptability of the sentences in (54) below.

- (54) a. John wants to write the book that solves all syntactic problems.
b. John wants to build the most beautiful house in his hometown.

³⁴ Note that it is not the presence of a relative clause per se that makes a difference, as is evidenced by the unacceptability of (i) below. Rather, what seems to be required is that the relative clause helps to make available a relativized interpretation of the respective definite DP (see above):

- (i) *Mary repeatedly killed the ant that had bitten her yesterday.

Rather, the unacceptability of (53b) seems to be due to the fact that the uniqueness presupposition associated with the definite determiner is not fulfilled in this case: Roughly speaking, according to Heim (1992: 193, building on Stalnaker (1984)), a sentence of the form ‘ α wants that ϕ ’ is true in the world of evaluation w_0 iff for every world w in the set of α ’s epistemic alternatives to w_0 it is the case that every ϕ -world maximally similar to w is more desirable to α in w_0 than any non- ϕ -world maximally similar to w . If we furthermore assume that the uniqueness presupposition associated with the definite determiner does not have to hold with respect to w_0 , but may also hold with respect to other worlds (in this case: the ϕ -worlds/ non- ϕ -worlds maximally similar to the respective world w), (53b) would thus be true in w_0 iff for every world w in the set of John’s epistemic alternatives to w_0 it is the case that any world that is maximally similar to w in which John writes the unique book (in this world) that sells well is more desirable to John than any world maximally similar to w in which he doesn’t write the unique book (in that world) that sells well. Now, the problem with this proposition is that under the default assumption that John has reasonable beliefs, it is very odd to assume that John’s epistemic alternatives to w_0 are worlds that are maximally similar to worlds where there are unique books that sell well. Rather, if John does not hold very strange beliefs, there should be huge amounts of books that sell well in those worlds. Concerning (54a), on the other hand, it is much more reasonable to assume that John’s epistemic alternatives to w_0 are worlds that are maximally similar to worlds each of which contains a unique book that solves all syntactic problems (and similarly for (54b)).

I have thus shown that Wiltschko’s (ibid.) explanation for the unacceptability of (53b) is on the wrong track. But this, of course still leaves open the question why (53c) is acceptable. I think the key to understanding the difference between (53b) and (53c) is the fact that (as already said) FRs are underspecified with respect to the singular/plural distinction, i.e. it depends solely on contextual factors, basic facts about the world where the sentences containing them are evaluated and/or the respective CP-predicate whether they denote unique atomic individuals or maximal sum individuals. This of course has the consequence that in the case of (53c) (in contrast to (53a)) there is no reason to assume that John’s epistemic alternatives to w_0 contain worlds that are maximally similar to worlds each of which contains *unique* written objects that sell well. Rather, it is perfectly possible that the FR in (53c) denotes the maximal sum of all written objects that sell. But does (53c) then mean that John wants to write everything that sells well himself, or more formally: That he prefers every world that is maximally similar to a world w in the set of his epistemic alternatives to w_0 where he writes everything that sells well (in this world) to every world that is maximally

similar to a world w in the set of his epistemic alternatives to w_0 where this is not the case? This does not seem correct. Rather, the sentence intuitively says that John wants to write some (unspecific) books that have the property of selling well – which admittedly is an indefinite reading (albeit not exactly the one predicted by Wiltschko (ibd.), as according to her FRs are interpreted as singular indefinites).

Nevertheless, in view of the compelling evidence to the contrary discussed so far, I do not think that this is a reason to analyse FRs as (plural) indefinites. Rather, we should stick to the assumption that they denote maximal sum individuals, and account for the meaning of (53c) in a manner that is compatible with this assumption. I therefore suggest that in sentences like (53c) a mechanism comes into play that is also at stake in episodic sentences where kind-denoting DPs are the arguments of object-level predicates: The mechanism of existential quantification over instances.

It is well-known that bare plurals (and bare singular mass nouns) can be the arguments of kind-level predicates like *be extinct*, *be widespread* etc., while they get an existential reading when they are the arguments of object-level predicates in episodic sentences (see Carlson (1977) for the first systematic discussion of these facts). This is evidenced by (54 a, b) below, respectively:

- (55) a. Dodos are extinct.
b. Yesterday during the safari, Mary saw dodos.

Now, there are basically two ways to account for this double behaviour of bare plurals: Either they are assumed to be ambiguous between a kind-denotation and a denotation as plural existentially quantified DPs (see Krifka et al. (1995) and Krifka (2004)), or it is assumed that they are unambiguously kind-denoting, but that in the context of object-level predication a type-shifting operation is triggered in order to fix the mismatch which is responsible for the existential reading (see Chierchia (1998) and Dayal (2004)). According to the second view, kinds are nothing but intensionalized maximal sum individuals: While plural definites denote maximal sum individuals that fulfil the respective NP-predicates in the actual world, bare plurals denote maximal sum individuals that consist not only of the individuals that fulfil the respective NP-predicates in the actual world, but also of those that fulfil this predicate in other possible worlds. Furthermore, according to Chierchia (1998), in the context of object-level predication two things happen to those intensional sum individuals: First, they are shifted back to the predicates they were generated from (via applying a covert σ -operator to the sets

the respective NP-predicates are the characteristic functions of), and secondly covert existential quantifiers are applied to those predicates.

Let us now assume that the type-shifting operation just described is also applied to the maximal sum individual denoted by the FR in (53c): The sentence would then be true in w_0 iff for every world w in the set of John's epistemic alternatives to w_0 it is the case that every world that is maximally similar to w in which John writes some things that sell well is preferable to every such world in which this is not the case. This seems to be correct.

The account just sketched leaves open an obvious question: Under what conditions is it possible to apply the complex type shifting operation under discussion to maximal sum individuals? Or, put differently, why do neither standard plural definites nor FRs in general also get existential readings, if this type shifting operation is in principle not only applicable to bona fide kind denoting terms like bare plurals and bare singular mass nouns, but also to FRs like the one in (53c)? While I do not want to go into this discussion too deeply at this point (this will be done in chapter 3), I nevertheless want to draw the reader's attention to the following fact: The availability of an existential interpretation of the FR in (53c) seems to be tied to the fact that the set denoted by the FR-internal CP consists of objects that are distributed over an unspecific amount of time that reaches in the past as well as into the future. To be more concrete, the maximal sum individual denoted by this FR not only consists of texts that sell well at the time of utterance, but also of texts that sold well in the past, and of ones that will be written in the future, and will sell well then. This is obviously due to the fact that the present tense marking of the FR-internal verb is interpreted as a generic tense (see the remarks above), i. e. it introduces a rather large interval that is required to include the speech time, but otherwise reaches into the past as well as into the future.

Now note that in a case like (56) below, where the FR-internal verb is marked for (episodic) past tense, and where accordingly a temporally specific event is introduced FR-internally, an existential interpretation of the FR is no longer available. Rather, the FR gets its usual interpretation as either a unique atomic individual, or as a maximal sum individual: In a situation where Mary suggested to John that he should write an article about kangaroos, a book about the semantics of Q-adverbs, a book about Conlon Nancarrow and an article about superiority effects, (56) is only true if John wants to write *all* of those things, and false if he wants to write only two or three of them. If, on the other hand, Mary only suggested to John that he should write a book about kangaroos, it suffices for (55) to be true that John wants to write that book.

(56) John wants to write what Mary suggested to him to last Sunday.

I therefore conclude that the existential type shift introduced above is not available freely to all terms that denote maximal sum individuals in the context of episodic object-level quantification, but only to a well-defined subclass (but see chapter 3 for more discussion of this point).

So far I have concentrated on the arguments Wiltschko (ibid.) gives for analysing FRs as indefinites, and have shown that they are not conclusive. Let me finally discuss an argument she gives for analysing FRs as unambiguously *singular* expressions.

This argument is based on contrasts like the one shown in (57) below: While sentences containing plural definites in subject position allow collective readings, and are therefore compatible with adverbs like *together*, sentences that contain FRs or singular indefinites in subject position become ungrammatical if such an adverb is added (Wiltschko (ibid.: 707)):

- (57) a. The boys are lifting a piano (together).
b. Who(ever) is strong lifts a piano (*together).
c. A strong man lifts a piano (*together).

Note, however, that it is not only possible to insert the adverb *together* FR-internally, but that furthermore as soon as this has been done, the respective FR is also compatible with a further instance of *together* in the matrix sentence³⁵. This, of course, does not hold with respect to singular indefinites:

- (58) a. Who(ever) wants to raise a child together should have spent some time together before.
b. *A person who wants to raise a child together should have spent some time together before.

³⁵ Note that in the case of (58a) there is no collective predication over all the individuals that satisfy the FR-internal predicate in the actual world. Rather, I assume that a covert generic quantifier is present in (58a), and the denotation of the FR is relativized with respect to the eventualities/situations bound by this quantifier via a covert eventuality/situation variable (see chapter 2 for a detailed discussion of similar cases). This has the following consequence: With respect to each of the situations quantified over, the (collective) matrix predicate is predicated of the sum individual that satisfies the FR-internal predicate in this situation. (This is truth-conditionally equivalent to quantification over sum individuals).

Furthermore, FRs can also be the subject arguments of (weakly) collective predicates like *gather*, which are of course incompatible with singular indefinites in subject position:

- (59) a. Who(ever) studies linguistics is gathering in the third floor.
b. *A person who studies linguistics is gathering in the third floor.

It is therefore fair to say at least that FRs in contrast to singular indefinites are not entirely incompatible with collective predication. Nevertheless, the behaviour of FRs with respect to the adverb *together* remains a mystery to me, and unfortunately I neither have a satisfactory answer to the question why there is such a strong contrast between (57b) and (58a), nor to the question why there is a difference between FRs and plural definites in the first place. I can only offer the following speculation: *Together* seems to prefer strongly subject arguments which unambiguously denote pluralities, and this seems to be in conflict with the fact that FRs are underspecified with respect to semantic number. If, on the other hand, there is strong evidence that an FR denotes a plurality, this conflict disappears.³⁶

Before closing this section, I just want to add one final remark: In German, wh-pronouns can also be interpreted as weak indefinites if they are not fronted, but stay VP-internally. Furthermore, those wh-pronouns can also be modified by relative clauses, as is shown in (60a) below. Therefore, if it was indeed true that FRs are indefinite DPs that contain relative clauses the external head of which is the respective clause-initial wh-pronoun (as proposed by Wiltschko (1999)), we would expect FRs and wh-pronouns modified by relative clauses to behave alike. This, however, is not the case: In a situation where Peter recommended 5 books to Maria, (60a) only gets an unspecific indefinite reading, according to which it is true if Maria read one of the books Peter recommended to her, while (60b) only gets an exhaustive reading according to which it is only true if Maria read all of those five books.

- (60) a. Maria hat was, das Peter ihr empfohlen hat, gelesen.
Maria has what, REL-NEUT-SING Peter her-DAT recommended has, read.
“Maria read something that Peter recommended to her“.
b. Maria hat, was Peter ihr empfohlen hat, gelesen.

³⁶ This, however, unfortunately still leaves open the question why *together* is compatible with the trace left behind by the wh-pronoun in (58a): After all, it is not obvious that the wh-pronoun itself is in any way different from the FR as a whole as far as number specification is concerned.

Maria has, what Peter her-DAT recommended has, read.

“Maria read what Peter recommended to her“.

In the last two sections we have seen that any attempt to analyse FRs as indefinites is bound to fail: The only contexts where FRs really seem to behave like indefinites are adverbially quantified and generic sentences, and even there we have seen that the correspondence breaks down in some cases. Let us therefore take a closer look at an account that tries to explain the behaviour of FRs in adverbially quantified and generic sentences under the assumption that FRs denote maximal sum individuals.

3 QVEs as the By-Product of Quantification over Minimal Situations: An Attempt to Reconcile the Behaviour of FRs in Episodic and Adverbially Quantified Sentences

3.1 Dayal’s (1995) basic suggestion

In this section I discuss a suggestion made by Dayal (1995) how QVEs in adverbially quantified sentences containing FRs could be explained. Her analysis of Hindi correlatives³⁷ is in relevant aspects similar to Jacobson’s (1995) analysis of FRs.

Dayal (1995) discusses QVEs in sentences containing correlatives and FRs as possible counterevidence for the analysis of both as definites, as uniqueness obviously does not obtain in the relevant contexts. Her solution to this problem is to assume that Q-adverbs are not unselective binders (cf. section 1.2.1), but rather that they quantify exclusively over situations, and that the respective uniqueness conditions can be relativized to each of the situations being bound. That means, according to her suggestion³⁸ a sentence like (61a) would be interpreted (very roughly, but see below) as shown in (60b) below:

- (61) a. What Anne serves for dinner is always tasty.
b. $\text{All}_s [\text{in } (s, \sigma_s \{x: \text{servers-for-dinner}(x, \text{Anne})\})]$

³⁷ Correlatives are sentences that contain a relative clause with an internal head which are left-adjoined to the main clause, while the latter contains a demonstrative pronoun which is co-indexed with the relative clause-internal wh-term (see Dayal (1995, 1996), Bhatt (2003) and the references therein for details):

(i) jo laRkii khaRij hai, vo lambij hai. (Dayal (1995): 179).
which girl standing is, she tall is.

³⁸ Note that her claim is only stated in informal terms.

[tasty (s, $\sigma_s\{x: \text{servers-for-dinner}(x, \text{Anne})\}$)]

“Most situations that contain the (relative to this situation) unique thing that Anne serves for dinner are situations where the (relative to this situation) unique thing that Anne serves for dinner is tasty.”

As Dayal’s suggestion (which is not worked out in any formal detail, but only sketched informally) is based on situation-semantics (see Berman (1987), Kratzer (1989), Heim (1990), von Stechow (1994), Percus (2000), Elbourne (2001, to appear) and Büring (2004)), I will briefly introduce the basics of this approach, in order to evaluate against this background whether a solution to the phenomenon under discussion can be found along the lines sketched by Dayal (1995).

3.2 The basics of situation semantics

The situation semantics approaches to QVEs I am aware of (see the references above) only discuss sentences containing Q-adverbs in combination with indefinites³⁹, but at first sight the extension to Hindi correlatives and FRs suggested by Dayal (1995) seems rather straightforward, as we will see below. The following sketch is based on Berman (1987), Heim (1990), von Stechow (1994, 1995) and Elbourne (2001).

From the viewpoint of situation semantics, Q-adverbs are not unselective binders, but rather establish relations between sets of situations in the same way that quantificational determiners establish relations between sets of individuals. Let us first turn our attention to conditionals, since it is assumed by the above authors that in the case of conditionals which either contain an overt Q-adverb or a covert generic quantifier, both arguments of the respective quantifier are encoded syntactically: The denotation of the respective *if*-clause serves as the first argument (the *restrictor*, cf. 1.2.2.1 above), and the denotation of main clause (minus the Q-adverb) serves as the second argument (the *nucleus*, cf. 1.2.2.1 above).

Of course, in order to be interpreted as sets of situations, the respective clauses must contain constituents that introduce slots for situation arguments which are filled by pronominal elements which can be interpreted as free variables, such that the respective Q-

³⁹ Note, however, that the idea to relativize the uniqueness conditions associated with definite determiners (in singular DPs) is made use of in Heim (1990), Elbourne (2001) and Büring (2004), albeit in entirely different contexts: In the context of donkey anaphora (Heim (1990), Elbourne (2001), Büring (2004)) and binding out of DP (Büring (2004)).

adverb can bind them. Let us therefore for the moment simply follow Elbourne (2001), according to whom all (i.e. verbal as well as nominal and adjectival) predicates, and also quantificational determiners have an additional situation argument. This is shown for a few simple examples in (62) below (Note that in this framework indefinites are not analysed as predicative expressions, but as generalized quantifiers with existential force):

- (62) a. $[[\text{beat}]] = \lambda x \lambda y \lambda s . \text{beat}(x, y, s)$
 (The function that takes two individuals and a situation as arguments and yields 1 iff the second individual beats the first one in this situation).
- b. $[[\text{man}]] = \lambda x \lambda s . \text{man}(x, s)$
 (The function that takes an individual and a situation as arguments and yields 1 iff this individual is a man in this situation).
- c. $[[a]] = \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s . \exists x [P(x, s) \wedge Q(x, s)]$

Now, concerning (overt and covert) Q-adverbs, note that it is assumed that they are not interpreted compositionally, but rather that they impose a certain LF-structure (which is given in (63a) below) on sentences containing them, which is in turn interpreted according to a special semantic interpretation rule, which is given in (63b) below for conditionals containing the Q-adverb *always* (see Elbourne (2001: 250)):

- (63) a. $[[\delta_s \text{ if } \alpha_s, \beta]]$
 where δ is the respective Q-adverb, *if* α the if-clause and β the main clause.
- b. $[[[[\text{Always}_{S_{S_1}} \text{ if } \alpha_{S_2} \beta]]]]^{g S_1/S_1} = 1$ iff for every minimal situation \mathbf{s}_1 such that $[[\alpha]]^{g S_1/S_1} = 1$, there is a situation \mathbf{s}_2 such that $\mathbf{s}_1 \leq \mathbf{s}_2$ and \mathbf{s}_2 is a minimal situation⁴⁰ such that $[[\beta]]^{g S_1/S_1, S_2/S_2} = 1$.

Note that in (63b) above the “superscripts ... indicate that in the calculation of truth conditions the corresponding metalanguage situation variables (indicated by boldface) must be put in place of the object level ones” (Elbourne (ibid.: 250)). Note furthermore that as “the part-

⁴⁰ Note that the minimality condition with respect to the „nucleus situations“ \mathbf{s}_2 is not contained within Berman’s (1987) and Elbourne’s (2001) proposals. I follow Fintel (1994, 1995) in including it for the reasons to be discussed shortly.

whole structure of the domain of situations makes it difficult to count situations and to compare the cardinalities of two sets of situations” (von Stechow (1994: 18)), the sets of situations that Q-adverbs operate on have to be restricted to the sets of minimal situations the respective propositions are true of, i. e. to the sets of situations that do not have proper subparts that are also in the respective sets. But this minimality condition makes it necessary to introduce an additional situation in the nucleus which (possibly) extends the restrictor situation: If, for example, in the main clause an indefinite is introduced in addition to the one introduced in the if-clause, the minimality condition applied to the set of situations denoted by the if-clause would preclude the situation predicate that constitutes the nuclear scope from applying to those situations as well.

Consider now the donkey sentence in (64) below as a concrete example for how the rule in (63b) works, and how it explains the QV-readings of adverbially quantified conditionals that contain indefinites in the if-clause:

(64) If a farmer owns a donkey, he always beats it.

Of course, donkey sentences introduce an additional complication that at first sight seems to be unrelated to our present concerns: The two pronouns in the main clause seem to pick up the individuals introduced by the indefinites in the if-clause, while according to standard assumptions those pronouns cannot be bound by the indefinites in the if-clause, as the latter do not c-command the former⁴¹. We will, however, see shortly that Elbourne’s (ibid.) analysis of sentences like (64) is highly relevant to our concerns, as he treats pronouns like the ones in that example as concealed definite descriptions (see fn. 41).

To be more concrete, according to Elbourne (ibid.) those pronouns are nothing but definite determiners the NP-complements of which have been deleted in the phonological component because of being identical to one of the NPs contained within the indefinites in the

⁴¹ There are three prominent lines of research that deal with that problem, which also occurs in other types of sentences: (a) The unselective binding approaches already discussed in section 1.2.2.1, according to which the indefinites as well as the pronouns introduce free variables which can be bound by c-commanding operators (Kamp (1981), Heim (1982)), (b) Dynamic binding approaches (Staudacher (1987), Groenendijk and Stokhof (1990) and especially Chierchia (1995a)), according to which existential quantifiers have the special property of being able to bind variables outside of their scope, and (c) so called *E-type pronoun* approaches (Evans (1977), Cooper (1979), Heim (1990), Heim and Kratzer (1998): chapter 11), according to which pronouns like the ones above are concealed definite descriptions. As will become clear soon, the analysis discussed in the text belongs in the third category.

if-clause. Furthermore, he assumes (following Heim and Kratzer (1998): 290-293) that a phonological rule is responsible for the fact that those bare determiners get spelled-out as *he* and *it*, respectively (see Elbourne (ibd.) for further justification of this assumption). Now, in order to explain the fact that those pronouns seem to pick up the individuals introduced by the respective indefinites in the if-clause, Elbourne (ibd.) assumes that the situation argument slots of the respective elided NPs get filled by pronominal situation variables which do not bear the “nucleus index”, but the “restrictor index”.

This has the consequence that they with respect to each of the situations quantified over by the Q-adverb denote the unique individual which fulfils the respective (elided) nominal predicate in that situation. As this predicate is identical to the one denoted by the NP-complement of the respective indefinite determiner, this results in co-variance with the individuals introduced by the respective indefinite. In order to see this, consider (in (65a) below) the LF Elbourne (ibd.: 250) assumes for the example under discussion⁴², and (in (65b)) the truth conditions that result from applying the rule in (63b) to that LF (ibd.: 251):

- (65) a. $[[\text{always}_{s_1} \text{ if a man}(s_1) \text{ owns}(s_1) \text{ a donkey}(s_1)]_{s_2} \text{ he } \underline{\text{man}(s_1)} \text{ beats}(s_2) \underline{\text{it donkey}(s_1)}]$.
- b. For every minimal situation s_1 such that there is an x such that x is a man in s_1 and there is a y such that y is a donkey in s_1 and x owns y in s_1 , there is a situation s_2 such that $s_1 \leq s_2$ and the unique u such that u is a man in s_1 beats in s_2 the unique z such that z is a donkey in s_1 .

As is evident from (65b), the framework assumed by Elbourne (ibd.) is able to account for the fact that the indefinites in sentences like (63) seem to get their quantificational force from the Q-adverb as well as it gets the interpretation of the respective donkey pronouns right. Both results are essentially achieved via the same mechanism: Binding of a situation variable included in the respective NPs by the Q-adverb contained within the same clause.

Now, in order to see whether this mechanism also works for adverbially quantified sentences containing FRs, we first have to determine how adverbially quantified sentences that do not contain an if-clause are to be interpreted. According to von Stechow (1994, 1995),

⁴² This is of course only a very rough approximation, as according to standard assumptions the indefinite in object position (being a quantificational DP) needs to be moved out of that position and leave a trace behind in order to be interpretable (see Heim/Kratzer (1998): Chapters 6-8 for an overview over the arguments for Quantifier Raising given in the literature).

this is the standard case in adverbial quantification, conditionals being the exception. He assumes that apart from the obvious difference concerning the respective quantificational domains, the main difference between Q-adverbs and quantificational determiners is the following: In the case of quantificational determiners, the two arguments of the respective quantifier are explicitly given in the syntax, the NP complement of the respective determiner being the first argument, the rest of the clause being the second one. In the case of Q-adverbs, on the other hand, von Fintel (*ibid.*) assumes that with the exception of conditionals, the two arguments of the respective quantifier are not explicitly encoded in the syntax: The only argument that is explicitly given is the set of situations that the respective sentence as a whole (minus the Q-adverb) denotes. According to von Fintel (*ibid.*), this set can plausibly be assumed to constitute the second argument of the Q-adverb, its nuclear scope. But this of course raises the question where the first argument (the restriction) comes from?

As intonation (in addition to word order, see section 1.2.2.1) seems to play a major role as far as the determination of the restriction of Q-adverbs is concerned, many accounts of QVEs (no matter, whether they assume Q-adverbs to be unselective binders, or to be selective binders of situation or event variables) assume that information structure directly determines clause splitting: They assume that either topical (Partee (1995), Chierchia (1995a), Cohen and Erteschik-Shir (2002)), non-novel/presupposed (Krifka (2001)) or non-focal (Rooth (1985, 1992, 1995), Krifka (1995), Herburger (2000)) material is mapped onto the restriction of Q-adverbs.

Von Fintel (1994, 1995) explicitly argues against this view and assumes only an indirect interdependence of information structure and the determination of the restriction of Q-adverbs (see also Beaver and Clark (2003) for a similar view), being due to the fact that both involve processes of anaphora resolution (see below). More concretely, he assumes that while all quantifiers (i. e. quantificational determiners as well as Q-adverbs) introduce a silent variable in their restriction that ranges over contextually retrieved predicates, in the case of Q-adverbs the restriction consists of nothing more but this contextual variable. (In the case of quantificational determiners, on the other hand, the explicitly given predicate denoted by the respective NP gets intersected with the predicate the respective contextual variable is resolved to, which has the effect that the domain of quantification is further reduced – an empirically

well attested phenomenon.) A sentence like (66a) below would thus be semantically interpreted as shown in (66b)⁴³:

- (66) a. A dog is always smart.
 b. $\{s: s \in \min(\{s': C(s')\})\} \subseteq \{s': \exists s'' [s' \leq s'' \wedge s'' \in \min(\{s''': \exists x [\text{dog}(x, s''') \wedge \text{smart}(x, s''')]\})]\}$

Now, according to von Stechow (ibid.), assigning a value to the C-variable is not the job of the semantic component anymore. Instead, he considers it to be a purely pragmatic process, which, however, in the default case makes use of the focus semantic value of the respective sentence (see Rooth (1992))⁴⁴: According to von Stechow (ibid.), the (characteristic function of the) set of situations C gets resolved to needs to be determined on the basis of a discourse topic, where discourse topics are understood to be questions under discussion (see also Carlson (1983) and Roberts (1996)). If, however, there is no explicitly given discourse topic, one needs to be reconstructed on the basis of available information.

This is where the focus semantic value of the respective sentence becomes relevant: According to Rooth (1985, 1992), focus on a constituent evokes a set consisting of this constituent plus all the plausible alternatives to that constituent. This has the consequence that at the level where the complete sentence is interpreted we get a set of propositions which consists of the original proposition plus all propositions which contain an alternative to the focussed constituent. As, on the other hand, according to an influential theory developed by Hamblin (1973), the denotation of a question is a set of propositions – namely the set of possible answers to it, no matter whether they are true or false –, the focus semantic value of a given sentence (minus the Q-adverb) is exactly the kind of object needed. All that needs to

⁴³ Note that all complications that were introduced in order to get the semantics of adverbially quantified conditionals right (i. e. the minimality conditions as well as the need to introduce extended situations in the second argument) are adopted, in order to arrive at a unified account.

⁴⁴ Also presuppositions play a role in the process of finding a suitable value for the respective C-variable: In a sentence like (i) below the verb *misses* presupposes that there has been a prior situation where Robin Hood aims at some target (Schubert and Pelletier (1987)). The hearer thus automatically accommodates a set of such situations – which has the consequence that the C-variable can be resolved to the characteristic function of this set of situations.

- (i) Robin Hood never misses.

be done to this object in order to arrive at a set of situations that the respective C-variable can be resolved to is to form the union of the propositions contained within it.

Let us return to sentence (66a) in order to see how this works for a concrete example. For concreteness, I assume that the VP *is smart* is focussed (realized as a pitch accent on *smart*; see Selkirk (1995) for an influential theory that addresses the relation between pitch accents and focus marking), as shown in (67a) below. Note that from now on, focus marking is indicated by an F-subscript. Furthermore, the corresponding focus semantic value (under the assumption that the Q-adverb is excluded from the computation of the focus semantic value) is given in (67b):

- (67) a. A dog is always [smart]_F.
 b. {A dog is smart, A dog is stupid}

As shown formally in (68a) below, the union of this set of propositions is a set of situations where a dog is either stupid or smart. Under the (slightly simplifying) assumption that a dog can only be either stupid or smart, this set is identical to the set of situations containing a dog, which has the consequence that (68a) can be simplified to (68b):

- (68) a. $\{s: \exists x \exists R \in \text{Alt}([\text{smart}])[\text{dog}(x, s) \wedge R(x, s)]\}$.
 b. $\{s: \exists x[\text{dog}(x, s)]\}$

Now, the characteristic function of this set is exactly the right kind of object for the C-variable in (66b) to be resolved to, which gives us (69) below as the final result:

- (69) $\{s: s \in \min(\{s': \exists x[\text{dog}(x, s')]\})\} \subseteq \{s': \exists s''[s' \leq s'' \wedge s'' \in \min(\{s''': \exists x[\text{dog}(x, s''') \wedge \text{intelligent}(x, s''')]\})]\}$.

According to (69), (67a) is true if the set of minimal situations that include a dog is included in the set of situations that can be extended to minimal situations where a dog is intelligent. Note that the minimality condition stated for the “nucleus” situations is necessary in order to take care of a problem that is created by the fact that in cases like the one above the non-focal indefinite is interpreted twice: once in the restrictor and once in the nucleus (see Rooth (1995) and Krifka (2001) for alternative solutions to this problem). Now, without this minimality condition there would be no guarantee that with respect to each of the situations in the

restrictor the dog included in that situation is identical to the dog introduced by the indefinite in the corresponding nucleus situation (see von Stechow (1995): 29). Therefore, the existence of one single dog that is intelligent would make the sentence true – no matter whether all the other dogs in the world are stupid or smart –, as each minimal situation containing a dog can easily be extended to a situation containing the only intelligent dog in the world: Namely the world containing that dog.

As I said above, an extension of this approach to FRs at first glance seems to be relatively straightforward, as we will see below. But before going into the details I want to draw the reader's attention to the following fact: Dayal (1995) predicts singular definites to behave like FRs with respect to QVEs, because what enables adverbially quantified sentences that contain FRs to get QV-readings should also hold for sentences containing singular definites, i. e. it should also in this case be possible to relativize uniqueness with respect to the situations quantified over. Furthermore, under the assumption that this relativization is generally possible, sentences containing singular definites should be ideal candidates for QVEs, as they automatically come with the uniqueness condition that in the case of sentences containing indefinites has to be guaranteed by invoking minimality, if one wants to get the truth conditions right. They should be even better suited for this job than FRs, as the latter can in principle denote atomic as well as (maximal) sum individuals, while singular definites unambiguously denote atoms: Quantification over situations containing atomic individuals automatically guarantees QV with respect to those individuals, while for situations containing sum individuals it has to be made sure that in all those situations the respective sum individual consists of atoms of a fixed number. This, at least in the absence of contextual clues, should be a harder task for the hearer than to imagine a set of situations each of which contains just a single individual that fulfils the respective predicate.

Of course, we can also assume that for some reason the respective Q-adverb in the relevant cases only quantifies over situations each of which contains just one single individual that fulfils the respective predicate in that situation. If this were the case, FRs and singular definites should be equally well suited for the job.

In (70) below the assumptions are repeated that lead to the expectation that sentences containing singular definites get QV-readings with at least the same ease as sentences containing FRs.

- (70) a. FRs denote the maximal individuals that satisfy the respective description, where those individuals may either be atomic or sum individuals.

- b. Q-adverbs quantify unambiguously over situations.
- c. Uniqueness/maximality can be relativized with respect to the situations quantified over.

3.3 A comparison between the behaviour of FRs and singular definites in adverbially quantified sentences

Let us test the hypothesis that FRs and singular definites behave alike as far as QVEs are concerned, and consider the sentences in (71) below: According to the assumptions in (70) they only differ insofar as the definite DP in (71a) unambiguously denotes a unique atomic individual, while the FR in (70b) either denotes a unique atomic individual or a maximal sum individual:

- (71) a. The person who drives a blue car is usually aggressive.
 b. Who drives a blue car is usually aggressive.

Nevertheless, the two sentences differ dramatically, as far as the readings available for them are concerned. (71b) is three-way ambiguous: It can either mean that most owners of blue cars are aggressive, or (if the hearer is willing to accommodate a suitable context) that a contextually salient owner of a blue car is aggressive in most (relevant) situations, or that all owners of blue cars are aggressive in most (relevant) situations – with the first reading being the most prominent one. In the case of (71a), on the other hand, the most prominent reading is the second one from above, according to which it is presupposed that there is a highly salient owner of a blue car⁴⁵, while it is asserted that this person is aggressive in most (relevant) situations. A QV-reading, on the other hand, does not seem to be possible (but see below).

Let us for the moment ignore the third reading of (71b), which is irrelevant for our present concerns, and concentrate on the question how the first two readings that are available for (71b) can be derived under the assumption that the hypotheses above are correct. In order to generate those readings, it suffices to combine the assumptions of Elbourne (2001) and von Stechow (1994, 1995): One only needs to assume that in both cases the VP *is aggressive* is focus marked, which has the effect that the FR is interpreted both in the restrictor and in the nucleus, but that in the first case the situation variable introduced within the NP-complement of the

⁴⁵ Contextual salience is required, as the predicate by itself does not denote (the characteristic function of) a singleton set in the actual world.

covert σ -operator gets bound by the Q-adverb, while in the second case this variable gets assigned a value from the context – either some previously mentioned salient situation or the utterance situation. The resulting readings are given formally in (72) below⁴⁶:

$$(72) \text{ a. } \{s: s \in \min(\{s': \exists R[\mathbb{R}(\sigma\{x: \text{man}(x, s') \wedge \text{drives-a-blue-car}(x, s')\}, s')]\})\} \\ \cap \{s': \exists s''[s' \leq s'' \wedge s'' \in \min(\{s''' : \text{is-aggressive}(\sigma\{x: \text{man}(x, s''') \wedge \\ \text{drives-a-blue-car}(x, s''')\}, s''')]\})\} \geq \frac{1}{2} \{s: s \in \min(\{s': \exists R \\ [\mathbb{R}(\sigma\{x: \text{man}(x, s') \wedge \text{owns-a-blue-car}(x, s')\}, s')]\})\}$$

“More than half of the minimal situations s each of which stands in some relation to the unique individual which is a man in s and drives a blue car in s are also included in the set of situations which can be extended to a situation s' such that the unique/maximal individual that is a man in s' and drives a blue car in s' is aggressive in s' .”

$$\text{b. } |\{s: s \in \min(\{s': \exists R[\mathbb{R}(\sigma\{x: \text{man}(x, s^*) \wedge \text{owns-a-blue-car}(x, s^*)\}, s')]\})\} \\ \cap \{s': \exists s''[s' \leq s'' \wedge s'' \in \min(\{s''' : \text{is-aggressive}(\sigma\{x: \text{man}(x, s^*) \wedge \\ \text{owns-a-blue-car}(x, s^*)\}, s''')]\})\}| \geq \frac{1}{2} |\{s: s \in \min(\{s': \exists R \\ [\mathbb{R}(\sigma\{x: \text{man}(x, s^*) \wedge \text{owns-a-blue-car}(x, s^*)\}, s')]\})\}|$$

“More than half of the minimal situations s each of which stands in some relation to the unique individual which is a man in s^* and drives a blue car in s^* are also included in the set of situations which can be extended to a situation s' such that the unique individual which is a man in s^* and drives a blue car in s^* is aggressive in s' .”

Now, as already mentioned, the problem is that (71a) (in the absence of a special context) only gets the reading in (72b), which is the dispreferred reading, as far as (71b) is concerned, while according to the assumptions above (71a) should get the QV-reading in (72a) at least as easily as (71b). This casts serious doubts on the assumption that QVEs in sentences containing FRs come about in the way suggested by Dayal (1995) and formalized above – namely via quantification over (minimal) situations each of which contains a unique individual that fulfils the respective predicate in that situation. We therefore need to

⁴⁶ For the moment, I abstract away from the precise semantic representation of the relative clause, and simply treat it on a par with nominal predicates like *man* (but see below for further discussion).

reconsider the assumptions in (70), as the difference between (71a) and (71b) cannot be explained if they are all correct.

(70a) seems to be pretty well motivated: The assumption that not only definite DPs, but also FRs contain a (covert or overt) definite determiner that denotes the σ -operator is well supported by the (semantic as well as syntactic) behaviour of FRs in episodic sentences. Let us therefore check the other two hypotheses, to see if something is wrong about them.

If (70b) and (70c) were wrong, i.e. if Q-adverbs were also able to quantify over individuals, while the uniqueness/maximality condition associated with the σ -operator could for some reason not be relativized with respect to the situations quantified over by a Q-adverb, the different behaviour of FRs and singular definites in adverbially quantified sentences could be explained in the following way: As in the default case, FRs denote (maximal) sum individuals, it is conceivable that in the context of adverbial quantification, the sum individuals denoted by FRs may be shifted to the sets of atomic individuals constituting the respective sum individuals. In this way, a suitable first argument (restrictor) for the respective Q-adverb would be generated. Concerning singular definites, on the other hand, the fact that they unambiguously denote (unique) atomic individuals would have the effect that the application of the type shift under discussion to the objects denoted by them would always generate singleton sets. But quantification over singleton sets arguably results in unacceptability, as is evidenced by the fact that the sentences in (73) are rather deviant:

- (73) a. ??All highest mountains in the world are hard to climb.
b. ??No current pope likes the pill.

If this hypothesis is on the right track, we would explain why plural definites pattern with FRs, as far as QVEs are concerned. Let us test this prediction and have a closer look at the behaviour of plural definites in adverbially quantified sentences.

Consider (74) below, which is the minimal variant of (71b) that results from replacing the FR with a plural definite that has almost the same descriptive content:

- (74) The people who drive a blue car are usually aggressive.

As it turns out, (74) does not get a QV-reading: Rather, it (in the absence of a context that makes available a set of situations each of which can plausibly be assumed to contain a plurality of people who drive a blue car) can only be interpreted as saying that for each person

among a contextually salient group of people who drive a blue car it is the case that he/she is aggressive in most relevant situations. This, however, suggests that the plural definite in (74) is *not* equivalent to the FR in (71b): As already mentioned in section 2.2.2, in English only FRs that introduce specific, episodic events are equivalent to plural definites, while ones that introduce non-episodic and unspecific events are equivalent to bare plurals. This fact will be discussed at length in chapter 3, so I will not go into it here. Let us therefore (for the moment) simply control for this factor, and restrict ourselves for the moment to a comparison between “episodic” FRs and “episodic” plural definites.

Consider again the examples in (47a, b), which are repeated below as (75 a, b):

- (75) a. What Peter ate during his trip was always tasty.
b. The things that Peter ate during his trip were always tasty.

As already mentioned in section 2.2.2, both sentences easily get a QV-reading that can be paraphrased as “All the things that Peter ate during his trip were tasty”. Sentence (76), on the other hand, where the FR has been replaced by a singular definite, is quite strange, and does not get a QV-reading. Rather, it can only be true in a very odd situation, where Peter eats one and the same thing several times during his trip, and were this thing nevertheless tastes good every time he eats it:

- (76) ?The thing Peter ate during his trip was always tasty.

The same contrast obtains in (77) below: While (77a) and (77b) easily get QV-readings that can be paraphrased as “Most people who lectured on kangaroos at the conference last summer were open-minded”, (77c) can only be true in a situation where the unique person who lectured on kangaroos at the conference last summer was open-minded in most relevant situations (presumably lecturing situations), i.e. it requires the i-level predicate *be open-minded* to be reinterpreted as an s-level predicate in order to be acceptable at all:

- (77) a. Who lectured on kangaroos at the conference last summer was usually open-minded.
b. The people who lectured on kangaroos at the conference last summer were usually open-minded.

- c. The person who lectured on kangaroos at the conference last summer was usually open-minded.

In light of these facts, it is very plausible to assume that the relevant factor that sets FRs apart from singular definites, as far as QVEs are concerned, is the fact that the former denote (maximal) sum individuals by default, while the latter unambiguously denote (unique) atomic individuals. This, of course, in and of itself does not mean that the hypothesis sketched above is correct, i.e. it does not automatically mean that Q-adverbs may indeed also quantify over individuals, and that the sum individuals denoted by FRs (and, presumably, plural definites) may be shifted to the sets of atoms they consist of. It is also possible that (70b) is correct, and that Q-adverbs are indeed only able to quantify over abstract entities like situations or events, but that only (70c) is wrong for some reason. If this was the case, i.e. if the uniqueness/maximality condition associated with the definite determiner could not so easily be relativized to the situations quantified over by a Q-adverb as assumed by Dayal (1995), we would have an explanation for the absence of QVEs in sentences containing singular definites, but we would still not have an account of how QVEs in sentences containing FRs and plural definites come about. Therefore, it seems to be very attractive to give up the assumption that Q-adverbs only quantify over situations or events, and work out the type-shifting story sketched above.

As promising as this solution might seem at first, there are nevertheless good reasons to not adopt it. While a detailed discussion of the relevant facts will have to await chapter 3, where I present my final analysis of QVEs in sentences containing plural definites and FRs, I nevertheless want to give some preliminary empirical arguments right now for sticking to the assumption that Q-adverbs only quantify over situations or events. Consider the sentences in (78) and (79) below:

- (78) a. *What Peter ate during his trip is usually tasty.
b. *The things that Peter ate during his trip are usually tasty.
c. ^(*)Most things that Peter ate during his trip are tasty.
- (79) a. ^{??}Who lectured on kangaroos at the conference last summer is usually open-minded.
b. ^{??}The people who lectured on kangaroos at the conference last summer are usually open-minded.

- c. Most people who lectured on kangaroos at the conference last summer are open-minded.

Let us first concentrate on the sentences in (78). The fact that they are all similarly odd if the NP *things Peter ate during his trip* is understood as denoting a set of concrete objects is expected under the assumption that not only the quantificational determiner *most* in (78c), but also the Q-adverb *usually* in (78a, b) quantifies over the set of things Peter ate during his trip: Food ceases to exist after having been eaten, and it presumably does not make sense to say that an entity has a certain property at a time when it does not exist anymore (with the exception of existence-independent predicates like *be famous*; see Musan (1997) for discussion). Note, however that (78c) is fully acceptable if the NP *things that Peter ate during his trip* is understood to denote not a set of concrete objects, but a set of kinds of food, while no such reading is available in the case (78a, b). While there is no obvious reason for why there should be such a contrast, it might nevertheless be possible to come up with a story according to which the set denoted by the NP in (78c) differs from the set that results from shifting the maximal sum individuals denoted by the FR in (78a) and the plural definite in (78b) to the set of atoms they consist of in the relevant respect.

The contrast between (79a, b) on the one hand, and (79c) on the other, is, however, harder to explain if in each case we have quantification over the set of people who lectured on kangaroos at the conference last summer: While the acceptability of (79c) is completely expected, as there is no reason to assume that those people do not exist anymore at the time when the sentence is uttered, there is no plausible reason why (79a, b) should be odd. The contrast in (79) therefore casts serious doubts on the assumption that QVEs in sentences containing FRs and plural definites come about via quantification over the individuals constituting the respective sum individuals. This is even more noteworthy in light of the fact that a similar phenomenon can be observed in adverbially quantified sentences containing indefinite DPs modified by relative clauses (This will be discussed in chapter 3): Also in this case, QV-readings – at least in the default case; see chapter 3 for discussion – are only available if the tense markings of the relative clause verbs agree with the tense markings of the matrix verbs. In order to see this, consider the sentences in (80) below: While (80a) easily gets a QV-reading that is equivalent to the meaning of (80b), (80c) does not get a QV-reading that is equivalent to the meaning of (80d), but is rather odd in a neutral context, as it seems to require that there is a single specific car which changes its colour extremely often.

- (80) a. A car that was bought in the eighties was usually blue.
 b. Most cars that were bought in the eighties were blue.
 c. ^(??)A car that was bought in the eighties is usually blue.
 d. Most cars that were bought in the eighties are blue.

Intuitively, the oddity of (79a, b) as well as the oddity of (80c) seems to be a consequence of the fact that in all three sentences the tense markings of the relative clause verbs do not agree with the tense markings of the respective matrix verbs. As, on the other hand, no such tense agreement seems to be required in sentences with quantificational DPs instead of Q-adverbs, it is very reasonable to assume that this difference is somehow related to the fact that Q-adverbs (always) quantify over different entities than quantificational determiners. Further evidence for this claim comes from the contrast in (81) below:

- (81) a. ^{??}Who listened to Peter's talk on kangaroos at the conference last summer was usually open-minded.
 b. ^{??}The people who listened to Peter's talk on kangaroos at the conference last summer were usually open-minded.
 c. Most people who listened to Peter's talk on kangaroos at the conference last summer were open-minded.

Also in this case, (81c), which contains a quantificational determiner, behaves as expected, while there is no plausible reason why (81a, b) should be odd if the respective Q-adverb was able to quantify over the set of people denoted by the plural definite/FR, respectively. Intuitively, the sentences in (81) only differ from the ones in (77 a, b) with respect to the internal constitution of the respective relative clause internal (plural) eventualities/situations: While in the case of (81a, b) it is clear that the atomic listening events all had to take place at the same time (namely at the time when Peter gave his talk), in the case of (77a, b) it is easily possible that the atomic lecturing events are distributed over the whole duration of the conference on kangaroos last summer. Of course, it is still entirely open why the internal constitution of the respective relative clause eventualities should be relevant⁴⁷. Nevertheless, it seems safe to conclude that this constraint (which, as is evidenced by the acceptability of (80c), is again absent in sentences with quantificational determiners) is somehow related to

⁴⁷ An explanation for this constraint, as well as for the "tense agreement constraint" mentioned above, will be given in chapter 4.

the fact that Q-adverbs also in sentences with FRs and plural definites quantify over eventualities/situations, not over individuals.

Let us therefore draw the following intermediary conclusion: QVEs in sentences containing plural definites and “temporally specific” FRs do not come about via quantification over the sets of atoms that constitute the respective maximal sum individuals. Rather, quantification over abstract entities like situations (or eventualities) seems to be involved – albeit not quantification over minimal situations (or eventualities) each of which contains the maximal sum individuals that satisfies the respective predicate in that situation/eventuality. Furthermore, the fact that plural definites and FRs (at least by default) denote sum individuals seems to play a role as far as the availability of the respective QV-readings is concerned.

Having confirmed the hypotheses formulated in (70a, b), let us now have a closer look at (70c), according to which the maximality/uniqueness condition associated with (overt and covert) definite determiners can be relativized with respect to the situations/eventualities quantified over by Q-adverbs. This will be done in the next section.

3.4 Can the uniqueness/maximality condition associated with the definite determiner be relativized with respect to the situations/eventualities quantified over by Q-adverbs?

In the last section we have seen that while there are good reasons to assume that QVEs in sentences with FRs and plural definites come about via quantification over situations/eventualities, this does presumably not happen in the way suggested by Dayal (1995) – namely via quantification over a set of minimal situations each of which contains the unique/maximal entity that satisfies the predicate denoted by the respective NP/CP *in that situation*. Otherwise, the observed contrast between FRs/plural definites on the one hand, and singular definites on the other would be hard to explain.

But then again, note that if the basic assumptions of the situation semantics approaches discussed in section 1.2 are right, it should at least in principle be possible to relativize the uniqueness/maximality of definite DPs and FRs in the required way: If Q-adverbs quantify over situations, and if furthermore each predicate – nominal as well as verbal and adjectival ones – comes with an additional situation variable, there is no reason why Q-adverbs should not be able to bind the situation variables that are presumably present within the NP/CP-complements of definite determiners. Let us therefore check whether the uniqueness/maximality of definite DPs/FRs can *never* be relativized with respect to the situations quantified over by a Q-adverb, or whether it is only the case that such a

relativization is subject to an additional constraint we did not pay attention to so far – irrespective of the fact that sentences containing FRs and plural definites presumably at least have an additional option to obtain QV-readings.

I will for this purpose have a closer look at the behaviour of singular definites in adverbially quantified sentences, because if the relativization under discussion is possible at all, we should at least find *some* examples where sentences with singular definites get QV-readings.

Consider again example (71a), which is repeated below as (82):

(82) The man who drives a blue car is usually [aggressive]_F.

As already discussed, this sentence does not get a QV-reading if it is uttered out of the blue and with standard intonation, i. e. with the main accent on the matrix verb *aggressive*. Rather, it can only be interpreted as saying that most (contextually restricted) situations that contain the (with respect to a context the hearer has to be willing to accommodate) unique person who has the property of being a man and driving a blue car are situations where this man is aggressive.

In the last section we took this fact as an indication that the situation variables that are presumably contained within the NP-complements of definite determiners cannot be bound by Q-adverbs, and that therefore these situation variables have to be resolved to some default value – namely, the actual world.⁴⁸ This, however, seems to be too strong: If the adjective *blue* contained within the definite DP is read with a fall-rise accent (in addition to the focus accent on the matrix verb *aggressive*), an additional reading becomes available, according to which the individuals denoted by the definite DP vary with the situations bound by the Q-adverb – although it is by no means equivalent to a standard QV-reading. But let us first try to be a little more precise on the phonological properties I have in mind, before we turn to an informal characterization of the resulting reading.

The fall-rise accent I have in mind has been termed *B-accent* by Jackendoff (1972), and it can be described as an H* or L+H* followed by a H-L% boundary sequence in Pierrehumbert's (1980) autosegmental notation. According to many authors (see especially Vallduvi (1990, 1993), Roberts (1996) and Büring (1997)), the function of the B-accent is to

⁴⁸ Remember that worlds count as maximal situations.

indicate the presence of a *contrastive topic*.⁴⁹ Let us for the moment simply use this term as a convenient label for constituents bearing the B-accent, without going into the discussion of its theoretical significance. (This will be done below). The minimal variant of example (82) where the adjective *blue* bears such an accent can thus be represented as in (83) below. Note that the subscript “CT” is meant to indicate that the respective element bears the accent just discussed. This does not necessarily mean that this element itself is a contrastive topic, but only that it is contained within a contrastive topic:

(83) (#) [The man who drives a [blue]_{CT} car] is usually [aggressive]_F.

Note that the resulting sentence is still a bit odd in a neutral context. While it does no longer necessarily trigger the expectation on the side of the hearer that it is uttered in a context with respect to which there is a unique man who drives a blue car, it (on one of its possible readings) triggers a different expectation: Namely, that a set of situations has been introduced such that each of those situations contains exactly one man who drives a blue car, exactly one man who drives a red car, exactly one man who drives a green car, etc. If, however, the hearer is willing and able to accommodate such a set of situations *s*, (83) asserts that most of those situations *s* are such that the unique person that is a man and owns a blue car in *s* is aggressive in *s*. (83) therefore shows that the situation variable that is presumably present within the NP-complements of definite determiners *can* in principle be bound by a Q-adverb. This is further evidenced by the fact that (83) is completely acceptable under the intended reading, if it is uttered in a context like the one given in (84) below⁵⁰:

(84) There is one thing that is really funny about car races: The man who drives a [blue]_{CT} car is usually [aggressive]_F.

It is therefore plausible to assume that the situation variable contained within a singular definite can only be bound by a Q-adverb if the following condition is fulfilled: A set of situations is either explicitly given in the context, or can be accommodated by the hearer such

⁴⁹ This accent has an equivalent in German (and also in many other languages; see Vallduvi (1990, 1993) for discussion)), which has been discussed extensively in Büring (1997). According to Büring (ibid.), the two accents differ in their phonological properties, but not in their discourse function (which will be discussed below).

⁵⁰ Note that (84), while being fully acceptable, feels incomplete: It triggers a feeling that one is told next that the driver of a car that is of a different colour is not aggressive.

that each situation in this set can plausibly be assumed to contain exactly one individual that satisfies the predicate denoted by the respective NP. The Q-adverb then quantifies over the elements in this set. Furthermore, marking (parts of) singular definites as contrastive topics for some reason seems to facilitate the accommodation of a set of such situations.

That the availability of a set of situations of the right kind is the decisive factor is further evidenced by the example in (85a) below: (85a) easily gets a reading according to which the piano-players vary with the situations quantified over, in spite of the fact that no element within the definite DP receives a CT-accent. Note, however, that an accent on some element within the definite DP (in the examples below, accents are indicated by capital letters) is required in order for co-variation to be possible: If the definite DP as a whole is de-accented, as in (85b, c), it can only denote an individual that is (a) unique with respect to the whole universe of discourse and (b) familiar. This has the consequence that (84b) is a bit odd, as no discourse referent has been introduced that the definite DP can pick up, while (84c), where such a discourse referent is provided, is fine.

- (85) a. Paul HATES going to jazz-concerts: The PIANO-player always flirts with his GIRLFRIEND.
b. Paul HATES going to jazz-concerts: #The piano-player always flirts with his GIRLFRIEND.
b. Paul HATES going to Herbie Hancock concerts: The piano-player always flirts with his GIRLFRIEND.

The results of section 1.3.4 can thus be summarized as follows: In principle, the individuals denoted by singular definites can vary with the situations (or eventualities) bound by Q-adverbs. This, however, is only possible if a set of situations/eventualities is either given by the context or can be accommodated by the hearer that fulfils the following criterion: It is plausible that each situation/eventuality in this set contains exactly one individual that satisfies the predicate denoted by the respective NP. Furthermore, there must be an accent on some element within this NP: Either a CT-accent, or a focus-accent.

In chapter 2, I will offer an explanation for these constraints. We will see that universally quantified DPs show a similar behaviour in the presence of Q-adverbs. Also in this case, the set denoted by the NP-complement of the determiner may only vary with the situations/eventualities bound by the respective Q-adverb if the following condition is fulfilled: A predicate that characterizes a set of situations/eventualities has either been

established in the immediately preceding context, or can easily be accommodated by the hearer such that each of those situations/eventualities can plausibly be assumed to contain a plurality of individuals that satisfy the respective NP-predicate. Furthermore, in contrast to the case of singular definites, co-variation is only possible if the Q-adverb c-commands the universally quantified DP overtly, while no special accent on some element within the respective NP is required.

As we will see, the similarities as well as the differences between the two cases follow from the interplay of the semantics of Q-adverbs with the denotations of the respective DPs if we stick to the following assumptions: (i) Q-adverbs may only quantify over situations/eventualities. (ii) NP-predicates may in principle contain situation/eventuality variables that can be bound by Q-adverbs. (iii) The arguments of Q-adverbs are determined on the basis of syntactic information as well information structure (in a manner to be made precise). But before we will turn to this issue in detail, I will quickly summarize the results of chapter 1.

4 Chapter Summary

In chapter 1 we have taken a closer look at the behaviour of FRs in adverbially quantified sentences. It turned out that while there are good syntactic as well as semantic arguments for analysing FRs as DPs with a covert definite determiner, they nevertheless behave like singular indefinites and bare plurals in adverbially quantified sentences: If they are not focussed, they no longer seem to denote maximal sum individuals, but rather seem to get the quantificational force of the respective Q-adverb. We have discussed an attempt to reconcile these two facets of the meaning of FRs, according to which QVEs come about in the following way: Q-adverbs unambiguously quantify over (minimal) situations, but the unique/maximal sum individuals denoted by FRs may vary with those situations because the respective CPs contain situation variables that can be bound by Q-adverbs.

It turned out, however, that QVEs in sentences with FRs cannot plausibly be accounted for in this way, because if this was the only option for such sentences to get QV-readings, we would expect them to pattern with sentences containing singular definites as far as QVEs are concerned. This, however, was shown not to be the case, because the latter have to fulfil constraints in order to get QV-readings that do not seem to be in effect in adverbially quantified sentences with FRs. From this we have drawn the conclusion that the following

fact is relevant for an explanation of QVEs in sentences with FRs: FRs in contrast to singular definites denote plural individuals by default.

That this assumption is on the right track was further evidenced by the following observation: Plural definites pattern with FRs, as far as QVEs are concerned, if we restrict our attention to cases where the situations/eventualities introduced by the respective relative clauses are contained within rather specific time intervals (which can either be given overtly in the form of temporal adverbials or be given covertly by the context). If, on the other hand, those situations/eventualities are not located within such specific intervals, FRs do not correspond to (i. e. cannot be replaced by) plural definites, but to bare plurals.

We furthermore noted that in spite of the relevance of (semantic) plurality, there are good reasons for assuming that QVEs neither in sentences containing (temporally specific) FRs nor in ones containing plural definites come about via quantification over the atoms the sum individuals denoted by the respective FR/plural definite consist of. Otherwise it would be hard to explain why adverbially quantified sentences containing plural definites modified by relative clauses and ones containing FRs only get QV-readings if the following two conditions are met, while sentences with corresponding quantificational DPs modified by relative clauses are not constrained in this way: (i) The tense of the respective relative clause verb has to agree with the tense of the matrix verb (at least in the absence of intervening factors, which will be discussed in chapter 3). (ii) It at least has to be possible that the sum eventuality/situation introduced by the respective relative clause consists of atoms that fulfil the following criterion: They are temporally distributed, i. e. they do not all have the same running time.

From this we drew the conclusion that QVEs in sentences with FRs and plural definites have to come about via quantification over eventualities/situations, albeit not via quantification over situations each of which contains the unique/maximal sum individual that satisfies the respective predicate in that situation. Instead, as I will argue in chapter 3, Q-adverbs in those cases quantify over the atomic parts of the sum eventualities that contain the sum individuals denoted by the respective FR/plural definite. In order to explain the two constraints mentioned above, this assumption will be combined with the results of chapter 3, section 2, where an explanation for the fact will be offered that also in adverbially quantified sentences containing indefinites the tense of the relative clause verb has to agree with the tense of the matrix verb in order for QVEs to obtain. Furthermore, in chapter 3 I will also offer a tentative suggestion concerning the question why temporally specific FRs correspond to plural definites, while temporally non-specific FRs correspond to bare plurals. On the basis of this suggestion, an (also rather tentative) account for the fact will be offered that

adverbially quantified sentences that contain temporally non-specific FRs as well as ones containing bare plurals modified by relative clauses do not have to obey the two constraints mentioned above in order to get QV-readings.

But in the next chapter I will first return to the question why in adverbially quantified sentences with singular definites the individuals denoted by those definites may only vary with the situations/eventualities quantified over by the respective Q-adverb if the conditions discussed at the end of section 3.4 are met. Furthermore, I will compare those sentences with adverbially quantified sentences containing universally quantified DPs, as there are interesting parallels as well as differences between the two cases.

Chapter 2:

The Case of Singular Definites and Universally Quantified DPs: Co-Variation with the Situations Quantified over by Q-Adverbs

1 Introduction: The Behaviour of Singular Definites in Adverbially Quantified Sentences

1.1 A recapitulation of the basic problem

In the last chapter we have seen that adverbially quantified sentences containing singular definites may in principle get “QV-like” readings according to which the individuals denoted by those definites vary with the situations/eventualities quantified over (as shown in (1) below, which is repeated from chapter 1).

- (1) Paul HATES going to jazz-concerts: The PIANO-player always flirts with his GIRLFRIEND.

Such readings, however, are only available if the conditions given below are fulfilled:

- (i) A set of situations/eventualities has either been introduced explicitly in the preceding discourse, or can be accommodated on the basis of available information such that each situation/eventuality in this set can plausibly be assumed to contain exactly one individual that satisfies the predicate denoted by the NP-complement of the respective definite determiner.
- (ii) There must be some element within the respective NP that either receives a focus accent or a contrastive-topic accent.

Remember furthermore that adverbially quantified sentences containing FRs and plural definites are not constrained in this way: They get QV-readings easily in contexts where none of the above conditions are met. I took this as evidence that sentences containing singular definites get QV(-like)-readings in a different way than sentences containing plural definites and FRs, or, to be more precise, that sentences of the latter type at least have an additional option in order to get QV-readings that is not available to sentences of the former type.

Nevertheless we have seen in the last chapter that there are good reasons to assume that singular definites as well as plural definites and FRs denote objects of type e , and that Q-adverbs are not unselective binders, but are only able to quantify over abstract entities like situations or eventualities.

Before I start to develop an analysis of QVEs (or “QV-like” effects) in sentences with singular definites that is based on those two assumptions, I will in section 1.2 quickly discuss an analysis of QVEs in such sentences that treats definites as predicative expressions and Q-adverbs as unselective binders. We will see that this analysis is neither able to account for the constraints repeated above, nor does it leave open the possibility that sentences containing plural definites (and FRs) behave differently with respect to those constraints.

1.2 A failed attempt to account for QVEs in adverbially quantified sentences containing definites: The approach of Graff (2001)

Graff (2001) assumes that the definite article unambiguously introduces a uniqueness/maximality condition: It turns the set denoted by the respective NP-predicate into the singleton set that contains “the *highest-ranked* member of the extension of the common noun” (Graff 2001: 20). In line with Link (1983) and Jacobson (1995), she takes singular nouns to denote sets of atoms and plural nouns to denote sets of sums of atoms. So in case the definite article combines with a plural noun, it returns the singleton set consisting of the maximal sum in the original set, while it can only be combined with a singular noun if this noun denotes a singleton set in the first place, as she assumes that there is no natural ordering available for the members of a set of atoms.

The only difference between the approach of Link (1983) and Jacobson (1995) on the one hand and the one of Graff (2001) on the other is that the former assumes that the definite determiner turns a set into an individual, while the latter assumes that the definite determiner turns a set into a singleton set. There are two reasons why Graff (ibid.) takes definites to be predicative expressions: Their ability to appear in predicative position in copula-constructions, and their ability to get QV-readings. According to her, those properties as well as the “standard meaning” of definites in episodic contexts can easily be accounted for if one assumes that definites in argument position are mapped onto the restriction of either a covert existential quantifier (in episodic contexts), a covert generic quantifier (in generic contexts) or an overt Q-adverb (also in generic contexts), while in predicative position they retain their original meaning.

Let us now take a closer look at the examples Graff (2001) cites as evidence for the quantificational variability of singular and plural definites. It is at first glance surprising in light of the discussion at the end of chapter 1 that in her examples the singular/plural contrast does not seem to play any role as far as the availability of QV-reading readings is concerned: All of her examples get a QV-reading easily, no matter whether they contain singular or plural definites. Note, however, that they all have the same structure: The NP-complement of the definite determiner is always of the form N+PP, where this PP consists of the preposition *of* and an indefinite DP¹. This is exemplified by the sentences in (2) below:

- (2) a. The owner of a Porsche is often smug (Graff (2001: 26)).
 b. The parents of twins seldom awake before dawn (Graff (ibd.: 24)).

What is especially striking is how easily (1a) gets a QV-reading, while this reading is almost unavailable for the minimally different sentence given in (3) below: (3) can only mean that there is a particular contextually salient man/woman who owns a blue car, and that this man/woman is often smug².

- (3) The man/woman who owns a Porsche is often smug.

For this reason, it seems likely that there is something special about the construction exemplified by (2a, b). But let us first take a closer look at the analysis of Graff (2001). She assumes that (2a) under its QV-readings is interpreted as in (4) below (Graff (ibd.: 27)).

- (4) [Often x : $[\exists y$: y is a Porsche] (x is the owner of y)] (x is smug)

Graff (ibd.) gives a merely semantic explanation for the fact that her examples get QV-readings in spite of the uniqueness condition built into the (meaning of the) definite

¹ As pointed out to me by Manfred Krifka (p.c.), those examples are reminiscent of the cases of “inverse linking” first discussed by May (1977) (see also May (1985)), where a quantificational DP which is contained within another quantificational DP takes scope over this DP. This is exemplified by (i) below, where the DP *every company* is preferably interpreted as having wide scope:

- (i) A representative of every company was present.

² Or, to be more precise, it presupposes the existence of such a person and asserts that this person is often smug.

determiner. According to her the “predicates ‘the owner of a Porsche’ and ‘the parents of twins’ may contain more than one thing in their extension, despite the uniqueness on the definite article, since each contains an embedded noun phrase. Uniqueness of ownership in ‘the owner of a Porsche’ is relativized to particular Porsches, and uniqueness of parentage in ‘the parents of twins’ is relativized to particular pairs of twins” (Graff (ibid. : 29). This sounds plausible, but unfortunately there is nothing about Graff’s analysis that would keep sentences like (3) from getting the same reading for the same reason. Furthermore, if we replace *smug* with an i-level predicate like *intelligent*, the sentence becomes very odd (as is evidenced by (5a) below), while it’s minimal variant in (5b), which has the same structure as (2a), is perfectly acceptable:

- (5) a. ??The man/woman who owns a Porsche is often intelligent.
 b. The owner of a Porsche is often intelligent.

Interestingly, Barker (2000) discusses DPs of the form *the NP of DP* and possessive DPs (like *a Porsche’s owner*) as examples for definite DPs that seem to require neither familiarity nor uniqueness to be felicitous. He correlates this with the observation that in DPs of the above kind the behaviour of the whole DP depends on the possessor (which may be realized either as a genitive argument or as a complement of the preposition *of*). This is evidenced by the following facts (see Barker (2000)):

- (i) The definiteness of the whole DP depends on the possessor: *There’s the father of a good friend waiting outside.*
 (ii) Pronouns can be bound by the possessor in the absence of a c-command-relation: *Every woman_i’s father believes she_i is intelligent.*
 (iii) The possessor can license negative polarity items: *No/*any man’s dog has ever let him down.*

These facts suggest that also in the cases where sentences containing possessive definites get QV-readings, this is due to the fact that the indefinite possessor turns the whole DP into an indefinite. As such, this QV-reading may be the result of quantification over minimal situations each of which contain an individual of the respective kind (as discussed in section 3.2 of chapter 1). Note that Graff (2001: 27) explicitly rejects the possibility that in a sentence like (2a) the indefinite *a Porsche* might get its quantificational force from the Q-adverb. Apart

from theory-internal reasons that need not concern us here, because they have to do with the specific mechanism by which *see* assumes definites and indefinites are mapped onto the restriction of (overt or covert) Q-adverbs or bound by a covert existential quantifier, she claims that if we map the indefinite onto the restriction of the Q-adverb and give the definite existential force, we get the wrong truth conditions. According to her, this is so because the sentence would then “be true if one smug man owns a disproportionate number of the world’s Porsches” (Graff 2001: 24). This is easy to see by looking at the LF Graff (*ibid.*) gives for the reading of (2a) she considers to be unavailable:

- (6) [Often y : y is a Porsche] ($[\exists x : x$ is the owner of $y]$ (x is smug))

This also seems to be a problem for my attempt to explain the special behaviour of possessive DPs with an indefinite possessor in “QV-environments” by analysing the whole DP as an indefinite, independently of the approach we adopt with respect to QVEs in sentences containing indefinites. For even if we take indefinites to be existentially quantified DPs and adopt a situation semantics analysis of QVEs in sentences containing them, we still would have to count as many situations as there are Porsches, so the truth conditions would be the same as under Graff’s (*ibid.*) account. We would get a reading that can be paraphrased as follows: “Many minimal situations that contain a Porsche and its owner are extendable to minimal situations in which the owner of this Porsche is smug”.

I am not quite sure how to solve this problem, but tentatively assume that we simply do not take into account Porsches that have the same owner, i. e. that we interpret sentences like (2a) against the background of an idealized world where no person owns more than one Porsche. That this line of reasoning is not completely hopeless is evidenced by the fact that people usually do not have clear intuitions when they are asked whether they would consider the sentence true or false in the scenario described above.

Anyway, I think Barker (2000) gives very convincing arguments for treating the possessor argument as the head of possessive DPs. Furthermore, the contrast between possessive definite DPs with an indefinite possessor on the one hand, and other definites (no matter whether they contain an indefinite or not) on the other hand with respect to QVEs is also very clear. We should therefore at least not take possessive DPs as paradigmatic for the behaviour of definites with respect to QVEs. But once we leave them aside, the singular/plural contrast winds up again, and the approach of Graff (2001) doesn’t have anything to say about that, nor about the conditions under which uniqueness can be relativized in such a way that it

does not prevent sentences containing singular definites from getting QV-readings: According to Graff (*ibid.*), it is the presence of an indefinite in the restriction of the Q-adverb that is responsible for this relativization, but we have already seen that this is not true. For this reason, I conclude that the approach of Graff (2001), which treats definites as predicative expressions, is unable to offer a solution to our problems.

I will therefore in the remainder of this chapter return to the question how an approach that is based on the following assumptions can be made to account for the constraints mentioned at the beginning of this chapter:

- (i) Q-adverbs are only able to quantify over situations/eventualities.
- (ii) Definites are objects of type e – namely the maximal sum individuals/unique atomic individuals in the sets denoted by the NP-complements of the respective (overt as well as covert) definite determiners (as in Link (1983)).
- (iii) The NP-complement of a definite determiner contains a situation/eventuality variable that can in principle be bound by a Q-adverb, as a result of which the individuals denoted by the respective definite DPs vary with the situations/eventualities quantified over.

Furthermore, as already mentioned, my account of the constraints that adverbially quantified sentences containing definites have to obey in order to get QV-readings will be based on a comparison between those sentences and adverbially quantified sentences that contain universally quantified DPs. We will therefore in section 2 have a look at the behaviour of universally quantified DPs in the context of adverbial quantification.

But before I turn to universally quantified DPs, I want to end section 1 with a brief sketch of how I will account for the constraints observed in adverbially quantified sentences that contain singular definites.

1.3 A brief sketch of how the observed constraints can be accounted for

It is a well-known fact that the descriptive content of singular definites is in many cases not sufficient to single out a unique individual (see for example Kripke (1977) and Wettstein (1981), who argue that therefore definite descriptions (at least in some of their uses) should be

treated as referential terms in the sense of Strawson (1950)³. In terms of the analysis argued for by Link (1983), the problem can be stated as follows: In many cases the NP-complement of the definite determiner does not denote a singleton set, but a set with many atomic members. As a set of atomic individuals does not have a maximal element, the application of the σ -operator to such a set does not have a defined result, and the corresponding sentence should therefore be infelicitous⁴.

This, however, is not the case if the respective sentence is uttered in a context where either a salient individual has been introduced explicitly, or can at least easily be accommodated that satisfies the respective predicate, as in the examples below (cf. Christopherson (1939), Ebert (1970), Löbner (1987) and Lyons (1999) on “bridging” definites):

- (7) a. Yesterday at the party, I met a mathematician and a philosopher: The mathematician was very interesting, while the philosopher was terribly boring.
b. At the concert yesterday evening, the drummer played an amazing solo.

With respect to our present concerns, example (7b) is especially instructive: In this case, the fronted PP introduces a situation/eventuality that on the basis of standard world knowledge can plausibly be assumed to contain exactly one individual that satisfies the predicate *drummer*.⁵ Let us assume that this fact enables the hearer to resolve the free situation variable included within the NP-complement of the definite determiner to this situation/eventuality. Once this is done, the set that the σ -operator is applied to is a singleton, and the sentence is therefore felicitous: It is true if the unique individual that has the property of being a drummer at the concert mentioned played a solo that was amazing (according to the shared standards of speaker and hearer), and false otherwise.

Now, I will argue that the only relevant difference between examples like (7b) and the adverbially quantified sentences under discussion in this chapter is the following: In the

³ This is also one of the reasons why in many cases theories that incorporate a familiarity condition into the meaning of the definite determiner (as in Hawkins (1978) and Heim (1982)) seem to be empirically superior to “uniqueness based theories” (see Roberts (2003) for a recent overview over the debate).

⁴ Note that in the case of plural definites the situation is different: As long as there are any individuals that satisfy the respective NP-predicate, the set characterized by this predicate always has a maximal element. The use of plural definites should therefore be far less restricted than the use of singular definites.

⁵ Of course, this is not guaranteed by the explicitly given material alone, since not all concerts include drummers. The hearer therefore still has to accommodate the additional information that the concert is a concert of the right type to include drummers.

former case a single salient situation/eventuality has to be provided by the context that is guaranteed to contain exactly one individual that satisfies the respective predicate in that situation/eventuality, while in the latter case a *set* of situations/ eventualities has to be provided by the context such that each of those situations/ eventualities is guaranteed to contain exactly one individual that satisfies the respective predicate in that situation/eventuality. This difference is due to the fact that in the former case the respective situation/eventuality variable within the NP-complement of the definite determiner is assigned a value from the context, while in the latter case this variable is bound by the Q-adverb. But, crucially, also in the latter case the uniqueness condition associated with the definite determiner has to be satisfied with respect to each of the situations/ eventualities quantified over. This, however, is only guaranteed to be the case if the information that each of the situations/ eventualities quantified over contains exactly one individual of the right kind is provided by the context (or can at least be accommodated on the basis of contextual information). In other words, a set of situations/ eventualities that plausibly satisfies this condition has to be made available by the context.

This has the consequence that the denotation of a singular definite that contains a situation/eventuality variable to be bound by a Q-adverb is of no use in determining the first argument of this Q-adverb. Rather, the possibility to interpret the situation/eventuality variable contained within a singular definite as a variable bound by a Q-adverb depends on this Q-adverb's already being provided with a suitable restrictor. In other words: Singular definites need to be mapped onto the nuclear scope of Q-adverbs in order to receive the co-varying interpretation under discussion.

I will argue that this latter fact conspires with the fact that the situation/eventuality variable contained within a singular definite can only be bound by a Q-adverb if the latter c-commands the former at LF: As a result of this conspiracy, singular definites containing situation/eventuality variables bound by Q-adverbs need to be reconstructed into their VP-internal base position at LF. We will see that this requirement in combination with a mapping algorithm that is based on the one proposed by Chierchia (1995a)⁶ is responsible for the fact that singular definites only get the variable interpretation under discussion if they contain an element that receives a focus accent.

Finally, we will also see in detail how a contrastive topic (CT-) accent on some element contained within a singular definite helps to accommodate a set of suitable

⁶ Modulo the fact that Chierchia (ibid.) – who only discusses QVEs in sentences with indefinites – assumes that Q-adverbs are also able to quantify over individuals.

situations/eventualities, and therefore makes available a “QV-like” reading even in cases where the respective sentence is presented out of the blue.

But in the next section I will discuss the behaviour of universally quantified DPs in adverbially quantified sentences for the following reason: There are (as already mentioned) instructive similarities as well as differences between the two types of DPs, as far as the availability of QV-readings to sentences containing them is concerned. A comparison will therefore help us to be more precise about the conditions under which the situation/eventuality variables presumably contained within DPs can be bound by Q-adverbs.

2 The Interaction of Adverbial Quantifiers and Universally Quantified DPs

2.1 The phenomenon of implicit restrictions

It is well-known that not only in the case of definite DPs, but also in the case of quantificational DPs the (denotation of the) respective determiner often does not seem to be applied to the set denoted by its respective NP-complement, but rather to a subset thereof.

In order to see this, consider the following example (cf. von Stechow (1994: 28)): If this sentence is uttered in a situation where a party that took place at the evening before is under discussion, it is not interpreted as saying that every student in the actual world had a great time, but rather that every student present at that party had a great time:

(8) Every student had a great time.

According to von Stechow (1994) (see also Westerstahl (1984) and Marti (2003), and Stanley and Szabo (2000) and Stanley (2002), who argue for a slightly different implementation⁷), this is possible because quantificational determiners introduce a free variable ranging over predicates that gets assigned a value on the basis of contextual information. (This variable will henceforth be called *C-variable*). He furthermore assumes that the predicate the respective *C*-variable is resolved to gets intersected with the denotation of the respective NP-argument. That is, the quantificational determiner *every* is assumed to have the following denotation:

(9) $[[\text{every}_C]]^g = \lambda P \lambda Q \lambda w \forall x [g(C)(x)(w) \wedge P(x)(w) \rightarrow Q(x)(w)]$

⁷ According to Stanley and Szabo (2000) and Stanley (2002) *C*-variables are not introduced by quantificational determiners, but rather are part of the meaning of common nouns.

According to this view, example (8) above would be interpreted as shown in (10) below, and the C-variable would presumably get assigned a predicate like “present at the party yesterday” as value.

$$(10) \quad \forall x[g(C)(x, w_0) \wedge \text{student}(x, w_0) \rightarrow \text{had-a-great-time}(x, w_0)].$$

Now, interestingly, Kratzer (2004) argues that in many cases the respective C-variables cannot be resolved to predicates that intuitively seem to be highly salient in a given context. Consider for example the exchange given in (11) below (from Kratzer (2004: 17)):

- (11) A: Lisa is a phonologist. I think that most linguists would agree with what she said.
B: I don't think that any syntactician or semanticist would.
C: I was only talking about phonologists, of course.

Kratzer (ibid.) argues that C's answer to B seems very strange, in spite of the fact that the noun *phonologist* is highly salient and is furthermore of the right semantic type for the C-variable associated with the quantificational DP *most linguists* to be resolved to. If this was possible, however, C's answer would be quite natural.

According to Kratzer (ibid.) restrictions like the one exemplified by (11) above can easily be explained if it is assumed that “salient subsituations, not salient properties, should guide the availability of covert quantifier domain restrictions” (Kratzer (ibid.: 32)). In other words, according to her the fact that NP-predicates can be further restricted covertly as well as the fact that this phenomenon seems to be constrained can easily be explained in the following way: The situation variables which according to situation semantics approaches are introduced by nominal (as well as verbal and adjectival, of course) predicates get assigned contextually salient (or topical) situations as values, if such situations are available. Furthermore, in the default case the utterance situation counts as the respective topical situation. Note, however, that in principle it is also possible to resolve the respective situation variables to w_0 , i. e. to the actual world.⁸ This corresponds to the cases where the respective NP-predicate does not seem to be further restricted.

⁸ Remember that in situation semantics worlds are nothing but maximal situations.

Kratzer's (ibd.) assumptions explain immediately why in the case of (8) (if it is uttered in the context mentioned above, of course) the set quantified over is automatically understood to be the set of students that were present at the party that took place the evening before: The free situation variable introduced by the noun *student* gets resolved to the contextually salient (or topical) party-situation. In the case of (11), on the other hand, no salient situation (apart from the speech situation) is available that the situation variable introduced by *linguist* could be resolved to: As the sentence "Lisa is a phonologist" is a generic claim about the actual world, it does not introduce a particular situation. Therefore, the situation variable introduced by *phonologist* is resolved to w_0 . This has the consequence that also the situation variable introduced by *linguist* most likely gets resolved to w_0 .⁹ Accordingly, the second sentence uttered by A in (11) above is understood to be a claim about all linguists in the actual world.

Thus, in the system proposed by Kratzer (ibd.) a sentence like (8) above would be interpreted as given (in slightly simplified form) in (12) below, where s^* is meant to be the contextually salient party-situation. Note that for the moment tense markings are ignored (Kratzer (ibd.) also does not encode tense in her formulas). We will, however, come back to this point in chapter 3, where it will become relevant.

$$(12) \quad \forall x [\text{student}(x, g(s^*)) \rightarrow \exists s' [s' \leq g(s^*) \wedge \text{had-a-great-time}(x, s')]]$$

Note that while both nominal and verbal predicates are assumed to have a situation argument in addition to their individual arguments, there are good arguments to assume that the two arguments are not necessarily saturated by the same variable: As discussed by Enc (1981), Kratzer (1995) and Percus (2000), in many sentences it is intuitively clear that an individual does not satisfy the respective nominal predicate at the same time (or, in our terms: in the same situation) as this individual is involved in the situation that satisfies the respective verbal predicate. This is evidenced by the examples below: (13a) is only non-contradictory if it is interpreted in such a way that the person denoted by the singular definite has had the property of being a winner in a different situation than the situation where she lost (see Percus (2000) for an almost identical example). Also in the case of (13b) it is clear that the two situation arguments have to be saturated by variables that are resolved to different values, as only grown-up people can be politicians:

⁹ Note that in principle this situation variable could also be resolved to the utterance situation, of course. This, however, only makes sense if the respective sentence is uttered in a situation where various linguists are present, as otherwise the quantificational determiner would have to be applied to the empty set.

- (13) a. The winner lost.
 b. Every politician was a nasty child.

Kratzer (ibid.) therefore assumes that situation arguments introduced by nouns are saturated within (extended) nominal projections, while situation arguments introduced by verbs are saturated within (extended) verbal projections. As the details of Kratzer’s (ibid.) system are not entirely clear to me – her proposal is only available as the handout of a talk – , I will slightly depart from her proposal and make the following assumptions for concreteness: Initially, all predicates introduce an additional situation argument. The situation arguments of nouns are then saturated by free variables that are introduced by the respective determiners those nouns combine with. This has the effect that those variables can be assigned a value on the basis of contextual information. The situation arguments of verbs (and adjectives that occur in verbal projections), on the other hand, are left unsaturated if the respective vP does not become the argument of a quantificational DP. If it becomes the argument of such a DP, on the other hand, the respective situation argument is “passed up” in the way shown below. This has the consequence that in both cases the resulting situation predicate can either become one of the arguments of an adverbial quantifier¹⁰, of the covert generic operator or become the argument of an existential quantifier which is inserted by default in episodic sentences.¹¹

Consider in detail how according to those assumptions example (8) is interpreted: In (14) the denotations of the respective constituents are given (where *had a great time* is treated

¹⁰ The details of how the arguments of adverbial quantifiers are determined will be one of the central topics of this and the next chapter.

¹¹ Consider the example in (i) below (see Partee (1973) for discussion), which is intuitively understood to make a claim about a specific time interval, as otherwise the truth conditions of the sentence would be either much too weak or much too strong:

- (i) I didn’t turn off the stove.

I assume that also in such cases we have an existential quantification over turning-off-the-stove situations, where negation has scope over the existential quantifier, but that this existentially quantified situation is understood to be located within a specific time interval. (Concerning the latter point, I will argue in chapter 3 that situations in general have to be located within an interval that is determined in accordance with a pragmatic strategy the details of which will be given in that chapter). The sentence then gets a reading that can be paraphrased as follows: “It is not the case that there is a past-situation of me turning off the stove which is located within i^* ”, where i^* is a contextually given specific time interval.

as a complex predicate for simplicity), and (15) shows the result of applying the denotation of *every* to the two predicates *student* and *had a great time*:

$$(14) \quad (a) \quad [[\text{every}]] = \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s \forall x [P(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge Q(x, s')]]$$

$$(b) \quad [[\text{student}]] = \lambda x \lambda s. \text{student}(x, s)$$

$$(c) \quad [[\text{had-a-great-time}]] = \lambda x \lambda s. \text{had-a-great-time}(x, s)$$

$$(15) \quad \lambda s. \forall x [\text{student}(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge \text{had-a-great-time}(x, s')]],$$

where s^* is a free situation variable.

As (8) does not contain an overt Q-adverb, and is furthermore an episodic sentence, I assume that the final step consists in applying a covert existential quantifier (which has the denotation given in (16a)) to the object shown in (15), which gives us (16b):

$$(16) \quad a. \lambda P_{\langle s, t \rangle} \exists s [P(s)]$$

$$b. \exists s \forall x [\text{student}(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge \text{had-a-great-time}(x, s')]]$$

Note that (16b) differs from the denotation we initially assumed for (8) – namely the one shown in (12) above, according to which the situation argument of the verb and the situation argument of the noun are both saturated by the same (free) variable, and accordingly have to get assigned the same contextually salient situation as value. At an intuitive level, however, it is quite obvious that the situation that includes all the students quantified over and the situation that consists of all the individual having-a-good-time-situations by those students are at least intimately related. I.e. if the sentence is uttered in the context sketched above, it is automatically understood that the students quantified over are the students present at that party, and that the situation that consists of all their individual having-a-good-time situations has to be a part of that party-situation. Therefore, the denotation given in (12) seems to be more accurate, as it directly encodes the relevant information, while the one in (16b) only leaves open the possibility that the two situations are related in the required way. Note, however, that in chapter 3 we will see that there are good reasons to assume that situations quantified over need to be located temporally (and probably also spatially) on the basis of available contextual information, anyway. It is therefore predicted that in the case of (8) the

existentially quantified situation will be located (temporally and spatially) within the party-situation that the free situation variable within the noun gets assigned as value.

Let us now in the next section have a closer look at sentences that contain universally quantified DPs and Q-adverbs, in order to see whether the readings available to those sentences can be accounted for in the system proposed in this section.

2.2 The available readings

Consider the sentence in (17) below, where the universally quantified DP c-commands the Q-adverb overtly. Let us furthermore assume that the sentence is uttered with default intonation, i. e. that the verb receives the main accent.

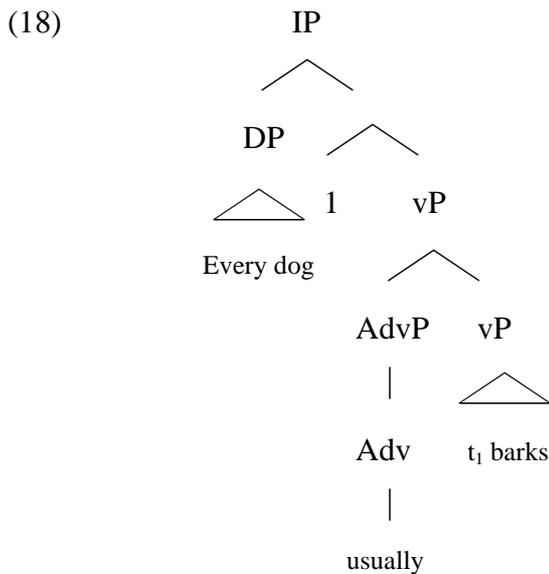
(17) Every dog usually BARKS.

This sentence only gets a reading that can be paraphrased as follows: For every dog in the actual world (or, if the sentence is uttered in a context that makes available a situation that contains a plurality of dogs: For every dog contained in that situation) it is the case that most relevant situation that contain this dog are situations where this dog barks. Let us assume that this reading comes about in the following way: The Q-adverb and the quantificational DP are both interpreted in their respective surface positions, i.e. the Q-adverb occupies a vP-adjoined position¹² (as is assumed in Chierchia (1995a)), while the quantificational DP remains in Spec, IP/TP¹³. This has the consequence that the quantificational DP has scope over the Q-adverb. Furthermore, the trace left behind by the moved subject DP – which has been base-generated in Spec, vP – is interpreted as a variable of type e which bears an index, and this index is adjoined directly below the quantificational DP (in the manner proposed by Heim and Kratzer (1998: chapter 7). I.e. at LF example (17) is represented as given in (18) below¹⁴:

¹² Alternatively, it could of course also be assumed that the Q-adverb is base generated in the specifier of a designated functional projection (cf. Cinque (1999) for the view that adverbs are always base generated in the specifier positions of designated functional projections). As nothing hinges on that with respect to my concerns in this dissertation, I will continue to assume that Q-adverbs are base-generated in vP-adjoined position.

¹³ As it is largely irrelevant to my concerns in this dissertation, I use the more traditional term “IP” in order to refer to the functional projection the specifier position of which is occupied by the respective “subject-DP”.

¹⁴ Note that the node dominating vP and the numerical index is not assumed to have a label (Heim and Kratzer (1998): chapter 7).



Now, Heim and Kratzer (ibid.: 186) give the following rule for interpreting trees that contain numerical indices (cf. chapter 1, p. 25):

(19) *Predicate Abstraction Rule (PA)*

Let α be a branching node with daughters β and γ , where β dominates only a numerical index i . Then, for any variable assignment g , $[[\alpha]]^g = \lambda x. [[\gamma]]^{g[1 \rightarrow x]}$, where $g[1 \rightarrow x]$ is the variable assignment which is identical to g , except for the fact that it assigns x as a value to the index 1 .

With these assumptions in place, we have assured that the sister of the quantificational DP is an individual predicate. Remember, however, that according to our above assumptions quantificational determiners take arguments of type $\langle e, \langle s, t \rangle \rangle$, which has the consequence that the sister of the (node dominating the) quantificational DP in (18) above also has to be of type $\langle e, \langle s, t \rangle \rangle$. This, however, is only the case if the sister of (the node dominating the) numerical index is of type $\langle s, t \rangle$. In other words, the vP containing the Q-adverb needs to be interpreted as a situation predicate itself. This, however, is unproblematic: While I abstracted away from this point in section 3.2 of chapter 1, it is clear that also the situations quantified over by Q-adverbs have to be parts of a “larger” situation themselves. Let us therefore assume (see also von Stechow (1994)) that adverbial quantifiers take an additional situation argument, where the situation they take as argument has to include all the situations quantified over by the respective Q-adverb. Let us furthermore assume that in the default case a covert existential quantifier is applied to the situation predicate that results from applying the denotation of the

respective Q-adverb to its argument of type $\langle s, t \rangle$, but that in a sentence like (17) above the situation argument of this predicate is simply left unsaturated. This has the consequence that the vP including the Q-adverb in (18) denotes an object of type $\langle s, t \rangle$, and, accordingly, that the node dominating the numerical index denotes an object of type $\langle e, \langle s, t \rangle \rangle$, as desired. The denotation that has to be assumed for *usually* in order to achieve this result is given in (20) below¹⁵:

$$(20) \quad [[\text{usually}]] = \lambda Q_{\langle s, t \rangle} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \\ \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': Q(s''''')\}]\} | \\ \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |$$

Let us now concentrate on how the denotation of the vP is derived. Concerning the vP-segment excluding the Q-adverb, it denotes the situation predicate given in (21a), which results from applying the denotation of the verb *bark* to the variable denoted by the trace of *every dog*. This object is of the right type for the denotation of *always* to apply to, and accordingly we get (21b) as the denotation of the whole vP:

$$(21) \quad \text{a. } \lambda s. \text{ bark}(y_1, s) \\ \text{b. } \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \\ \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': \\ \text{bark}(y_1, s''''')\}]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |$$

Now the next step consists in interpreting the node that dominates the numerical index and vP in (18) according to the PA-rule given in (19) above. As stated there, applying this rule has two consequences: (a) A lambda-operator that binds an individual variable is inserted. (b) All variables that bear the numerical index the presence of which triggered the application of the PA-rule are replaced by a variable of the same “name” as the one bound by the lambda-operator, i.e. those variables become bound by this lambda-operator. (21b) is thus “transformed” into the object given in (22) below:

¹⁵ That is, under the assumption that the first argument of Q-adverbs, i. e. the restrictor, is only given in the form of a free variable ranging over situation predicates which has to be assigned a value on the basis of contextual information (as argued for by von Stechow (1994); see chapter 1, section 3.2). We will see later on that there are good reasons to assume that this is not always the case, i. e. that at least sometimes also the first arguments of Q-adverbs are given overtly.

$$(22) \quad \lambda_{\mathbf{x}} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \\ \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': \\ \text{bark}(\mathbf{x}, s''''')]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |$$

Let us next turn to the interpretation of the quantificational DP. (23) below shows the result of applying the denotation of *every* (which is given in (15)) to the denotation of the NP *dog* (which is obvious):

$$(23) \quad \lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s \forall x [\text{dog}(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge Q(x, s')]]$$

As the object given in (22) above is obviously of the right type for the object in (23) to apply to it, we get (24) as the denotation of the IP in (18) above:

$$(24) \quad \lambda s \forall x [\text{dog}(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge | \{s'': s'' \leq s' \wedge s'' \in \min\{s''': \\ C(s''')\} \cap \{s''''': \exists s'''' [s'''' \leq s' \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': \\ \text{bark}(\mathbf{x}, s''''')]\} | \geq \frac{1}{2} | \{s': s' \leq s \\ \wedge s' \in \min\{s'': C(s'')\} |]]$$

Let us finally assume that the covert existential quantifier introduced above is applied to (24), and that s^* is resolved to w_0 , which has the consequence that we get (25) as the final interpretation of example (17):

$$(25) \quad \exists s \forall x [\text{dog}(x, w_0) \rightarrow \exists s' [s' \leq s \wedge | \{s'': s'' \leq s' \wedge s'' \in \min\{s''': \\ C(s''')\} \cap \{s''''': \exists s'''' [s'''' \leq s' \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': \\ \text{bark}(\mathbf{x}, s''''')]\} | \geq \frac{1}{2} | \{s': s' \leq s \\ \wedge s' \in \min\{s'': C(s'')\} |]]$$

(25) can roughly be paraphrased as follows: “There is a situation s such that for every dog x in the actual world there is a situation s' that is a part of s such that most situations that are a part of s' and which furthermore are situations that minimally satisfy C can be extended to minimal situations where x barks”. This seems to be the right result if we furthermore assume that C is resolved to something like “includes x and is a possible-barking situation”.

Consider next (26) below, which only differs from (17) insofar as the Q-adverb has been fronted and thus c-commands the quantificational DP overtly. Interestingly, the sentence (at least for most speakers) sounds a bit strange if it is uttered out of the blue and with default intonation, i. e. with the main accent on *barks*.¹⁶

(26) #Usually, every dog BARKS.

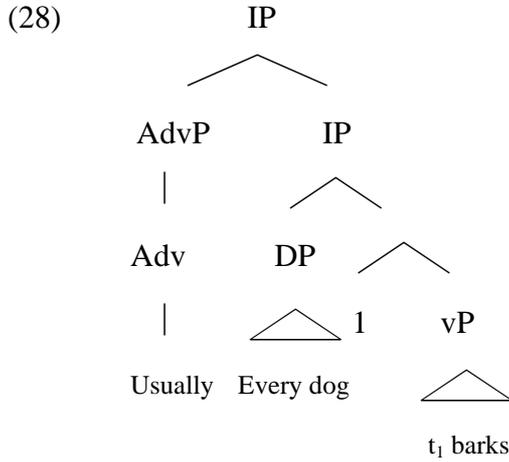
Crucially, at least if it is read with default intonation, (26) does not get the reading given in (25) above, which is the only reading that is available to (17). I will come back to this point at the end of section 2. But let us first concentrate on the second noteworthy fact: With some cognitive effort, at least for most speakers a reading becomes available that can be paraphrased as follows: Most contextually specified situations *s* are such that for every dog *x* present at *s* there is a situation *s'* such that *s'* is a part of *s* and *s'* is a situation of *x* barking.

Before we turn to the question how this reading is generated, it is worth noting that the same phenomenon is attested in German. Also in this language, the overt c-command relations between the respective Q-adverb and the universally quantified DP seem to be decisive as far as the range of available readings is concerned: If the universally quantified DP c-commands the Q-adverb overtly (as in (27a, b)) below, only the reading given in (23) above is available to the respective sentence. If, on the other hand, the Q-adverb c-commands the universally quantified DP overtly (as shown in (27c, d)), this reading is completely unavailable (if the respective sentence is read with default intonation), and the respective sentence is a bit strange if it is uttered out of the blue. Furthermore, the only reading it gets is the one paraphrased above.

- (27) a. Jeder Hund bellt meistens.
 Every dog barks usually.
 b. ... weil jeder Hund meistens bellt.
 because every dog usually barks.
 c. #Meistens bellt jeder Hund.
 Usually barks every dog.
 d. ... #weil meistens jeder Hund bellt.
 because usually every dog barks.

¹⁶ Remember from chapter 1 that I use the symbol '#' to indicate that a sentence is odd if it is given without a suitable context.

Let us now turn to the question how the reading paraphrased above can be generated for the sentence given in (26) above. (28) below gives the LF-representation I assume for (26). Note that I assume for simplicity the Q-adverb has been base-generated in its left-adjoined position, though nothing hinges on that assumption.



Let us first concentrate on the interpretation of the IP-segment that excludes the Q-adverb: First, the denotation of *barks* is applied to the variable denoted by the trace of *every dog*. Then, the PA-rule is triggered at the level of the node that dominates the numerical index and the vP, and we get the object in (29a) below as the denotation of this node. This object is of course of the right type for the denotation of the universally quantified DP to apply to (as shown in (29b)), and we get (29c) as the denotation of the IP-segment that excludes the Q-adverb:

- (29) a. $\lambda z \lambda s. \text{bark}(z, s)$
 b. $\lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s \forall x [\text{dog}(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge Q(x, s')]] (\lambda z \lambda s. \text{bark}(z, s))$
 c. $\lambda s \forall x [\text{dog}(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge \text{bark}(x, s')]]$

Now the next step of course consists in applying the denotation of *usually* to the object given in (29c), as shown in (30) below:

- (30) a. $\lambda Q_{\langle s, t \rangle} \lambda s. \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': Q(s''''')\}]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} | (\lambda s \forall x [\text{dog}(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge \text{bark}(x, s')])]$

$$\begin{aligned}
& \text{b. } \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \\
& \quad \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': \forall x [\text{dog}(x, g(s^*)) \rightarrow \\
& \quad \exists s' [s' \leq s'''' \wedge \text{bark}(x, s')]]]\}\} | \\
& \quad \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |
\end{aligned}$$

Let us assume that finally the covert existential quantifier we are already familiar with is applied to the object given (30b), and we get (31) as the final result:

$$\begin{aligned}
(31) \quad & \exists s | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \\
& \quad \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': \forall x [\text{dog}(x, g(s^*)) \rightarrow \\
& \quad \exists s' [s' \leq s'''' \wedge \text{bark}(x, s')]]]\}\} | \\
& \quad \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |]
\end{aligned}$$

But is (31) really what we want? It can be paraphrased roughly as follows: “There is a situation s such that most situations s' that are parts of s and which are furthermore minimal situations that satisfy C can be extended to minimal situations s'' such that for every dog x in a contextually specified situation s^* it is the case that there is a situation s''' which is a part of s'' such that s''' is a situation of x barking”. Therefore, according to (31) the sentence in (26) should be true if most relevant situations s are such that each dog that is contained in a contextually salient situation s^* barks in s . In other words, the dogs do not vary with the situations. Rather, we expect there to be a set of situations each of which contains the same dogs – namely the set of individuals that are dogs in a contextually salient situation s^* . Furthermore, if (26) is uttered out of the blue, we expect s^* to be resolved to w_0 by default¹⁷. But this would have the consequence that we would expect there to be a set of situations each of which contains all the dogs in the whole world! But of course it is neither the case that (26) has such a reading nor that this is the reading we are after. Rather, we want to generate a reading according to which the dogs vary with the situations quantified over by the Q-adverb.

Of course, the fact that the set of dogs denoted by the NP-complement of *every* does not automatically vary with the situations quantified over by the Q-adverb is a consequence of the way the denotation of *every* (which is repeated below as (32a)) is defined. If we would

¹⁷ Remember that we assumed this to be a possibility in the case of (17), as the sentence can indeed be understood as a claim about all dogs in the actual world.

minimally change it to the denotation given in (32b), we would automatically get what we want:

- (32) a. $[[\text{every}]]^g = \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s \forall x [P(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge Q(x, s')]]$
- b. $[[\text{every}]]^g = \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s \forall x [P(x, s) \rightarrow \exists s' [s' \leq s \wedge Q(x, s')]]$

Remember, however, that there was a good reason to define the denotation of *every* (and of quantificational determiners in general) as in (32a): Namely the fact that it is not always necessary that the individuals quantified over satisfy the respective NP-predicate in the same situation that includes the minimal situations where the respective VP-predicate is satisfied (as is evidenced by an example like (13b), which is repeated below as (33))¹⁸. Rather, this is only an option.

- (33) Every politician was a nasty child.

Let us therefore stick to the assumption that the situation variable contained within the NP-complement of a (quantificational as well as definite, as we will see) determiner has the status of a silent pronoun that gets assigned situations as value. Of course, this does not preclude generating the reading we are after: After all, also ordinary pronouns can not only get assigned a value on the basis of contextual information, but can also be bound by c-commanding quantificational DPs. Let us therefore simply assume that pronoun binding is what happens in the case of (26): The situation variable contained within the NP-complement of *every* is interpreted as a situation pronoun that gets bound by the Q-adverb *usually*. Concerning the details of how this binding relation comes about, I propose an extension of Buring's (2004) pronoun binding rule, which is itself based on Partee (1975) and Sag (1976). Buring (ibid.: 25) assumes that the binding of individual pronouns by quantifiers comes about in the following manner: At LF, a binding operator β_n (where n is a numerical index) can optionally be inserted immediately below a quantificational DP if this DP occupies an argument (= A-) position. According to Buring (2004: 24), this operator "signals that the DP

¹⁸ We will see soon that there is another good reason to define the denotation of (quantificational as well as definite) determiners in this way.

immediately c-commanding it binds any free occurrence of a pronoun indexed n within its c-command domain". The according rule is formally stated as given in (34) below (Büring (ibid.: 25):

$$(34) \quad [[[\beta_n \text{XP}]]^{w, g} = \lambda x. [[[\text{XP}]]^{w, g[n \rightarrow x]} (x)]$$

Stated informally, the insertion of the binding operator immediately below a quantificational DP has the consequence that any free variable gets replaced by a variable that is bound by a lambda-operator. Note that the above mentioned restriction, according to which the pronoun binding operator may only be inserted below quantificational DPs that occupy an A-position, is meant to account for the well-known fact that pronouns cannot be bound by quantifiers (and also wh-terms) from A'-positions¹⁹ (Reinhart (1983) and many others; see Büring (2004) for references).

It is now completely straightforward to extend Büring's (ibid.) proposal to quantifiers over minimal situations/eventualities, i. e. to Q-adverbs²⁰: We only need to assume that an analogous binding operator can optionally be inserted directly below a Q-adverb at LF²¹, which has the consequence that any free situation variable in the scope of this operator (and therefore, in the scope of the Q-adverb), becomes bound by a lambda-operator. The corresponding rule is given in (35) below.

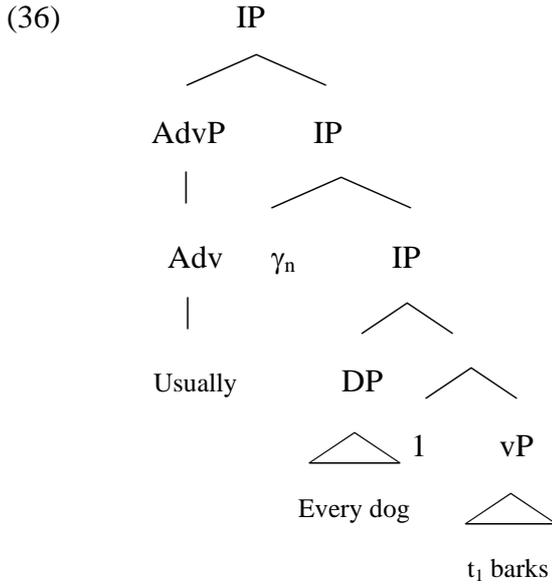
$$(35) \quad [[[\gamma_n \text{XP}]]^{w, g} = \lambda s. [[[\text{XP}]]^{w, g[n \rightarrow s]} (s)]$$

Let us now, with this assumption in place, return to example (26). Let us assume that at LF, the binding operator from above is inserted below the Q-adverb, as shown in (36) below.

¹⁹ This restriction has come to be known as the Weak Crossover (WCO) generalization.

²⁰ Büring (ibid.: 47) himself also proposes an extension of his pronoun binding rule to situation pronouns. This extension, however, is not intended to apply to adverbially quantified sentences (which he does not discuss in his paper), but rather to a different phenomenon: Namely to the indirect binding of situation variables that are contained within definite descriptions and E-type-pronouns (which he, following Elbourne (2001), takes to be nothing but definite descriptions the descriptive content of which has been elided) by c-commanding quantificational DPs. It is thus formulated differently (see Büring (ibid.) for details).

²¹ The distinction between A- and A'-positions is obviously not applicable to Q-adverbs, as they are by definition unable to occupy argument positions in the first place.



This has the consequence that the IP-segment c-commanded by the Q-adverb is not interpreted as in (29c) above (repeated below as (37a)), but rather as in (37b):

- (37) a. $\lambda s \forall x [\text{dog}(x, s^*) \rightarrow \exists s' [s' \leq s \wedge \text{bark}(x, s')]]$
 b. $\lambda s \forall x [\text{dog}(x, s) \rightarrow \exists s' [s' \leq s \wedge \text{bark}(x, s')]]$

Accordingly, the sentence as a whole gets interpreted as given in (38):

- (38) $\exists s [\{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': \forall x [\text{dog}(x, s''''') \rightarrow \exists s' [s' \leq s'''' \wedge \text{bark}(x, s')]]]\}] \}$
 $\geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |]$

(38) can be paraphrased as follows: “There is a situation s such that most situations s' that are parts of s and which are furthermore minimal situations that satisfy C can be extended to minimal situations s'' such that for every dog x in s'' it is the case that there is a situation s''' such that x barks in s''' ”. Therefore, according to (38) the dogs vary with the situations quantified over. This seems to be the correct result.

In this section we have seen that Q-adverbs can interact with universally quantified DPs in two different ways: If the quantified DP c-commands the Q-adverb overtly, we only get a reading according to which the former has scope over the latter. This has the consequence that each of the situations quantified over by the Q-adverb contains *one* of the

individuals that is included within the set denoted by the NP-complement of the quantificational determiner, not *all* of those individuals. Furthermore, the situation variable contained within this NP cannot be bound by the Q-adverb, but rather has to be assigned a value on the basis of contextual information (in the default case: w_0). If, on the other hand, the Q-adverb c-commands the Q-adverb overtly, the respective sentence is slightly odd, and marginally gets a reading according to which the set denoted by the NP-complement of the quantificational determiner varies with the situations quantified over. I have proposed that this is accomplished by means of a binding operator that is inserted directly below the Q-adverb and in effect turns the situation variable contained within the NP into a variable bound by the Q-adverb. This has the following consequences: First, each of the situations quantified over contains all individuals that are included within the set denoted by the respective NP, and secondly, this set itself (a least potentially) varies with the situations quantified over.

Note that in both cases the overt c-command relations decide on the respective interpretation, i. e. it does not seem to be possible to move one operator across the other at LF, or to reconstruct one of the two into its base position. Furthermore, there is an interesting contrast between adverbially quantified sentences that contain universally quantified DPs and ones that contain indefinites: While a universally quantified DP that c-commands a Q-adverb overtly can only be interpreted as having scope over it, an indefinite DP that c-commands a Q-adverb overtly can either be interpreted as having scope over it, or it can be interpreted in the restrictor of this Q-adverb. I will come back to these two points soon. But let us first turn to another question: Why is (26) slightly odd if is presented without any context, i. e. why is the reading given in (38) not easily available to this sentence if it is presented without any context?

2.3 The role of contextual clues in licensing the co-varying reading

As already mentioned in the last section, sentence (26) (repeated below as (39a)) is slightly odd if it is uttered out of the blue and only marginally allows the reading given in (38) above, according to which the sentence is true if most (minimal) situations s that satisfy some predicate C can be extended to situations s' such that for every dog contained within s' it is the case that there is some situation s'' that is a part of s' such that s'' is a situation where x barks. Note furthermore that the sentence becomes much better, and easily gets a reading according to which the set of dogs that the denotation of *every* is applied to varies with the situations quantified over if it is embedded in a context like the one given in (39b) below:

- (39) a. #Usually, every dog BARKS.
 b. Paul hates passing-by animal shelters: Usually, every dog BARKS (and he can't stand the noise).

Note that in the case of (39b), a set of situations is introduced explicitly such that each situation contained within this set can plausibly be assumed to include a (different) set of dogs: Namely, the set of situations where Paul passes-by an animal shelter. Furthermore, sentence (39a), if it is embedded in this context, is almost inevitably understood to make a claim about the situations where Paul visits an animal shelter: Namely the claim that on most of those occasions all the dogs in the respective animal shelter bark. It is therefore plausible to assume that if (39a) is uttered in this context, the C-variable in the first argument of the Q-adverb gets resolved to the following predicate: $\lambda s. \text{passes-by-an-animal-shelter}(\text{Paul}, s)$ (or something equivalent). (39a), if it is embedded in the context given in (39b), is thus interpreted as in (40) below:

$$(40) \quad \exists s \left[\left| \{s' : s' \leq s \wedge s' \in \min\{s'' : \text{passes-by-an-animal-shelter}(\text{Paul}, s'')\} \cap \{s''' : \exists s'''' [s'''' \leq s \wedge s'''' \leq s''' \wedge s'''' \in \min\{s'''''' : \forall x [\text{dog}(x, s''''') \rightarrow \exists s' [s' \leq s'''''' \wedge \text{bark}(x, s')]]]\}\} \right| \geq \frac{1}{2} \left| \{s' : s' \leq s \wedge s' \in \min\{s'' : \text{passes-by-an-animal-shelter}(\text{Paul}, s'')\} \right| \right]$$

The formal representation in (40) can be paraphrased as follows: “There is a situation s such that most situations s' that are parts of s and which are furthermore minimal situations of Paul passing-by an animal shelter can be extended to minimal situations s'' such that for every dog x in s'' it is the case that there is a situation s'''' which is a part of s'' such that x barks in s'''' ”. This seems to be the correct result.

Consider next the sentences in (41) and (42) below:

- (41) a. ??Every student usually loves DONKEY anaphora.
 b. #Usually, every student loves DONKEY anaphora.
 c. There is something strange about teaching classes on formal semantics:
 Usually, every student loves DONKEY anaphora (but hates bound variable pronouns).
- (42) a. ??Every man usually has long blond HAIR and is very MUSCULAR.

- b. #Usually, every man has long blond HAIR and is very MUSCULAR.
- c. Heavy-metal concerts are very funny: Usually, every man has long blond HAIR and is very MUSCULAR.

(41a) and (42a) are both very odd, and only get readings according to which the universally quantified DPs have scope over the respective Q-adverbs. But as the respective matrix predicates denote states that a given individual is either in or not in²² (and can therefore be seen as individual level predicates (see chapter 1)), the resulting readings are very strange: They require there to be a set of situations such that in each of those situations the respective individual is in the state of loving donkey anaphora or having blond hair. This, however, is in conflict with the above mentioned fact that the respective states are permanent. (41a) and (42a) are therefore strange for essentially the same reason that sentences like “Mary usually loves donkey anaphora” or “Peter usually has long blond hair” are.

Various proposals have been made in the literature to account for the fact that the combination of an individual level predicate and a subject of type *e* is unacceptable in adverbially quantified sentences, while the combination of an individual level predicate and an indefinite subject DP is fine in this environment. Maybe the most famous among those proposals is the one by Kratzer (1995), which I already mentioned in chapter 1. According to Kratzer (*ibid.*), who assumes that Q-adverbs are unselective binders, and indefinites introduce free variables, the pattern under discussion can be explained as follows: Individual level predicates do not introduce situation/event variables, but Q-adverbs need at least one variable to bind. While in the case of sentences with indefinite DPs as subjects the respective Q-adverb can bind the individual variable introduced by the²³ indefinite, DPs that denote objects of type *e* do not provide such a variable. This has the consequence that the respective Q-adverb does not have a variable to bind, and the ban against vacuous quantification is therefore violated.

²² This may well be too strong: It is of course possible that a given individual at some point stops loving donkey anaphora, or changes his hair colour. It is, however, nevertheless implausible to assume that the attitude of one and the same individual towards donkey anaphora is tied to particular situations, or that one and the same person changes her hair colour so often that there is a set of situations to quantify over such that in each of those situations this person has a different hair colour (But of course, such contexts can be provided; see Kratzer (1995), Chierchia (1995b), de Swart (1993) a. o. for discussion).

²³ A similar proposal has been made by Chierchia (1995b), according to whom the event variables introduced by individual level predicates need to be bound by a covert generic operator. This also has the consequence that Q-adverbs in sentences containing such predicates need an individual variable to bind, which is provided by indefinites, but not by referential DPs.

As I do not share Kratzer's (ibd.) views concerning Q-adverbs and indefinites, I have to look for another explanation of the pattern under discussion. De Swart (1993) offers an account that is compatible with the view I argue for in this dissertation: According to her, individual level predicates together with predicates like *be born* or *die* belong in the class of so-called *once-only predicates*, i. e. predicates that can apply to a given individual only once. This, however, does not mean that those predicates do not introduce situation/eventuality variables, but rather that with respect to a given individual, there is only one situation/eventuality of this individual standing in the respective relation to this situation/eventuality.²⁴ Therefore, if adverbially quantified sentences with individual level predicates have referential DPs as subjects, the respective Q-adverb would have to operate on singleton sets, which plausibly leads to deviance. If, on the other hand, those sentences have indefinite DPs as subjects, the respective sets of situations/ eventualities have as many elements as there are individuals that satisfy the respective NP predicate, as the values assigned to the individual variables bound by the existential quantifier may vary with the values assigned to the situation/eventuality variables bound by the Q-adverb.

This explanation carries over straightforwardly to our examples (41a) and (42a): As the universally quantified DP leaves a trace in its base position beneath the Q-adverb which is interpreted as an object of type *e* (namely an individual variable, see above), the respective Q-adverb also in those cases would have to operate on singleton sets. Let us therefore assume for the moment that the deviance of (41a) and (42a) can be explained in the way suggested by de Swart (ibd.) (In chapter 3 we will see that this suggestion has to be modified slightly, but for the moment it will do).

Let us next turn to (41b) and (42b): They are both very odd if they are given without any context, but become perfect if they are embedded in the contexts given in (41c) and (42c), respectively. Also in these cases, the decisive factor seems to be that a set of situations is introduced explicitly that fulfils the following constraint: It must be plausible to assume that each situation contained within the respective set includes a set of individuals that satisfy the predicate denoted by the NP-complement of the respective quantificational determiner. But why should this be so, i.e. why does it seem to be necessary that a set of suitable situations has been introduced explicitly in order for the sentences under discussion to be acceptable? In other words, why does it seem to be so hard to accommodate a suitable value for the C-variable in the first argument of the Q-adverb to be resolved to on the basis of the information

²⁴ This situation/eventuality may be relatively short (in the case of predicates like *die*), or very long (in the case of predicates like *be intelligent* or *be blond*).

provided by the second argument? After all, this does not seem to be a problem in many other cases: In a sentence like “Fido always barks”, for example, the Q-adverb is automatically understood to quantify over a set of situations that are likely situations for Fido to bark, i. e. situations where Fido does not sleep, eat etc. and where furthermore something is happening that may upset Fido. Furthermore, remember that I have assumed that in example (18) above (the sentence “Every dog usually barks”), where the universally quantified DP has scope over the Q-adverb, the C-variable contained within the first argument of the Q-adverb can be resolved easily to a predicate that characterizes a set of situations such that each of those situations contains the dog x and is furthermore a likely situation for x to bark (x being the variable denoted by the trace that is left behind by the moved universally quantified DP; remember that x is a free variable at the level under consideration, i. e. it is only bound by a lambda-operator from a position above the Q-adverb).

Why does it seem to be so much harder to accommodate a suitable situation predicate in the case of (41b) and (42b)? Consider in more detail how (41b) would be interpreted according to our assumptions: In (43) below the relevant aspects of this interpretation are given in simplified, schematic form. Note especially that I have omitted the respective minimality conditions in order to facilitate the discussion of the relevant aspects.

$$(43) \quad \text{Most } s [C(s)] [\exists s' [s \leq s' \wedge \forall x [\text{student}(x, s') \rightarrow \exists s'' [s'' \leq s' \\ \wedge \text{loves-donkey-anaphora}(x, s'')]]]]$$

Let us focus on the interpretation of the universally quantified DP in the nuclear scope of the Q-adverb. It can be paraphrased as follows: “For all individuals x it is the case that if x is a student in s' there is a situation s'' such that s'' is a part of s' and s'' is a situation of x loving donkey anaphora”. Now it is often assumed that strong quantifiers like *every* and *most* can only be applied to NP-predicates felicitously if those predicates characterize non-empty sets (see especially Lappin and Reinhart (1988))²⁵. In other words, strong quantifiers are often assumed to presuppose that their first argument characterizes a non-empty set. Evidence for this claim comes from the observation that sentences like (44) below are judged to be infelicitous by most speakers (while according to standard first-order predicate logic the sentence should be true under the assumption that there are no flying horses).

²⁵ But see Landman (2004: chapter 2.4.1) for a different view, according to which what is at stake here is not a presupposition, but rather an implicature.

(44) Every flying horse loves situation semantics.

Let us therefore assume the slightly modified denotation of *every* given in (43) below:

$$(45) \quad [[\text{every}]]^g = \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s: \{x: P(x, g(s^*))\} \neq \emptyset . \forall x [P(x, g(s^*)) \rightarrow \exists s' [s' \leq s \wedge Q(x, s')]]$$

Now note that in the case of (45) above, where s^* is neither resolved to w_0 by default, nor assigned a value on the basis of contextual information, but turned into the indirectly bound variable s' , it depends on those situation s' whether the restriction of the universal quantifier is empty or not: If the situations s' contain students, it is not empty, whereas if s' does not contain students it is empty. But all that is known about the situations s' is that they are extensions of the situations s quantified over by the Q-adverb. This, however, is of no help as long as the C-variable within the restrictor of the Q-adverb remains empty: In order for the presupposition associated with *every* to be fulfilled, it would have to be guaranteed that each situation s contains at least one student, which is of course not the case if nothing is known about those situations.²⁶

Now the fact that in the case of sentences like (41b) and (42b) the situations quantified over need to satisfy a presupposition that is associated with an element that is interpreted in the nuclear scope of the Q-adverb of course sets them apart from the cases mentioned above, where no such presupposition needs to be satisfied. This, however, does not in and of itself explain why (41b) and (42b) are so much worse than those sentences. After all, it is easy to construct examples that are fine if they are uttered out of the blue (or at least much better than (41b) and (42b)), in spite of the fact that there also a presupposition is triggered by some element in the nuclear scope of a Q-adverb that can only be satisfied by accommodating a suitable situation predicate that the C-variable in the restrictor can be resolved to. Consider for example (46) below²⁷:

²⁶ It is important to keep in mind that (on the view that strong quantifiers are presuppositional in the sense discussed above) it is presupposed in (43) that each of the situations s' contains a plurality of students, not asserted. Otherwise, there would of course be no problem, since it is trivially true of every situation that it can be extended to a (minimal) situation that contains a plurality of students.

²⁷ There are even theories like the one proposed by Berman (1994), according to which the need to satisfy presuppositions that are associated with elements in the nuclear scope of Q-adverbs is one of the driving forces

- (46) a. Usually, Mary stops jogging after 30 minutes (because she is exhausted).

In the case of (46), it seems to be relatively unproblematic to accommodate a value for the C-variable that satisfies the presupposition associated with the verb *stops*: The sentence is automatically understood to quantify over a set of (minimal) situations where Mary jogs, and therefore is (most likely) interpreted in a way that can be paraphrased as follows: “Most (minimal) situations where Mary jogs can be extended to (minimal) situations where Mary stops jogging after 30 minutes (because of being exhausted)”.

The reason for the fact that (41b) and (42b) are infelicitous when they are given without a suitable context therefore cannot be the simple fact that a presupposition is associated with *every* that needs to be satisfied accommodating a suitable value for the C-variable to be resolved to. Rather, the fact that it is far less clear in the case of (41b) and (42b) what such a value would be than it is in the case of (46) seems to be what makes the difference: While the choice in (46) is restricted to predicates that characterize situations such that those situations satisfy the predicate *jog*, there are many options in the case of (41b) and (42b). After all, there are many predicates that characterize situations such that each of those situations contains a plurality of students, or a plurality of men. Let us assume that this is the reason why (41b) and (42b) are infelicitous when they are presented without a suitable context: The hearer is simply unable to accommodate a value for the C-variable that would satisfy the presupposition associated with *every* (namely that the set characterized by its NP-complement contains some elements), as there are too many options.

Note that in principle it would of course be possible not to insert the situation binding operator introduced above, which would have the consequence that the situation variable within the NP-complement of *every* would remain free. If this situation variable would furthermore be assigned w_0 as value by default, the presupposition associated with *every* would of course be satisfied, as there are many students as well as many men in w_0 . This, however, would have the consequence that the C-variable in the restrictor of the Q-adverb could only be resolved to a completely trivial value: It would be known that each of the situations quantified over would have to be such that it could be extended to a (minimal) situation s' such that each student/man in the whole world would love donkey anaphora in s' /have long blond hair in s' . But in order for this to be possible s' would have to include all students/men in the whole world. Now in the absence of any contextual clues there is only one

as far as the determination of the restrictors of those Q-adverbs is concerned (see, however, von Stechow (1994) and especially Beaver and Clark (2003) for critical discussion and counterexamples).

(minimal) situation that includes all students/men in w_0 : Namely that part of w_0 that consists of nothing but those men/students. But of course any situation that is a part of w_0 can be extended to such a situation. In other words, the C-variable in the restrictor of the Q-adverb could only be resolved to a trivial value like “is a part of w_0 ”, and the sentences as a whole would make the following claims: “Most situations that are a part of w_0 can be extended to a minimal situation s' such that every student in w_0 loves donkey anaphora in s' ” and “Most situations that are a part of w_0 can be extended to a minimal situation such that every man in w_0 has long blond hair in s' ”. Let us simply assume without further discussion that it is the complete triviality of those claims²⁸ that prevents (41c) and (42c) from being interpreted in this way.

It should by now be obvious why (41c) and (42c) (and (39b), of course; see above) are perfect: In those cases the context makes available a value for the C-variable that guarantees the presupposition associated with *every* to be fulfilled. (41c) can therefore be interpreted as shown (in simplified form; see above) in (47a) below, and (42c) as shown in (47b):

- (47) a. Most s [class-on-formal-semantics(s)] [$\exists s'[s \leq s' \wedge \forall x$ [student(x, s') \rightarrow
 $\exists s''[s'' \leq s' \wedge$ loves-donkey-anaphora (x, s'')]]]]]
 b. Most s [heavy-metal-concert(s)] [$\exists s'[s \leq s' \wedge \forall x$ [man(x, s') \rightarrow
 $\exists s''[s'' \leq s' \wedge$ has-long-blond-hair(x, s'')]]]]]

In the case of (47a), this presupposition is satisfied because classes on formal semantics can plausibly be assumed to contain students, and in the case of (47b) it is satisfied because heavy-metal concerts can be assumed to contain men.

2.4 Are co-varying readings also possible if the respective universally quantified DPs are interpreted in the restriction of Q-adverbs?

Before turning to a comparison of my approach to the behaviour of universally quantified DPs in adverbially quantified sentences with a related proposal by Beghelli and Stowell (1997), I want to discuss a point that I have been silent about so far: In discussing adverbially quantified sentences with universally quantified DPs where the Q-adverb is fronted and

²⁸ They furthermore furthermore violate the Grician maxim of quantity, as of course *every* situation that is a part of w_0 can be extended in the required way, not just *most* of those situations.

therefore c-commands the DP overtly, I have tacitly assumed that a main accent on the (roughly) most deeply embedded constituent is automatically understood as signalling that the whole sentence c-commanded by the Q-adverb is focussed (due to focus projection; see Selkirk (1995)). That is, I have tacitly assumed that the focus structure of (41b), for example, is as given in (48) below:

(48) Usually, [every student loves DONKEY anaphora]_F.

This is important for the following reason: Remember from chapter 1 that according to von Stechow (1994), who builds on Rooth (1985, 1992) (see also the references cited in chapter 1), the focus value of an adverbially quantified sentence (minus the Q-adverb) can be made use of in order to determine a value for the C-variable in the restrictor. Remember furthermore that the focus value of a sentence is a set of propositions that is obtained in the following way: In each proposition the focussed item is replaced by an item of the same type, where the choice of those items may be further restricted by the context. Now, if – as in (48) above – the sentence as a whole (minus the Q-adverb) is taken to be focussed, the focus semantic value of this sentence is of no use in determining a value for the C-variable in the restrictor of the Q-adverb, as this focus value is just the set of all propositions whatsoever. In other words, if the focus structure of the sentences under discussion is as in (48) above, it can simply be ignored, and the arguments put forth in this chapter therefore remain unaffected.

But of course the focus accent on *donkey* can not only be interpreted as projecting to the level of the whole clause. Rather, it can also be taken to signal that only the VP *loves donkey anaphora* is focussed. This would have the consequence that the set of propositions given in (49) below is obtained as the focus semantic value of example (41b).

(49) {Every student loves donkey anaphora, Every student reads a book on binding theory, Every student hates Star Wars, ... }

If we now form the union of this set of propositions, we get the situation predicate in (50a), which the C-value in the restrictor of the Q-adverb can be resolved to. Note that I assume that everything else proceeds as above, i. e. a binding operator is inserted directly beneath the Q-adverb, and that the focus semantic value is computed after the insertion of this operator, i.e. after the free situation variable in the NP-complement of *every* has become bound by the

lambda-operator. Accordingly, (41c) is interpreted as shown (in simplified form; see above) in (50b) below:

- (50) a. $\lambda s. [\forall x [\text{student}(x, s) \rightarrow \exists P[\exists s' [s' \leq s \wedge P(x, s')]]]]$
 b. Most $s [\forall x [\text{student}(x, s) \rightarrow \exists P[\exists s' [s' \leq s \wedge P(x, s')]]]]$
 $[\exists s'' [s \leq s'' \wedge \forall x [\text{student}(x, s'') \rightarrow \exists s''' [s''' \leq s'' \wedge$
 loves-donkey-anaphora $(x, s''')]]]]$

(50b) can (roughly) be paraphrased as follows: “Most (minimal) situations s such that every x that is a student in s has some property in s can be extended to a minimal situation s' such that every x that is a student in s' loves donkey anaphora in s' “.

Note that in the restrictor the NP-internal situation variable is bound directly by the Q-adverb, while in the nucleus it is bound by the existential quantifier inserted there. This, however, is unproblematic because of the minimality condition (which is suppressed in (50b); see above): As the nucleus-situations are only allowed to be minimal extensions of the restrictor-situations, the respective sets of students have to remain the same. But of course there is another problem with (50b): The above discussed presupposition that is associated with *every* is not satisfied in the restrictor (and, as a consequence thereof, also in the nucleus), because nothing more is known about the situations quantified over than that they are (minimal) situations such that for every individual x it is the case that if x is a student in s , then x has some property in s . This, however, is a condition that is satisfied by every situation whatsoever since for every situation it is the case that if this situation contains students then those students have some property in this situation (namely at least the property of being contained in it). But if every conceivable situation satisfies the restrictor, no matter if it contains students, then the presupposition associated with *every* is not satisfied in many situations quantified over. It therefore would not make any difference if only the VP, not the whole clause was taken to be focussed in (41b): The presupposition associated with *every* would still not be satisfied if the situation variable within the NP-complement of *every* was interpreted as a bound variable.

Let us next turn to the question what would happen if the focus accent on *donkey* was interpreted as projecting up to the VP-level in (41c), where the sentence is embedded in a context that guarantees the presupposition associated with *every* to be fulfilled. In this case everything depends on how the C-variable within the restrictor of the Q-adverb is resolved: If it was mechanically resolved to the situation predicate obtained on the basis of the focus

semantic value of the clause, nothing would change, and the presupposition associated with *every* would again not be satisfied. If, on the other hand, it was resolved to the situation predicate obtained on the basis of contextual information, everything would proceed in complete analogy to the case discussed above, where the clause as a whole was taken to be focussed. A third possibility is of course that the situation predicate obtained on the basis of contextual information is intersected with the situation predicate obtained on the basis of the focus semantic value of the clause. If the latter situation predicate is added as the second conjunct, the result is identical to the result obtained if the C-variable is only resolved to the situation predicate obtained on the basis of contextual information: In order for the presupposition associated with *every* to be fulfilled, it needs to be taken for granted that classes on formal semantics contain students, anyway. But then the information that in each of those classes every student present at the respective class has some property is completely trivial. In other words, the situation predicate obtained on the basis of the focus semantic value would not add anything relevant in this case.²⁹ It is therefore impossible to decide on empirical grounds whether in a case like (41b) the quantificational DP can also be interpreted as non-focal.

But now remember that the relative order of Q-adverb and quantificational DP exemplified by (41a) is exactly the same order that often leads to a QV-reading in the case of adverbially quantified sentences with indefinites. In other words, with respect to those sentences it is automatically assumed that indefinites that c-command the Q-adverb (and are de-accented) are interpreted in the restrictor of the respective Q-adverb because of being non-focal/topical. This, however, is not the only option: In principle it is also possible to interpret the respective Q-adverb as a specific indefinite, i. e. as having scope over the Q-adverb – which of course only makes sense if the respective matrix verb is not an individual level predicate. In that case everything proceeds in complete analogy to the cases discussed above, where a universally quantified DP that c-commands a Q-adverb is interpreted as having scope over it – modulo the different meaning of the indefinite DP.

Consider (51) below:

(51) A dog usually BARKS.

²⁹ This is of course different if the situation predicate obtained on the basis of contextual information is added as the second conjunct, i. e. after the situation predicate obtained on the basis of the focus semantic value: In that case, the presupposition associated with *every* would again not be fulfilled.

The sentence is three-way ambiguous. It either gets a QV-reading, which can (roughly) be paraphrased as “Most dogs bark”, or a reading that can be paraphrased as “For dogs in general it is the case that they usually bark”, or a reading according to which there is a specific dog such that most relevant situations where this dog is included are situations of this dog barking. Note that I assume the second reading to be available because the sentence can also be understood as containing a silent generic quantifier in addition to the overt Q-adverb *usually*. It is the result of giving the covert generic quantifier scope over the Q-adverb, and interpreting the indefinite in the restrictor of the Q-adverb. As this reading does not give us a new perspective on the problem under discussion, but only introduces additional (but irrelevant) complications, I will ignore it for the moment.

Although in a neutral context the QV-reading, where the indefinite DP is interpreted in the restrictor of the Q-adverb, might be the preferred one, the third reading, where the indefinite DP has scope over the Q-adverb, is also clearly available. But now note that in the case of adverbially quantified sentences with universally quantified DPs we have taken it for granted that the quantificational DP has scope over the Q-adverb if it c-commands the Q-adverb and is de-accented. It is however far from obvious why this should be the only option: In principle it was also possible to determine the restrictor of the Q-adverb in those cases in the same way as it is determined in sentences with indefinites. This, however, would have the consequence that the quantificational DP would not only be interpreted in the nucleus, but also in the restrictor of the respective Q-adverb – just as in (50b) above. But, as we have already seen, there are good reasons to assume that such an interpretation is not available, because the presupposition associated with *every* would not be fulfilled in this case. We thus have a plausible explanation for the fact that universally quantified DPs (in contrast to indefinite DPs) can only be interpreted as having scope over Q-adverbs that they c-command in cases like (41a) and (42a) – which of course also leads to deviant interpretations because of the respective matrix predicates being individual level predicates.

But let us now consider what happens if the respective sentences are embedded in suitable contexts like the ones given in (41c) and (42c). These cases can help us decide whether it is in principle possible to interpret universally quantified DPs that contain a situation variable to be bound by a Q-adverb not only in the nuclear scope, but also in the restrictor of this Q-adverb: If it is possible to intersect the situation predicate obtained on the basis of contextual information with the situation predicate obtained on the basis of the focus semantic value of the clause (minus the Q-adverb), everything should be fine, as the presupposition associated with *every* could be fulfilled. In spite of being superfluous (see

above), the denotation of the universally quantified DP should at least not cause any harm. With this in mind consider (52a) below, where (41a) is embedded in the context given in (41c). The hypothesized reading under discussion is given in (52b).

- (52) a. There is something strange about teaching classes on formal semantics:
 (??) Every student usually loves DONKEY anaphora (but hates bound variable pronouns).
 b. Most s [class-on-formal-semantics(s) \wedge $\forall x$ [student(x, s) \rightarrow
 $\exists s'$ [$s' \leq s \wedge$ loves-donkey-anaphora (x, s')]]]
 $[\exists s''$ [$s \leq s'' \wedge \forall x$ [student(x, s'') $\rightarrow \exists s'''$ [$s''' \leq s'' \wedge$
 loves-donkey-anaphora (x, s''')]]]]]

Obviously, the adverbially quantified sentence in (52a) above cannot be interpreted as in (52b). It only gets the reading that is also the only one available if the sentence is presented without a context – namely the one according to which the universally quantified DP has scope over the Q-adverb. The sentence is therefore odd if the matrix predicate is interpreted as an individual level predicate³⁰ (see the discussion of example (41a) above).

But why does the adverbially quantified sentence in (52a) not get the reading given in (52b)? While it is surely true that the universally quantified DP is simply superfluous in the restrictor, as it does not add any relevant information (see above), there is also no reason to assume that it causes any harm. It is therefore not at all obvious why the reading in (52b) should not be available to the sentence under discussion.

One conceivable solution would be to assume that the context would have to be ignored in (52a) in favour of the focus semantic value of the clause, which would have the consequence that the context could not be made use of in order to satisfy the presupposition associated with *every*. This, however, would not only be in conflict with von Stechow's (1994, 1995) theory of adverbial quantification, according to which making use of the focus semantic value of an adverbially quantified sentence in order to obtain a value for the C-variable in the restrictor to be resolved to, is only an option in addition to the option of making use of contextual information (see also Beaver and Clark (2003) for evidence that this is the right way of looking at adverbial quantification). It is also in conflict with the well-known fact that the focus structure and the context often work together in order to arrive at a

³⁰ The sentence is of course quite good if *loves* is interpreted as *loves to deal with*.

suitable restrictor for Q-adverbs (see von Stechow (1994), Herburger (2000), Beaver and Clark (2003) and many others). Let us therefore ignore this option.

A second option would be to assume that for some reason the situation predicate obtained on the basis of the focus semantic value of the clause has to be processed first, and that the situation predicate obtained on the basis of contextual information can only be added as the second conjunct. This would have the consequence that at the point where the presupposition associated with *every* has to be fulfilled, the necessary information is not yet available. But this option is not very convincing either: As neither situation predicate is given overtly, and as both alike have to be determined indirectly on the basis of available information, there is no reason to assume that a particular order among them should be specified.

It is therefore plausible to assume that something about the word order itself in the sentence under discussion is responsible for the fact that the reading in (52b) is not available. One possibility that immediately comes to mind is the following: As the situation variable contained within the NP-complement of *every* has to be bound by the Q-adverb in order for the reading under discussion to be available, it would be completely in line with standard assumptions concerning variable binding by quantifiers to assume that this is only possible if the Q-adverb c-commands the DP containing this variable overtly.

In terms of the “binding operator account” introduced above this could be spelled out as follows: The binding-operator can only be inserted directly beneath the position occupied by the Q-adverb at the surface, i. e. the Q-adverb cannot be moved to a position where it c-commands the whole clause at LF before the binding operator is inserted. This would have the desired consequence that the reading given in (52b) is not available to the sentence under discussion. Note, however, that this account is in conflict with the view put forth by proponents of situation/event semantics approaches to adverbial quantification (von Stechow (1994, 1995), Herburger (2000), Percus (2000); see also Rooth (1985, 1995)). According to those authors, Q-adverbs are always fronted at LF. This has the desirable consequence that the clause c-commanded by the respective Q-adverb can be mapped onto nuclear scope of this Q-adverb, while the focus structure of the clause can serve as the basis for determining the restrictor of the respective Q-adverb.

Also unselective-binding approaches to adverbial quantification (Heim (1982), Diesing (1992), Kratzer (1995)) often assume Q-adverbs to be fronted at LF. I am aware of only one approach to adverbial quantification that explicitly assumes that only material that is c-commanded by a Q-adverb gets mapped onto the nuclear scope of the respective Q-adverb

(while material *c*-commanding a Q-adverb gets mapped onto the restriction) – namely the one by Chierchia (1995a). Unfortunately, Chierchia’s (ibid.) approach cannot be adopted straightforwardly, as he also assumes QV-readings to come about via the binding of individual variables contributed by topical indefinites (after existential disclosure (Dekker (1990) has applied to them). We will however see that there is a relatively straightforward way to reconcile Chierchia’s (ibid.) assumptions with the situations semantics approach to adverbial quantification argued for in this dissertation. This will become clear in section 4, where I develop a mapping algorithm that is not only able to account for the standard cases of QVEs, but is also compatible with the assumption that the above mentioned binding operator may only be inserted beneath the surface positions of Q-adverbs.

But before turning to this mapping algorithm in section 4, I will in section 2.5 quickly compare my approach to the behaviour of universally quantified DPs in adverbially quantified sentences to a related proposal by Beghelli and Stowell (1997), while in section 3 I will return to adverbially quantified sentences containing singular definites, which will be compared to ones that contain universally quantified DPs.

2.5 A comparison to Beghelli and Stowell (1997)

Interestingly, Beghelli and Stowell (1997) also propose an analysis according to which the denotation of universally quantified DPs may vary with the situations bound by Q-adverbs. But as we will see shortly, their analysis runs into various problems and is incompatible with the view advocated here. Their proposal is intended to explain the difference between *each* and *every* with respect to the availability of (what they call) generic readings. They observe that while the sentence in (53a) “can be construed as a claim about dogs in general”, the one in (53b) “must be construed as a claim about particular dogs previously mentioned in the discourse” (Beghelli and Stowell (1997): 100):

- (53) a. Every dog has a tail.
b. Each dog has a tail.

Their explanation for this difference roughly runs as follows: Both DPs headed by *each* and DPs headed by *every* are interpreted as set-denoting expressions that introduce a free (set-) variable, but while the variable introduced by *each* must be bound by a (covert) definite operator, the one introduced by *every* can be bound by whatever operator happens to be

present in the respective clause. For this reason, the set variable of *every dog* can be bound by a silent Gen-operator in (53a), and the sentence gets interpreted as “ ‘in the default situation *s* where *X* is the set of all dogs in *s*, all members of *X* have a tail’ ” (Beghelli and Stowell (1997): 101).

Note that an alternative to Beghelli and Stowell’s (ibd.) account for the difference between the two sentences almost suggests itself. It only needs to be claimed that *each* is lexically specified to take a set of individuals that have been introduced in prior discourse as its first argument, while *every* is free in this respect: Therefore, in the case of (53a) this set can be construed as including all the dogs in the actual world (or the world where the sentence is uttered). According to our assumptions, this would be the result of resolving the situation variable within the NP-complement of *every* to w_0 . If we follow this line and furthermore assume that the situation variable introduced by the matrix verb gets bound by a covert generic quantifier that is c-commanded by the universally quantified DP (in analogy to the sentences with overt Q-adverbs discussed above), we get the desired reading without having to give up the standard interpretation of DPs headed by *every* and *each* as quantificational DPs. A simplified version of the resulting reading is given in (54) below:

$$(54) \quad \exists s [\forall x [\text{dog}(x, w_0) \rightarrow \exists s' [s' \leq s \wedge \text{Gen } s'' [s'' \leq s' \\ \wedge \exists P [P(x, s'') \wedge C(s'')] [\exists s''' [s'' \leq s''' \wedge \text{bark}(x, s''')]]]]]]]$$

So, as far as the examples above are concerned, I see no reason why any mechanism should be invoked that enables the denotation of DPs headed by *every* to vary with the situations quantified over by the covert Gen-operator, as we easily get the right reading without such a mechanism.

With this in mind, let us now compare Beghelli and Stowell’s (ibd.) proposal and mine at a more abstract level, as they share the assumption that in principle it *is* possible that the denotation of DPs headed by *every* co-varies with the situations quantified over by Q-adverbs (Beghelli and Stowell (ibd.) do not discuss overt Q-adverbs, but I see no plausible reason why the ability to bind the set-variable that according to their assumptions is introduced by *every* should be restricted to covert Q-adverbs).

It is important to note in the present context that in Beghelli and Stowell’s (ibd.) proposal the co-variation of situations and individuals comes about in a way that is fundamentally different from the mechanism I propose: According to them, the co-variation of situations and individuals is a consequence of both situation variables (that are introduced by

the verb) and variables over sets of individuals being bound by the same operator. In my proposal, on the other hand, this co-variation is a consequence of the fact that a situation variable is present in the restriction of *every* that gets bound by the respective Q-adverb. But this has the consequence that I expect the availability of QV-readings in sentences with DPs headed by *every* and overt Q-adverbs to be restricted in the way discussed in detail in the last section, while Beghelli and Stowell (ibid.) would predict those readings to be available as easily as the generic reading of (53a).

The problem with the proposal of Beghelli and Stowell (ibid.) therefore is that it eliminates the difference between indefinite DPs and DPs headed by *every*, as far as the availability of QV-readings is concerned: In their approach, both kinds of DPs introduce free variables that get bound by the Q-adverb (irrespective of the fact that in the former case the respective variables range over individuals, while in the later case they range over sets of individuals). I take this as evidence that my account of the QV(-like) effects in sentences with DPs headed by *every* is superior to the one that could be developed on the basis of the suggestion in Beghelli and Stowell (1997). Furthermore, I assume that the generic reading of (53a) comes about in the way indicated above, according to which the generic quantifier is in the c-command domain of the universally quantified DP, and not because the denotation of the universally quantified DP varies with the situations quantified over by the Q-adverb.

Before returning to the interpretation of adverbially quantified sentences with singular definites in section 3, I want to take up a second loose end, one that also has to do with the surface order in sentences with Q-adverbs and quantificational DPs: As already mentioned in section 2.2, it is practically impossible to get the reading given in (55b) for a sentence like (55a) if the sentence is uttered with standard intonation. Rather, it only gets the reading given in (55c), and is therefore slightly deviant if it is presented without any context, as the presupposition associated with *every* is only fulfilled if a suitable value for the C-variable can be accommodated (see the detailed discussion above). I.e. in the default case the quantificational DP only seems to be able to take scope over the Q-adverb if it c-commands the Q-adverb at the surface.

- (55) a. #Usually, every dog barks.
 b. $\exists s [\forall x [\text{dog}(x, w_0) \rightarrow \exists s' [s' \leq s \wedge \text{Most } s'' [s'' \leq s' \wedge \exists P [P(x, s') \wedge C(s'')] [\exists s''' [s'' \leq s''' \wedge \text{bark}(x, s''')]]]]]]]$
 c. $\text{Most } s [C(s) [\exists s' [s \leq s' \wedge \forall x [\text{dog}(x, s') \rightarrow \exists s'' [s'' \leq s' \wedge \text{barks}(x, s'')]]]]]$

We are now in the position to answer the question why this should be the case. Remember that we assumed that Q-adverbs can either be base generated in vP-adjoined-position, or in IP-adjoined position (alternatively: in the specifier of a designated functional projection in the sense of Cinque (1999)). Let us furthermore assume that the vP-adjoined position is the “unmarked” position, while the IP-adjoined position is marked in the sense that base generating a Q-adverb in this position needs to have an effect on the interpretation of the respective clause. A possible effect would for example be to mark a Q-adverb as a “contrastive topic” in the sense of Büring (1997) (see Cohen (in preparation) for discussion). Under the assumption argued for in the last section (see section 4 for further details) that a (situation variable) binding operator may only be inserted beneath the surface position of a Q-adverb, another conceivable interpretative effect of base generating a Q-adverb in left-peripheral position is the following: It becomes able to bind a situation variable contained within a subject DP.

I assume that this is the reason why (55a) can only be interpreted as in (55c): The hearer automatically assumes that the Q-adverb occupies the marked left-peripheral position in order to be able to bind the situation variable contained within the NP-complement of *every*. If, on the other hand, a reading was intended according to which the quantificational DP has scope over the Q-adverb, there simply would not have been any reason for base generating the Q-adverb in fronted position: The intended reading could have been achieved by base generating the Q-adverb in its unmarked vP-adjoined position, and interpreting the quantificational DP in its surface position. If the Q-adverb occupies a left-peripheral position, on the other hand, the quantificational DP would have to be moved across it at LF in order to arrive at this reading.

2.6 Section Summary

Before I return to QVEs in sentences with singular definites, I want to summarize the results of section 2: We have seen that the denotation of NPs may also vary with the situations quantified over by a Q-adverb if those NPs are the first argument of a quantificational determiner like *every*. Such a relativization is only possible, however, if two conditions are fulfilled:

(a) A set of situations must either have been introduced explicitly or at least be inferable from prior discourse or clause internal information that fulfils the following condition: Each situation in this set can plausibly be assumed to contain a set of individuals that satisfy the

predicate denoted by the NP-complement of the quantificational determiner. This is because otherwise the presupposition associated with *every* is not fulfilled that its NP complement denotes (the characteristic function of) a non-empty set.

(b) The Q-adverb must c-command the universally quantified DP overtly. I have tentatively assumed that this is due to the following fact: In order for the initially free variable contained within the respective NP to become a variable bound by the respective Q-adverb, a binding operator needs to be inserted directly beneath the-adverb. This, however, can only be done if the Q-adverb stays within its surface position at LF (see section 4 for more details).

3 The Conditions under which QV-Readings are Possible in Sentences with Singular Definites

3.1 Contextual Licensing

Let us now have a closer look at the conditions under which the relativization of the denotation of NPs to situations is possible in sentences with singular definite DPs. As already discussed in detail in chapter 1, in the case of singular definites the NP-complement of the respective definite determiner is subject to the following condition: It has to denote (the characteristic function of) a singleton set. Remember furthermore that I assume NPs to denote sets of individuals that satisfy the respective predicate at some situation, where this situation is given in the form of a free variable. This free variable can either be resolved to w_0 by default, be assigned a contextually salient situation as value, or become a variable bound by a Q-adverb (see Percus (2000), Elbourne (2001, to appear), Büring (2004) and Recanati (2004) for similar views). This has the consequence that absolute uniqueness only needs to be guaranteed in case the free NP-internal situation variable is resolved to w_0 , while in the other cases it is sufficient that in the respective situation the variable is resolved to there is only one individual that satisfies the respective predicate.

It is therefore obvious why in case the NP-internal situation variable is bound by a Q-adverb a set of situations either must have been introduced explicitly or be inferable on the basis of contextual or clause-internal information that fulfils the following condition (see section 1.3): It must be plausible to assume that each of those situations contains exactly one individual that satisfies the respective NP-predicate. Otherwise, the uniqueness/maximality presupposition associated with the definite determiner is not fulfilled, and the result of applying the definite determiner to the respective NP is accordingly not defined with respect to the situations quantified over.

This is reminiscent of the case of universally quantified DPs discussed in the last section: While there the presupposition had to be satisfied that each of the situations quantified over contains a non-empty set of individuals that satisfy the respective NP-predicate, in the case of singular definites it needs to be guaranteed that each situation contains *exactly one* individual of the respective kind.

With this in mind, consider now the examples below (which all involve so-called *bridging definites* cf. Lyons (1999) and the references cited there):

- (56) a. #The PIANO-player usually is INTELLIGENT.
b. I love going to jazz concerts: The PIANO-player usually is INTELLIGENT (and it's nice to talk to him after the show).
c. The BRIDE usually wears a lovely DRESS.
d. Mary loves weddings: The BRIDE usually wears a lovely DRESS.

Let us for the moment abstract away from the technical details, and simply discuss the relevant points at an informal level. Consider (56a) first. The sentence is rather strange if it is presented without any context, as there is no well-formed semantic representation available for it. If the NP-internal situation variable is resolved to w_0 by default, there are two problems: First, the uniqueness presupposition is not fulfilled, as w_0 contains more than one piano player. Secondly, even if this presupposition was satisfied, we would run into the problem that *be intelligent* is an individual level predicate that for precisely this reason may not be applied to one and the same individual more than once (see above). This, however, would be an automatic consequence of resolving the NP-internal situation variable to w_0 , as in that case each of the situations quantified over would contain one and the same individual.

On the other hand, no salient situation is available for the NP-internal variable to be resolved to that would guarantee uniqueness – apart from the fact that this would still not solve the second problem from above. The only remaining option therefore is to interpret the NP-internal variable as a variable bound by the Q-adverb. This solves the problem resulting from the matrix predicate's being an individual level predicate, but it does not solve the first problem: If nothing is known about the situations quantified over, it cannot be decided whether each of them contains exactly one piano-player.

Consider next (56b): In that case, a set of situations has been introduced explicitly by the clause preceding the adverbially quantified sentence such that each of those situations can plausibly be assumed to contain exactly one piano-player. It is therefore unproblematic to

interpret the NP-internal situation variable as a variable bound by the Q-adverb, as the uniqueness is satisfied with respect to each of the situations quantified over.

Turning to (56c), in that case it is plausible to assume that a set of situations of the required kind can easily be accommodated on the basis of clause internal information, as it is part of the common ground of most discourse participants that there is a set of situations such that each of those situations contains exactly one bride: Namely the set of situations called *weddings*. It is therefore unproblematic to interpret the NP-internal situation variable as a bound variable even in the absence of a context like the one given in (56d), which explicitly introduces a set of situations of the required kind.

Let us now turn to the technical details of how the respective readings come about. It surely did not escape the reader's attention that the sentences in (56) all exemplify the word order that in connection with adverbially quantified sentences containing universally quantified DPs was claimed to preclude the respective NP-internal situation variables from being interpreted as bound variables. The reason for that was the following: I claimed that the free situation variables contained within universally quantified DPs can only be turned into bound variables by means of a binding operator that is inserted directly beneath the Q-adverb, and that this binding operator can furthermore only be inserted if the Q-adverb stays within its surface position.

This claim seems to be in conflict with the fact that the definite DPs in (56c, d) get co-varying readings in spite of c-commanding the Q-adverb overtly. Note, however, that neither the definite DPs in (56) nor the universally quantified DPs discussed in section 2 occupy their base position in the sentences under discussion: According to current syntactic theories, they have been base generated vP-internally, and moved to Spec, IP/TP in order to check their uninterpretable (nominative) case features (Chomsky (1993, 1995), building on Kuroda (1988), Koopman and Sportiche (1991) a. o.). It is furthermore often assumed that material moved in the overt component is not always interpreted in its surface position, but at least sometimes also in its base position (see Chomsky (1993, 1995), Sauerland (1998, 2004) and Fox (2000)). It is therefore conceivable that also in the sentences under discussion the respective definite DP is not interpreted in its surface position, where it c-commands the Q-adverb, but in its base position, where it is c-commanded by the Q-adverb.

The first point to note about this suggestion is that reconstructing the definite DP back into its vP-internal base position would be a case of A-reconstruction, which is sometimes

doubted to exist at all (cf. Lasnik (1999)).³¹ There are however examples which at least make a strong case for the existence of A-reconstruction. Consider the example in (57) below from Chomsky (1993: 35):

(57) Someone from New York is likely to win the lottery.

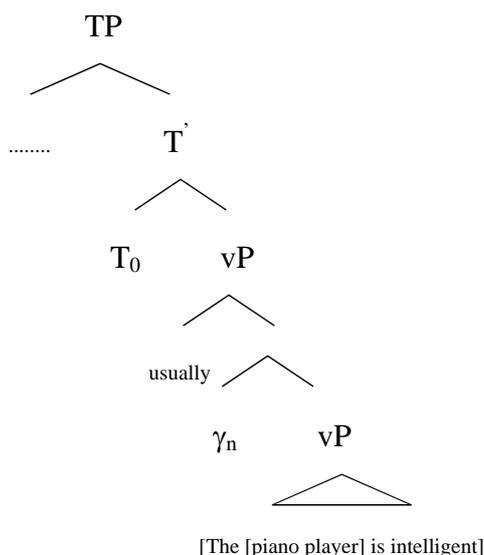
(57) gets two readings: In the first one it says that there is a specific person from New York such it is likely that this person wins the lottery. On the second reading it says that it is likely that one person or other who is from New York wins the lottery. This can be explained along the following lines: According to standard assumptions, the subject DP in (57) is base generated in the subject position of the infinitival clause. Furthermore, Chomsky (1993) assumes that moved items do not leave traces, but full copies, and that in principle there always is an option which copy (or, in the case of A'-movement, which part of a copy in which position) is deleted at the level of LF. Thus, (57) can get both of the two LF representations given below schematically (underlining indicates deletion):

- (58) a. Someone from New York is likely someone from New York to win the lottery.
b. Someone from New York is likely someone from New York to win the lottery.

Now, under the assumption that the copy theory of movement and reconstruction is right, the sentences in (56) can be assumed to give rise to LFs where the lower, vP-internal copy is the one spelt out at LF, while the higher one is simply ignored, as shown for the case of (56a, b) in (59) below. Note furthermore that if a binding operator is inserted directly beneath the Q-adverb, the NP-internal situation variable can be interpreted as a variable bound by this Q-adverb – in complete analogy to the case of universally quantified DPs discussed in section 2.

³¹ See Lebeaux (1995), Hornstein (1995), Romero (1998), Sauerland (1998) and Fox (2000) a. o. for discussion.

(59)



Let us first have a look at the lowest vP-segment in (59): I assume that the definite determiner denotes the object in (60a) below, i. e. it takes a function from situations to sets of individuals as argument, and returns the maximal element within the set of individuals that results from applying that function to a situation s_I (or some alphabetical variant thereof), where s_I is a free variable that needs to be assigned a value. (60b) shows the result of applying the denotation of the definite determiner to the NP *piano-player*, and (60c) the result of applying the denotation of *is intelligent* to the definite DP.

- (60) a. $\lambda P_{\langle e, \langle s, t \rangle \rangle} . \sigma \{x: P(x, s_I)\}$
b. $\lambda P_{\langle e, \langle s, t \rangle \rangle} . \sigma \{x: P(x, s_I)\} (\lambda y \lambda s. \text{piano-player}(y, s)) =$
 $\sigma \{x: \text{piano-player}(x, s_I)\}$
c. $\lambda y \lambda s. \text{is-intelligent}(y, s) (\sigma \{x: \text{piano-player}(x, s_I)\}) =$
 $\lambda s. \text{is-intelligent}(\sigma \{x: \text{piano-player}(x, s_I)\}, s)$

Now the next step consists in applying the rule triggered by the presence of the binding operator in (59) above (repeated below as (61a)), which results in (61b):

- (61) a. $[[\gamma_n \text{ XP}]]^{w, g} = \lambda s. [[[\text{XP}]]^{w, g[n \rightarrow s]} (s)]$
b. $\lambda s. \text{is-intelligent}(\sigma \{x: \text{piano-player}(x, s)\}, s)$

If we apply the denotation of *usually* (repeated below as (62a)) to the object in (61b), we get (62b). A schematic, simplified version of (60b), which will facilitate further discussion is given in (62c). Note that the minimality condition is suppressed.

- (62) a. $[[\text{usually}]] = \lambda Q_{<s, \triangleright} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': Q(s''''')\}]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |$
- b. $\lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': \text{is-intelligent}(\sigma\{x: \text{piano-player}(x, s''''')\}, s''''')]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |$
- c. $\text{Most } s [C(s)] [\exists s' [s \leq s' \wedge \text{is-intelligent}(\sigma\{x: \text{piano-player}(x, s')\}, s')]]$

As is obvious from (62c), it depends entirely on which predicate the C-variable in the restrictor is resolved to whether the set that the σ -operator is applied to has a maximal (in the present case: unique, as this set only contains atomic elements; see chapter 1) element or not in each of the situations quantified over. Therefore, the presupposition associated with the definite determiner is only fulfilled if the C-variable can be resolved to a predicate such that each (minimal) situation in the set characterized by this predicate can plausibly be assumed to contain exactly one piano-player.

Let us furthermore assume that it is not possible to accommodate such a predicate on the basis of clause internal information if the sentence is presented without any context, as there are too many possibilities, i.e. there are too many predicates imaginable that characterize (minimal) situations such that each of those situations contains exactly one piano-player. This, in combination with the fact that resolving the NP-internal situation variable to w_0 instead of inserting the binding operator above also does not lead to an acceptable result (see above), accounts for the oddity of (56a) if it is uttered out of the blue.

In the case of (56b), on the other hand, a suitable situation predicate (namely *jazz-concerts*) is explicitly introduced by the preceding sentence, and the C-variable can accordingly be resolved to this predicate, as shown in (63a) below. Finally, in the case of (56c) a suitable predicate can be accommodated on the basis of clause internal information, as there is a set of (minimal) situations of the right kind that is commonly associated with brides: Namely the set of situations characterized by the situation predicate *weddings*. Therefore (56c) (as well as (56d), where this predicate has been introduced explicitly) according to our assumptions gets interpreted as shown in (63b) below.

- (63) a. $\text{Most } s [\text{jazz-concert}(s)]$
 $[\exists s' [s \leq s' \wedge \text{is-intelligent}(\sigma\{x: \text{piano-player}(x, s')\}, s')]]$

b. Most s [wedding(s)]

$$[\exists s' [s \leq s' \wedge \text{wears-a-lovely-dress}(\sigma\{x: \text{bride}(x, s')\}, s')]]$$

Note, however, that one thing is problematic about the formulas in (63) above: It is strange to assume that the existentially quantified nuclear scope situations are extensions of the respective restrictor situations. Rather, the reverse relation seems to be the one needed, as the respective piano-player's/bride's being in some (mental or physical) state can only be a part of the respective jazz-concert/wedding: After all, those situations need to contain many other people apart from piano-players/brides in order to be considered as jazz-concerts/weddings. On the other hand, in the case of adverbially quantified sentences with (de-accented) indefinites, there are good reasons to assume that the respective nuclear scope situations are extensions of the respective restrictor situations: If nothing more is known about the situations quantified over than that each of them is a minimal situation containing an individual that satisfies the respective NP-predicate, the information added in the second argument in many cases forces the introduction of a situation that is a (minimal) extension of the respective restrictor situation. We therefore seem to be in a real conflict: In some cases we need to introduce situations that are extensions of the situations quantified over in the nuclear scope, while in other cases we need to introduce situations that are parts of the situations quantified over in the nuclear scope.

In order to resolve the tension between these two requirements, I assume that the relation that obtains between the restrictor and the nuclear scope situations is left underspecified in the lexical entries of the respective Q-adverbs. Rather, it is only specified that they have to stand in some relation to each other, and that either the restrictor situations have to be included in the nuclear scope situations, or the nuclear scope situations have to be included in the restrictor situations. In other words, I assume that the Q-adverb *usually*, for example, denotes the object given in (64b) below, rather than the one given in (20), which is repeated below as (64a):

$$(64) \quad \begin{aligned} \text{a. } [[\text{usually}]] &= \lambda Q_{<s, \triangleright} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \\ &\quad \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': Q(s''''')\}]\} | \\ &\quad \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\}\} | \\ \text{b. } [[\text{usually}]] &= \lambda Q_{<s, \triangleright} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap \\ &\quad \{s''': \exists s'''' [s'''' \leq s \wedge s''' R s'''' \wedge s'''' \in \min\{s''''': Q(s''''')\}]\} | \\ &\quad \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\}\} |, \end{aligned}$$

where $R \in \{\leq, >\}$.

This has the consequence that the sentences in (56b, c) do not have to be interpreted as given (in simplified form) in (63) above, but can also be interpreted as in (65) below:

- (65) a. Most s [jazz-concert(s)]
 $[\exists s' [s > s' \wedge \text{is-intelligent}(\sigma\{x: \text{piano-player}(x, s')\}, s')]]$
 b. Most s [wedding(s)]
 $[\exists s' [s > s' \wedge \text{wears-a-lovely-dress}(\sigma\{x: \text{piano-player}(x, s')\}, s')]]$

This move, however, seems to lead us into the following problem: In order to fulfil the presupposition associated with the definite determiner, it is no longer required that the situations quantified over contain exactly one individual that fulfils the respective NP-predicate. Rather, it is only required that the situations quantified over contain such individuals at all. This is due to the fact that if a situation s contains some individuals that satisfy some predicate P it is always possible to come up with a situation s' that contains only one P -individual such that s' is a situation such that the only P -individual contained within s' stands in some further relation Q to s' .

This, however, is not what we want, as it predicts sentences like (66b) below to be acceptable in a context like the one given in (66a): If the C-variable in the restrictor gets resolved to the predicate introduced in the previous clause, it is plausible to assume that each of the situations quantified over contains a plurality of students. Therefore, there should be no problem in interpreting (66b), as all there is required for the sentence to be true is that each of the situations quantified over contains a smaller situation such that the unique student contained in that situation loves donkey anaphora in that situation. But of course (66b) sounds rather strange, as it seems to be required that each of the classes on formal semantics quantified over contains exactly one student.

- (66) a. There is something strange about teaching classes on formal semantics.
 b. ^{??}The STUDENT usually loves DONKEY anaphora.

I propose to deal with this problem in the following way: In a sentence like (66b), where the situations quantified over are automatically assumed to contain a plurality of students, it is unclear what information is to be conveyed by using the singular definite *the student* (under

the assumption that the NP-internal situation variable is to be interpreted as bound by the Q-adverb), as for each of the situations s quantified over there are as many situations s' such that the unique student contained in s' loves donkey anaphora in s' as there are students in s . But then it is unclear what is to be expressed by (66b): That in each of the situations quantified over there is (at least) one student who loves donkey anaphora? That could have been expressed more clearly by using an indefinite DP like *a student/one of the students*. Or that in each of the situations quantified over *all* students love donkey anaphora? In that case, it would have been preferable to use a universally quantified DP (as in (41c)). In a case like (56b), on the other hand, where each of the situations quantified over can plausibly be assumed to contain only one piano-player, this problem does not occur: For each restrictor situation s there is only one nucleus situation s' contained within s such that the unique piano player in s' is intelligent in s' . Let us therefore assume that representations like the ones in (65) are correct, and that a pragmatic explanation along the lines above can be given for the fact that singular definites with co-varying interpretations are only felicitous in adverbially quantified sentences if each of the situations quantified over can plausibly be assumed to contain exactly *one*, and not several individuals of the right kind.

Before we turn to the question why a contrastive topic accent on some element contained within the respective NP makes available co-varying interpretations for singular definites even in the absence of contextual clues, let me address an obvious question concerning the differences between singular definites and universally quantified DPs in adverbially quantified sentences: I have proposed in this section that in sentences where a Q-adverb is c-commanded by a singular definite overtly, the free situation variable contained within the definite can be turned into a variable bound by the Q-adverb if it gets reconstructed into its base position at LF, and if furthermore a binding operator is inserted beneath the Q-adverb. This, however, raises the question why it should not also be possible to reconstruct universally quantified DPs that c-command Q-adverbs overtly into their base position at LF.

Remember that in the examples with singular definites the respective NPs have to contain a strong accent in order for co-variation to be possible: If the definite DP is de-accented, it cannot be interpreted in the required way. The minimal variant of (56b) (which is repeated below as (67a)) given below in (67b) is therefore unacceptable:

- (67) a. I love going to jazz concerts: The PIANO player usually is INTELLIGENT
(and it's nice to talk to him after the show).

- b. I love going to jazz concerts: ^{??}The piano player usually is INTELLIGENT (and it's nice to talk to him after the show).

I will argue in detail in section 4 that their being focus-marked is the reason why definite DPs like the one in (67a) can be reconstructed at LF. Remember furthermore that in all the examples with universally quantified DPs discussed so far those DPs did not contain an additional strong accent, but were rather de-accented relative to the matrix verb – no matter whether they (asymmetrically) c-commanded the respective Q-adverb overtly or were (asymmetrically) c-commanded by it. In the last section I have argued that de-accented universally quantified DPs can be interpreted as part of the focus projecting from the respective matrix verb if they are c-commanded by the Q-adverb overtly, and that this is not possible if they are “separated” from the rest of the clause by the Q-adverb (see chapter 4 for further details). This predicts that universally quantified DPs that c-command a Q-adverb overtly should be able to get a co-varying interpretation if they bear a strong accent, as then it should be possible to reconstruct them into their base position. We will see in section 4 that the resulting sentences are still less than perfect, but that this difference between adverbially quantified sentences with singular definites and ones with universally quantified DPs can be traced back to an independent difference between the two types of DPs: Namely, to the fact that singular definites in adverbially quantified sentences need to be focus-marked anyway in order to get a co-varying interpretation. Let me dwell on this last point a little bit before closing this section.

Interestingly, it has been observed by Carla Umbach (Umbach (2001); cf. Bosch (1988)) that (de)accenting does have a clear effect on the interpretation of definite DPs. Consider the sentences in (68) below (from Umbach (2001): 1):

- (68) (John has an old cottage.)
a. Last summer he reconstructed the SHED.
b. Last summer he RECONSTRUCTED the shed.

According to Umbach (*ibid.*), the accent on *shed* indicates “that there is exactly one shed belonging to John’s cottage”, whereas the absence of such an accent indicates that “we have to interpret *the shed* as referring to the cottage itself, the speaker obviously making a disapproving comment” (*ibid.*: 1). Umbach takes this contrast as evidence that there are actually two different types of definite descriptions: ‘Given definites’, which need an explicit

antecedent and “represent identity anaphors exploiting the order of salience of discourse referents”, and ‘non-given definites’, which “make use of their descriptive content to determine a unique referent” (ibid.: 1). So while according to her “the definite article uniformly indicates that the referent is unique”, this uniqueness comes about in two different ways: Either “via salience or via description” (ibid.: 1).

I do neither think that it is actually necessary to postulate two different types of definites, nor that the point about the two different ways in which uniqueness is guaranteed is really convincing: As already said, there are very few occurrences of definites that achieve uniqueness solely via their descriptive content. Also – as Umbach (ibid.) acknowledges herself – in (68a) above, the descriptive content alone of course does not guarantee uniqueness. Rather, there is a bridging relation to the old cottage mentioned in the immediately preceding clause, and it is the combination of this (part-of-) relation and the descriptive content that fulfils the uniqueness presupposition associated with the definite determiner. This of course can easily be captured in the situation-semantics framework argued for in this dissertation: It only needs to be assumed that the mentioning of the cottage in the immediate context of (68a) makes available a minimal situation containing this cottage. If the free situation variable contained within the definite DP in (68a) is resolved to this situation, uniqueness with respect to this situation is guaranteed, as a cottage can plausibly be assumed to have only one shed. Basically the same reasoning applies in (68b): Again, uniqueness is guaranteed with respect to the situation made available by the context, the only difference being that the hearer needs to interpret the predicate *shed* as a pejorative characterization of the unique cottage in that situation.³²

In spite of my differing views with regard to the necessity to postulate two different types of definites, I consider Umbach’s point with respect to givenness valid: The focus-accent on the noun in (68a) obviously signals that it introduces a new discourse referent, while the absence of such an accent in (68b) is due to the fact that it takes up a referent which has already been introduced in previous discourse³³. Now, if it is true that the presence or absence of a focus-accent signals whether a definite DP introduces a novel referent into the discourse

³² Alternatively it could of course also be assumed that in both cases the respective NPs contain C-variables that get resolved to predicates made available by the context. The first C-variable could then be assumed to get resolved to a predicate like $\lambda x. \textit{part of the previously mentioned cottage} (x)$ and the second C-variable could be assumed to get resolved to a predicate like $\lambda x. \textit{identical to the previously mentioned cottage} (x)$.

³³ Note that it is *not* the descriptive content of the DP the givenness of which is at issue here (in this respect, there is no difference between the two sentences), but the givenness of the entity denoted by the DP

or takes up an existing one, it is obvious why there has to be an accent on the singular definites in the adverbially quantified sentences under discussion: They simply do not take up already existing discourse referents, but rather introduce ones relative to each situation quantified over.

It is of course a bit problematic to say that the definites in (68a) and in sentences like (67a) actually introduce new discourse referents, as in both cases the uniqueness presupposition associated with the definite determiner is only fulfilled if it is assumed that the cottage talked about contains a unique shed, and that the jazz-concert situations quantified over contain a unique piano-player. So the existence of the respective discourse referents is actually presupposed (Otherwise, the respective sentences would not be acceptable, after all).. Nevertheless I think it is plausible to assume (cf. also Umbach (ibd.: 8)) that their existence is only accommodated at the point where it becomes relevant, i. e. not before the definite itself is semantically processed. Otherwise one “would have to believe that whenever a discourse referent is introduced, all entities related to that referent are introduced simultaneously (ibd.: 8), which is extremely unlikely. Under this perspective it makes sense to say that the definites in sentences like (68a) and (67a) introduce novel discourse referents, while in cases like (68b) the discourse referent is already available before the definite is semantically processed. I will therefore assume that this discourse novelty is responsible for the obligatory accent on definites that are interpreted relative to the situations quantified over by Q-adverbs. Concerning universally quantified DPs, on the other hand, they denote sets of sets of individuals and are therefore of the wrong type to introduce discourse referents anyway, so there is no inherent need for them to bear a focus-accent in adverbially quantified sentences in order to be interpreted in the required way. As we will see in section 4, this difference can help us explain the above mentioned difference between adverbially quantified sentences containing singular definites and ones containing universally quantified DPs.

But let me first return to the following question: Why does a contrastive topic accent on a definite singular DP, combined with a focus accent on some constituent inside the VP (at least in some cases) help to make available co-varying readings of sentences that without such an accent pattern do not get such readings when they are presented in isolation?

3.2 Contrastive topicality as a clue that makes available co-varying interpretations of singular definites

Consider the sentences in (69) and (70) below: In each case, the version with no accent inside the definite DP is unacceptable ((69a), (70a))³⁴. The version with a focus accent on some element within the respective NP easily gets a QV-reading and therefore becomes fine if it is embedded in a suitable context, but does not get such a reading if it is presented out of the blue. Now, crucially, the version where some constituent inside the NP gets a contrastive topic accent, i. e. a fall-rise accent (see section 3.4 of chapter 1 and the references cited there), while some constituent inside the VP gets a focus accent (i. e. a fall accent), at least for most speakers becomes significantly better even if it presented without a context³⁵:

- (69) a. *The piano player is usually INTELLIGENT.
b. #The PIANO player is usually INTELLIGENT.
c. The [PIANO]_{CT} player is usually INTELLIGENT.
- (70) a. *The man who drives a blue car usually is INTELLIGENT.
b. #The man who drives a BLUE car usually is INTELLIGENT.
c. The man who drives a [BLUE]_{CT} car usually is INTELLIGENT.

But why does the accent pattern exemplified by (69c) and (70c) help to make the respective sentences acceptable³⁶? If our discussion so far is on the right track, this can only be due to the fact that this accent pattern somehow helps to invoke a set of suitable situations, which in turn enables the situation variables contained within the respective NPs to be interpreted as bound by the respective Q-adverb. But why should this be the case?

³⁴ This is due to the fact already mentioned in section 2 that individual level predicates may only be applied once to one and the same individual, which, however, is a necessary consequence of the respective definites' being de-accented: If they cannot be interpreted as co-varying with the situations quantified over, they can only denote an object that is unique with respect to some other situation. This has the consequence that the same individual is contained within each of the situations quantified over.

³⁵ From now on I indicate contrastive topic marking by the combination of capital letters and a CT-subscript, and focus marking by capital letters alone.

³⁶ Of course, they still feel incomplete when they are presented without a context – as sentences that contain a contrastive topic always do (see below).

As already mentioned in section 3.4 of chapter 1, according to Büring (1997) contrastive topic marking is similar to focus marking insofar as it also introduces a set of alternatives to the respective constituent, but differs from focus marking in the type of semantic object it creates: Whereas focus marking evokes a set of propositions (i. e. a question denotation), contrastive topic marking introduces a set of sets of propositions (i. e. the denotation of a set of questions)³⁷. In the case of (69c), this set would be something like (71), while in the case of (70c), it would be something like (72):

- (71) { {The piano player is usually intelligent, The piano player is usually stupid},
 {The drummer is usually intelligent, The drummer is usually stupid},
 {The bass player is usually intelligent, The bass player is usually stupid}, ... }
- (72) { {The man who drives a blue car is usually intelligent,
 The man who drives a blue car is usually stupid},
 {The man who drives a red car is usually intelligent,
 The man who drives a red car is usually stupid},
 {The man who drives a green car is usually intelligent,
 The man who drives a green car usually is stupid}, ... }

3.2.1 The behaviour of contrastive topics with respect to the mapping algorithm in general

Of course, what you see in (71) and (72) are not really the topic semantic values of (69c) and (71c), since those are (sets of sets of) propositions, while (71) and (72) are just (sets of sets of) sentences that do not yet have a precise interpretation. Therefore it has to be determined how those sentences are to be interpreted, i. e. which constituents are mapped onto the restriction of the Q-adverb, and which constituents are mapped onto the nuclear scope. With respect to the focus marked matrix predicates, this seems to be pretty obvious: They get mapped onto the nuclear scope. With respect to the DPs marked as contrastive topics, things are not so clear: It depends on the content we give to the notion *contrastive topic*. Of course, regular topics would be assumed to get mapped onto the restriction – either simply because they are not foci or because the mapping algorithm is inherently sensitive to topicality (as in Chierchia

³⁷ This set is the *topic semantic value* of the constituent marked as a contrastive topic (Büring (1997)) – in analogy to the *focus semantic value* focus marked constituents get in addition to their ordinary semantic value (Rooth (1985)).

(1995), Partee (1995) and Krifka (2001)). But contrastive topics are not be equated with “regular” topics.

While there is no consensus in the literature what exactly the term “topic” means³⁸, at least the following points seem to be pretty clear: 1. Regular topics (at least in languages like German and English) are de-accented. 2. They (optionally) occupy special syntactic positions reserved for topics (cf. Jacobs (2001) and Frey (2000, 2004) for German). 3. Not any constituent can be a topic, as is evidenced by the fact that most quantificational DPs (with the exception of unmodified indefinites, cf. Ebert and Endriss (2004)) are banned from typical topic positions in German.

At least the first and the last point does not hold of contrastive topics³⁹: Neither are they de-accented nor is it true that quantificational DPs other than unmodified indefinites may not be marked as contrastive topics (cf. Büring (1997)). It seems therefore reasonable to keep contrastive topics apart from regular topics. But then, it is not at all clear that they get mapped onto the restriction of Q-adverbs.

3.2.1.1 Krifka (1998) on contrastive topics

Interestingly, Krifka (1998) has proposed that “contrastive topic constructions involve a focus within the topic that is realized by a rise accent” (ibid.: 11). His aim is to explain the well-known fact (cf. Jacobs (1982, 1983, 1984), Löbner (1990) and Büring (1997) among many others) that in German sentences exhibiting the rise-fall contour⁴⁰ that indicates the combination of a contrastive topic and a focus marked constituent are systematically ambiguous when they contain two quantificational DPs⁴¹. Consider example (73) below: It

³⁸ The debate is mostly centered around the question whether “givenness” or “aboutness” is the defining characteristic of topicality. See Reinhart (1981), Jacobs (2001) and Endriss (in preparation) among many others for discussion.

³⁹ The second point also seems to be true of contrastive topics. According to Krifka (1998), contrastive topics in German have to be moved to Spec., CP, and are only marginally acceptable in other positions.

⁴⁰ As already mentioned in section 3.4 of chapter 1, contrastive topics are realized differently in German and English: While in English they are indicated by a fall-rise accent, they are indicated by a simple rise accent in German. Nevertheless, they serve the same discourse function (see Büring (1997))

⁴¹ In German a quantifier may only take scope over another quantifier if it either c-commands the second quantifier itself or a trace of it (Frey (1993)). This means that in German scope inversion is only possible if one quantifier has been moved across the other overtly (i. e. before the level of LF).

may either mean that there is a specific student such that she read every novel or that for every novel there is a (different) student such that she read it (Krifka (1998: 8)).

- (73) Mindestens /EIN Student hat \JEDen Roman gelesen. $\exists (\forall), \forall (\exists)$
 At least one-NOM student has every-ACC novel read.

According to Krifka (ibd.), the ambiguity of sentences like (73) is the result of a pretty complex derivation that involves several invisible movement operations. The crucial steps are given below (ibd.: 11): First, the direct object DP is scrambled across the subject DP (as shown in (74c)), then the subject DP receives focus marking in its derived verb-adjacent position (as shown in(74d)) and is moved to Spec, CP (as shown in(74e)). Finally, the object DP receives focus marking in its derived verb-adjacent position (as shown in(74f)). Krifka (ibd.) assumes that the movement of the subject DP to Spec, CP “has a specific discourse pragmatic function, contrastive topicalization” (ibd.: 11).

- (74) a. $[_{CP} e [_{C'} e [_{\text{mindestens ein Student}} [_{\text{jeden Roman}} [_{\text{gelesen}}]] \text{hat}]]]$
 b. $[_{CP} e [_{C'} \text{hat}_1 [_{\text{mindestens ein Student}} [_{\text{jeden Roman}} [_{\text{gelesen}}]] t_1]]]$
 c. $[_{CP} e [_{C'} \text{hat}_1 [_{\text{jeden Roman}}_2 [_{\text{mindestens ein Student}} [t_2 [_{\text{gelesen}}]]] t_1]]]$
 d. $[_{CP} e [_{C'} \text{hat}_1 [_{\text{jeden Roman}}_2 [[_{\text{mindestens ein Student}}]_F [t_2 [_{\text{gelesen}}]]] t_1]]]$
 e. $[_{CP} [_{\text{mindestens ein Student}}]_{F,3} [_{C'} \text{hat}_1 [_{\text{jeden Roman}}_2 [t_3 [t_2 [_{\text{gelesen}}]]] t_1]]]$
 f. $[_{CP} [_{\text{mindestens ein Student}}]_{F,3} [_{C'} \text{hat}_1 [[_{\text{jeden Roman}}]_{2,F} [t_3 [t_2 [_{\text{gelesen}}]]] t_1]]]$
 g. $[_{CP} \text{Mindestens /EIN Student} [_{C'} \text{hat} [_{\text{JEDen Roman}} [_{\text{gelesen}}]]]$
 At least one-NOM student has every-ACC novel read

In order to makes his system work, Krifka (ibd.) has to make a few non-standard assumptions: He has to assume that focus “is preferably assigned to a constituent that immediately precedes the verbal predicate” (ibd.: 11) in German and that “focus assignment may occur prior to syntactic movement” (ibd.: 11). He furthermore has to assume that there is “altruistic” scrambling, i. e. scrambling that is not directly triggered by a morphosyntactic feature, but rather is licensed because it has an indirect effect on the further derivation. While the first two claims seem to be well supported (cf. ibd.: 12-23 and the references cited therein), the third claim seems to me a bit problematic. Nevertheless, I won’t discuss it, as it is not directly relevant to our concern here, and will instead concentrate on the points that might help us to

answer the following question: Are contrastive topics mapped onto the restriction or onto the nuclear scope of Q-adverbs?

3.2.1.2 Evidence for a real ambiguity: The existence of two different readings in sentences with proper names as contrastive topics

Note that according to Krifka's (ibid.) analysis contrastive topics are topics that receive an additional focus marking. It therefore depends on the mapping algorithm that is assumed whether they are interpreted in the restrictor or (exclusively) in the nuclear scope: If *topicality* is the central category (as in Chierchia (1995a) and Krifka (2001)), we would expect contrastive topics to be mapped onto the restrictor. If, on the other hand, the mapping algorithm is only sensitive to focus marking, while topicality is not a category that the mapping algorithm is sensitive to (as for example in Rooth (1995) and Herburger (2000)), we would have to assume that they are exclusively interpreted in the nuclear scope. Finally, if the mapping algorithm is sensitive to topicality as well as to focality (as alluded to in Partee (1995)), we would expect sentences containing contrastive topics to be ambiguous: The contrastive topic could either be interpreted in the restriction *and* the nuclear scope, or exclusively in the nuclear scope. In order to decide this question in general, let us first turn to some simple examples where focus marking has a clear semantic effect and test what happens if we mark a constituent therein as a contrastive topic. Compare (75a) and (75b) first:

- (75) a. Anne usually drinks whiskey AT PARTIES.
b. ANNE usually drinks whiskey at parties.

(75a) says that most situations where Anne drinks whiskey are situations where she is at a party, while (75b) says that most (contextually restricted) situations where someone drinks whiskey at a party are situations of Anne drinking whiskey. It is of course easy to imagine a scenario where (75a) is true, while (75b) is false: Imagine that there are fifteen parties where Anne has been invited, and she drinks whiskey at five of them, while Peter and Mary drink lots of whiskey at each of those parties. Furthermore, during the last ten years, Anne only drank two more whiskeys, and she drank them alone at home. In such a scenario, (75a) is true, while (75b) is clearly false. Consider now what happens if the subject DP is marked as a contrastive topic:

(76) [ANNE]_{CT} usually drinks whiskey at PARTIES.

Truth-conditionally, the sentence does not differ from (75a): It also is appropriate in the scenario described above. The only difference between the two sentences is that (76) in contrast to (75a) gives the hearer the feeling that the whiskey-drinking behaviour of Anne is to be compared to the whiskey-drinking behaviour of other people, i. e. (76) cries out for a continuation like ... *while [PETER]_{CT} usually drinks whiskey AT HOME.*

So we have initial evidence that contrastive topics at least *can* be mapped onto the restriction of Q-adverbs. Of course, this does not mean that they have to. Compare (77a) and (77b): With the accent on the direct object interpreted as VP-focus, (77a) on its most prominent reading says that most situations where Anne is engaged in some natural alternative to drinking whiskey (like consuming some kind of drug) are situations where Anne drinks whiskey. (77b) also gets such a reading, the only difference to (77a) being that it gives the hearer the feeling that the drug-consuming behaviour of Anne is compared to the drug-consuming behaviour of other people. But (77b) also gets a reading according to which the Q-adverb quantifies over a set of situations where Anne and some other people are always present together and are furthermore consuming drugs together (for example, parties where Anne and those other people are always invited), saying that in most of those situations Anne drinks whiskey⁴². Furthermore, it invites the hearer to expect that she will be told next what those other people usually drink at those eventualities.

- (77) a. Anne usually drinks WHISKEY.
b. [ANNE]_{CT} usually drinks WHISKEY.

Let us take a closer look at the two different readings of (77b) just mentioned: In the first reading, the subject DP *Anne* is mapped onto the restriction, i. e. quantification is over a set of (minimal) situations where Anne is consuming some drug. If we keep to our assumptions so far, this reading can be represented in simplified form as given in (78) below (let us assume that the relation between the respective restrictor situation s and the nucleus situation s' is specified as $s \leq s'$):

(78) Most s [$\exists P \in \text{ALT} (\lambda x \lambda s. \text{drink-whiskey}(x, s))$ [P(Anne, s)]]

⁴² In principle, (77a) can also get such a reading if the hearer is able to accommodate a suitable scenario. The difference is that the required accommodation is easier in the case of (77b).

$$[\exists s'[s \leq s' \wedge \text{drink-whiskey}(\text{Anne}, s')]]$$

Furthermore, in the (sets of) alternative propositions denoted by the topic semantic value of the clause, the Q-adverb quantifies over situations where some alternative to Anne drinks something alcoholic, i. e. the respective propositions look just like the ones given (79) below:

$$(79) \quad \{ \{ \text{Most } s [\exists P \in \text{ALT} (\lambda x \lambda s. \text{drink-whiskey}(x, s) [P(\text{Anne}, s)])] \\ [\exists s'[s \leq s' \wedge \text{drink-whiskey}(\text{Anne}, s')]], \\ \text{Most } s [\exists P \in \text{ALT} (\lambda x \lambda s. \text{drink-whiskey}(x, s) [P(\text{Anne}, s)])] \\ [\exists s'[s \leq s' \wedge \text{drink-vodka}(\text{Anne}, s')]], \dots \}, \\ \{ \text{Most } s [\exists P \in \text{ALT} (\lambda x \lambda s. \text{drink-whiskey}(x, s) [P(\text{Peter}, s)])] \\ [\exists s'[s \leq s' \wedge \text{drink-whiskey}(\text{Peter}, s)]], \\ \text{Most } s [\exists P \in \text{ALT} (\lambda x \lambda s. \text{drink-whiskey}(x, s) [P(\text{Peter}, s)])] \\ [\exists s'[s \leq s' \wedge \text{drink-vodka}(\text{Peter}, s)]], \dots \}, \dots \}$$

Crucially, in each of the propositions in (79), the set of situations quantified over is determined by the information that it includes the person denoted by the respective subject DP, and that it is a typical situation of this person consuming some drug. That means, the respective sets consist of many different situations: Some, where the respective person is drinking alone at home, some, where she has dinner with her colleagues, some, where she is at a party, etc. Furthermore, the topic semantic value in this case does not play any role in determining the set of situations quantified over, as this set has already been determined before the topic semantic value is computed. It only plays a role at the level of the discourse – insofar as it triggers the expectation that (77b) will be continued by sentences telling the hearer about the drug-consuming behaviour of other people that somehow are related to Anne.

In the second reading, on the other hand, the Q-adverb intuitively quantifies over a set of situations that is characterized by two facts: First, it consists of situations where some kind of drug is consumed. Secondly, Anne and all the other persons denoted by the proper names substituting *Anne* are present together at each of those situations. But that means that the topic semantic value of (77b) somehow helps to determine the set of situations quantified over: They have to be complex situations consisting of smaller situations each of which is a situation where one of those persons is consuming some drug. It is of course not at all clear how the topic semantic value of (77b) can be made use of in order to determine the restriction of the Q-adverb, if the semantic representation in (78) is taken to be the ordinary semantic

value after which the topic semantic value is modelled: In (78) the restriction has already been determined, i. e. we already have the information that each of the situations quantified over includes Anne, plus the information that she in each of those situations is engaged in some alternative to drinking whiskey.

Let us therefore assume that the reading we are interested in comes about in a different way: In the first step, the denotation of the whole clause minus the Q-adverb is mapped onto the nuclear scope. I assume this to be possible for the following reason: As we have already seen, contrastive topics (besides being topics of some special kind) also involve focus marking, and can therefore not only be mapped onto the restriction of Q-adverbs (because of their topicality), but also onto the nuclear scope (because of their inherent focality). Furthermore, the focus on the direct object is again interpreted as projecting up to the VP level. Remember furthermore that in the end we want the situations quantified over to be complex situations each of which contains a situation of Anne drinking whiskey. Let us therefore assume that the relation between the respective restrictor situations s and nucleus situations s' is specified as $s > s'$. That is, (77b) on its second reading is initially represented as in (80) below.

$$(80) \quad \text{Most } s [C(s)] [\exists s' [s > s' [\text{drink-whiskey}(Anne, s')]]]$$

Let us now assume that in complete analogy to the way the focus semantic value is made use of in order to determine the restriction of Q-adverbs (see section 2), the topic semantic value not of the whole clause, but of the nuclear scope is made use of in order to resolve the C-variable in the restriction.

The next step therefore consists in computing the topic semantic value of the nuclear scope of (80). Note that in this case we get a set of sets of situation predicates (i. e. sets of situations).

$$(81) \quad \{ \{ \{ s: \exists s' [s > s' \wedge \text{drink-whiskey}(Anne, s')] \}, \\ \{ s: \exists s' [s > s' \wedge \text{drink-vodka}(Anne, s')] \}, \\ \{ s: \exists s' [s > s' \wedge \text{smoke-weed}(Anne, s')] \}, \dots \}, \\ \{ \{ s: \exists s' [s > s' \wedge \text{drink-whiskey}(Peter, s')] \}, \\ \{ s: \exists s' [s > s' \wedge \text{drink-vodka}(Peter, s')] \}, \\ \{ s: \exists s' [s > s' \wedge \text{smoke-weed}(Peter, s')] \}, \dots \}, \dots \}$$

Now in the last step the topic semantic value given in (81) above is made use of in order to resolve the C variable in the restriction of the Q-adverb. The question is how this can be done, i. e. which semantic operation (or which combination of operations) can we apply to the set given in (79) in order to arrive at a sensible restriction, i. e. a sensible value the C-variable can be resolved to? A possibility that comes to mind first would be to proceed in a manner completely analogous to how the focus semantic value is made use of in the theory of Rooth (1985, 1992, 1995) in sentences containing Q-adverbs. According to Rooth (ibd.), the restriction of Q-adverbs is determined in the following way: Compute the focus semantic value of the respective clause minus the Q-adverb (which corresponds to the nuclear scope) and apply the operation of generalized set-union to this object. As we have already seen, this amounts to a set where the focus marked constituent has been replaced with an existentially quantified variable ranging over the set of alternatives to (the denotation of) this constituent (plus the denotation of the constituent itself).

As (81) is not simply a set of sets of situations (i. e. a set of situation predicates), but a set of sets of sets of situations (i. e. a set of sets of situation predicates), we can not do exactly the same thing to (81) that can be done to the focus semantic value of a situation predicate. Rather, we have to proceed in two steps in order to arrive at the right kind of object: First, the operation of generalized set union is applied to the “inner” sets in (81), i. e. the ones where for each alternative to Anne the alternatives to drinking whiskey are listed. This gives us the set in (82), which is equivalent to (83):

$$(82) \quad \{ \{s: \exists s'[s > s' \wedge \text{drink-whiskey}(\text{Anne}, s')]\} \\ \vee \{s: \exists s'[s > s' \wedge \text{drink-vodka}(\text{Anne}, s')]\} \\ \vee \{s: \exists s'[s > s' \wedge \text{smoke-weed}(\text{Anne}, s')]\} \vee \dots \}, \\ \{s: \exists s'[s > s' \wedge \text{drink-whiskey}(\text{Peter}, s')]\} \\ \vee \{s: \exists s'[s > s' \wedge \text{drink-vodka}(\text{Peter}, s')]\} \\ \vee \{s: \exists s'[s > s' \wedge \text{smoke-weed}(\text{Peter}, s')]\} \vee \dots \}, \dots \}$$

$$(83) \quad \{ \{s: \exists s'[s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{drink-whiskey}(x, s'')) [P(\text{Anne}, s')]\} \}, \\ \{s: \exists s'[s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{drink-whiskey}(x, s'')) [P(\text{Peter}, s')]\} \}, \dots \}$$

Applying the operation of generalized union to this set finally gives us the set in (84), which is equivalent to (85):

$$(84) \quad \{ \{s: \exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{drink-whiskey}(x, s'')) [P(\text{Anne}, s')]$$

$$\quad \vee \exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{drink-whiskey}(x, s'')) [P(\text{Peter}, s')]$$

$$\quad \vee \dots \}$$

$$(85) \quad \{s: \exists s' [s > s' \wedge \exists x \in \text{ALT}(\text{Anne}) \wedge \exists P \in \text{ALT}(\lambda y \lambda s''. \text{drink-whiskey}(y, s''))$$

$$\quad [P(x, s')]\}$$

So, what we get is a set of situations such that there is a smaller situation of either Anne or some alternative to Anne engaged in either drinking whiskey or some alternative action to drinking whiskey. If we take this set to be the restriction of the Q-adverb in (80), we arrive at the semantic representation in (86), which says that most (minimal) situations such that there is a smaller situation where Anne or some alternative to Anne is engaged in drinking whiskey or some alternative action to drinking whiskey are such that there is a smaller situation where Anne is drinking whiskey.

$$(86) \quad \text{Most } s [\exists s' [s > s' \wedge \exists x \in \text{ALT}(\text{Anne}) \wedge \exists P \in \text{ALT}(\lambda y \lambda s''. \text{drink-whiskey}(y,$$

$$\quad s'')) [P(x, s')]]$$

$$\quad [\exists s' [s > s' \wedge \text{drink-whiskey}(\text{Anne}, s')]$$

But this is not the reading we are after. For it to be true, Anne would have to drink whiskey most of the times when one of the persons she stands in some “natural” relation to drinks whiskey, drinks vodka, smokes weed etc. That means, the sentence would only be true if most of the time Anne’s friends/colleagues drink whiskey, drink vodka, smoke weed etc., Anne would also be present and drink whiskey. But this reading is of course much too strong. Intuitively, we do not want the adverb to quantify over any situation where Anne or some alternative to Anne is engaged in some alternative to drinking whiskey. Rather, we want it to quantify only over those situations where Anne and her friends are present together, and where they are furthermore all engaged in either drinking whiskey or some alternative to drinking whiskey.

Of course, we could add an additional covert predicate that would limit the set of situations quantified over in the right way, but I do not think that this solution is very attractive: It necessitates an additional step, and it is not at all clear what exactly triggers this step. Note furthermore that we would have gotten just the same result as in (84) if there had been a focus on *Anne* and a focus on the VP, i. e. the additional information resulting from the

fact that *Anne* is marked as a contrastive topic would be completely lost. I will therefore propose that the set given in (81) is made use of in a slightly different way right from the start.

Let us assume that with respect to the “inner” sets in (81), i. e. with respect to the focus alternatives to *drinking whiskey* for each alternative to *Anne*, we proceed just as above: We apply the operation of generalized set union to each of these sets. This gives us the set in (82)/(83). But let us furthermore assume that to this set we do not apply set union, but rather intersection. This gives us the set in (87):

$$(87) \quad \{s: \exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{drink-whiskey}(x, s'')) [P(\text{Anne}, s')]] \\ \wedge \exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{drink-whiskey}(x, s'')) [P(\text{Peter}, s')]] \\ \wedge \dots \}$$

Once this is done, we no longer quantify over a set including any old situation such that there is a smaller situation where either Anne or some alternative to Anne is engaged in either drinking whiskey or some alternative action, but over a much more restricted set: The set of (minimal) situations such that there is a smaller situation for each alternative to Anne plus Anne herself where the respective person is engaged in some alternative to drinking whiskey. That means, we are kicking out all situations where it is not the case that Anne and all the alternative persons are present together and are consuming some kind of drug. And this is exactly what we want. Consider the final representation in (88):

$$(88) \quad \text{Most } s [\exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{drink-whiskey}(x, s'')) [P(\text{Anne}, s')]] \\ \wedge \exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{drink-whiskey}(x, s'')) [P(\text{Peter}, s')]] \\ \wedge \dots] \\ [\exists s' [s > s' \wedge \text{drink-whiskey}(\text{Anne}, s')]]$$

According to this analysis, the sentence now says on its second reading that most complex situations such that there is a smaller situation of Anne consuming some drug and a smaller situation of Peter consuming some drug, ... are complex situations such that there is a smaller situation of Anne drinking whiskey. That means it is no longer necessary for (77b) to be true that always when some friend/colleague etc. of Anne consumes some kind of drug, Anne is also present and drinks whiskey. Rather, it suffices that every time Anne and all those people are present together, and are furthermore consuming some kind of drug, Anne is drinking whiskey. This corresponds to the second reading we were after. Furthermore, in contrast to the

representation that would result from applying set union twice (see (86)), the representation in (88) accounts for the intuition that (77b) also on its second reading feels incomplete (as sentences containing a contrastive topic always do) and needs to be succeeded by sentences that tell us what kind of drug all the other people Anne is contrasted with consume in the complex situations quantified over by the Q-adverb.

The question of course is why we should be allowed to apply generalized set intersection to the set in (82)/(83), which itself is the result of applying set union to the “inner” sets (of sets of situations) in (81). At the moment I only have a rather speculative answer to this question: I assume that set union as well as set intersection are such simple, basic operations that it is in principle always possible to apply any of them to objects like focus or topic semantic values in the course of deriving restrictions for Q-adverbs – It depends on the respective object which operation or combination of operations makes sense. In the case above, applying set union twice would have resulted in a loss of information – it would have destroyed the extra layer induced by contrastive topic marking. Furthermore, the fact that the sets to be intersected contained sets of complex situations made it possible that the result would not be the empty set. Therefore, applying set intersection as the second step was the most reasonable option: It enabled retaining the extra information resulting from topic marking (in contrast to double focus marking).

Let me add a note of caution before we proceed: I do not want to claim that hearers are able to arrive at complete semantic representations like (88) when the respective sentences are presented to them without a context. Without a context, a sentence like (77b) is far more likely to be interpreted as in (78) than it is likely to be interpreted as in (88). There is an obvious reason for that: While in sentences involving contrastive topics the topic semantic value can never be computed without a context that makes available a suitable set of alternatives to the constituents marked as contrastive topics, there is a crucial difference between the two readings of (77b) just discussed: In the first reading, at least the ordinary semantic value (given in (78)) can be computed without a context, as the restriction contains enough information to get a sensible interpretation. The topic semantic value therefore only comes into play at the level of the discourse, while it does not affect the truth conditions directly. This, however, does not hold with respect to the second reading: In this case the (final version of the) ordinary semantic value of the whole clause can only be computed after the topic semantic value of a part of the clause (i. e. the nuclear scope of the Q-adverb) has been computed. Of course, this is impossible without knowing the alternatives. Nevertheless I think that even without context a sentence like (77b) has two different readings, the only

difference being that in the second case it is impossible to arrive at a complete semantic representation. Rather, there is a “feeling” what such an interpretation would look like and what would be necessary to arrive at one: Namely, knowing the alternatives to *Anne*.

As will become clear soon, it is very plausible to assume that the process by which sentences with singular definites marked as contrastive topics (when they are presented without a context) get QV-readings is similar to the one just described. This is the reason why I presented (77b) without context and discussed the complicated process of arriving at a semantic representation that would have been available much easier if a suitable context had been provided.

So where do we stand now? The question to decide was whether DPs marked as contrastive topics are interpreted in the restriction *and* the nuclear scope, or exclusively in the nuclear scope of Q-adverbs. I have tried to get empirical evidence by looking at simpler examples with proper names as contrastive topics. It turned out that there are readings of such sentences that crucially depend on the contrastive topic being mapped onto the restriction (see the semantic representation of (77b) given in (80)). But there are also readings that seem to depend on the possibility to interpret the respective contrastive topic exclusively in the nuclear scope (see the semantic representation of (77b) given in (88)). I take this as evidence that contrastive topics can either be interpreted in the restriction *and* the nuclear scope, or exclusively in the nuclear scope of Q-adverbs: In the first case, the topic semantic value only plays a role at the discourse level, while in the second case it is made use of in order to determine the restriction of the respective Q-adverb. This double behaviour is exactly what we would expect if Krifka’s (1998) analysis of contrastive topics as constituents that receive focus as well as (some kind of) topic marking is correct, and if furthermore the mapping algorithm is sensitive to focality as well as to topicality⁴³.

3.2.2 The final analysis of QVE in sentences with singular definites marked as contrastive topics

Let us now return to the question why sentences with singular definites marked as contrastive topics get “QV-like” readings even when they are presented without context. Consider again (69), which is repeated below as (89).

(89) The [PIANO]_{CT} player is usually INTELLIGENT.

⁴³ The mapping algorithm I assume will be made more precise in section 4.

Above I took it for granted that the topic semantic value of a sentence like (89) comes into play at the level of the complete clause. I therefore assumed that the topic semantic value of this sentence would be a set like the one given in (71) (repeated below as (90)), and tried to decide how the sentences in this set are interpreted, i. e. which part is mapped onto the restriction, and which part is mapped onto the nuclear scope.

- (90) { {The piano player is usually intelligent, The piano player is usually stupid},
 {The drummer is usually intelligent, The drummer is usually stupid},
 {The bass player is usually intelligent, The bass player is usually stupid}, ... }

But maybe this was a little bit too hasty. If our discussion in the last section was on the right track, there are also cases where the topic semantic value of only a part of the clause – the clause minus the Q-adverb, i. e. the nuclear scope – was made use of in order to determine the restriction of the respective Q-adverb. Let us therefore see where we get if we try to determine the restriction of the Q-adverb on the basis of the topic semantic value of the nuclear scope, i.e. let us simply proceed in analogy to the process by which (77b) got its second reading. Note that as we want to account for the fact that (89) gets a reading according to which the piano players vary with the situations quantified over, the NP-internal situation predicate has to be interpreted as a variable bound by the Q-adverb. I. e. we have to assume that after the definite DP has been reconstructed into its base position – which is possible because of the fact that it is also focus marked (see above) – a (situation variable) binding operator is inserted directly beneath the Q-adverb⁴⁴(as discussed in section 3.1 above). This has the consequence that we start with a representation like the one in (91) below.

- (91) Most s [C (s)] [$\exists s' [s > s' \wedge \text{is intelligent} (s', \sigma\{x: \text{piano player}(x, s')\})]$]

What needs to be done next is computing the topic semantic value of the nuclear scope. That means we have to define plausible alternatives to the predicates *piano player* and *be intelligent*, respectively. In both cases it is not too hard to come up with such alternatives: In the first case, predicated like *saxophone player*, *drummer* etc. come to mind, in the second

⁴⁴ Of course this will only be legitimate in the end if we manage to resolve the C-variable in the restrictor to a situation predicate that characterizes a set of situations such that each situation in that set can plausibly be assumed to contain exactly one individual that satisfies the NP-predicate. But determining such a situation predicate on the basis of the topic semantic value of the clause is what we are ultimately after.

case a predicate like *be stupid* is the obvious option. Having decided on these matters, a set like the one given in (92) below can be computed:

$$(92) \quad \{ \{ \{ s: \exists s' [s > s' \wedge \text{is-intelligent}(s', \sigma\{x: \text{piano player}(x, s')\})] \} \}, \\ \{ \{ s: \exists s' [s > s' \wedge \text{is-stupid}(s', \sigma\{x: \text{piano player}(x, s')\})] \} \}, \\ \{ \{ s: \exists s' [s > s' \wedge \text{is-intelligent}(s', \sigma\{x: \text{saxophone player}(x, s')\})] \} \}, \\ \{ \{ s: \exists s' [s > s' \wedge \text{is-stupid}(s', \sigma\{x: \text{saxophone player}(x, s')\})] \}, \dots \}$$

The next step consists in applying generalized set union to the “inner” sets in (92). This gives us the set in (93), which is equivalent to the one in (94):

$$(93) \quad \{ \{ s: \exists s' [s > s' \wedge \text{is-intelligent}(s', \sigma\{x: \text{piano player}(x, s')\})] \\ \vee \exists s' [s > s' \wedge \text{is-stupid}(s', \sigma\{x: \text{piano player}(x, s')\})] \} \}, \\ \{ \{ s: \exists s' [s > s' \wedge \text{is-intelligent}(s', \sigma\{x: \text{saxophone player}(x, s')\})] \\ \vee \exists s' [s > s' \wedge \text{is-stupid}(s', \sigma\{x: \text{saxophone player}(x, s')\})] \} \}, \dots \}$$

$$(94) \quad \{ \{ s: \exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{is intelligent}(x, s'')) [P(s', \sigma\{x: \text{piano} \\ \text{player}(x, s')\})] \} \}, \\ \{ \{ s: \exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{is intelligent}(x, s'')) [P(s', \sigma\{x: \text{saxophone} \\ \text{player}(x, s')\})] \} \}, \dots \}$$

Now the final step consists in applying generalized set intersection to the set of sets of situations in (94). This gives us the set in (95):

$$(95) \quad \{ s: \exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{is intelligent}(x, s'')) [P(s', \sigma\{x: \text{piano} \\ \text{player}(x, s')\})] \} \wedge \exists s'' [s > s'' \wedge \exists P \in \text{ALT}(\lambda x \lambda s'''. \text{is intelligent}(x, s''')) \\ [P(s'', \sigma\{x: \text{saxophone player}(x, s'')\})] \wedge \dots \}$$

If the characteristic function of the set in (95) gets mapped onto the restriction of the Q-adverb (as shown in (96)), the Q-adverb quantifies over a set of situations s that includes a smaller situation s' such that the unique piano player in s' is either stupid or intelligent in s' , and a smaller situation s'' such that the unique saxophone player in s'' is either intelligent or stupid in s'' , etc. In other words, the Q-adverb quantifies over a set of situations s that includes the only person that is a piano player in s , the only person that is a saxophone player in s , etc.

- (96) Most s [$\exists s' [s > s' \wedge \exists P \in \text{ALT}(\lambda x \lambda s''. \text{is intelligent}(x, s'')) [P(s', \sigma\{x: \text{piano player}(x, s')\})] \wedge \exists s'' [s > s'' \wedge \exists P \in \text{ALT}(\lambda x \lambda s'''. \text{is intelligent}(x, s''')) [P(s'', \sigma\{x: \text{saxophone player}(x, s'')\})] \wedge \dots]]$
 $[\exists [s > s' \wedge \text{is intelligent}(s', \sigma\{x: \text{piano player}(x, s')\})]]]$

(96) is of course of no use, as it stands, as it gets us into another incarnation of the vicious cycle already discussed in section 3.1: The uniqueness presuppositions associated with the respective definite determiners are only fulfilled if it can plausibly be assumed that each of the situations quantified over contains exactly one individual that satisfies the respective NP-predicate, while at the same time the fact that each of them contains the objects denoted by the respective definite DPs is the only thing that is known about the situations quantified over.

But now remember from section 3.1 that there are cases where it seems to be possible to accommodate a suitable value for the C-variable in the restrictor of a Q-adverb to be resolved to merely on the basis of clause internal information – that is, in the absence of contextual clues and contrastive topic marking. We assumed this to be possible in the case of (56c), which is repeated below as (97a): As there is a highly familiar predicate that characterizes a set of situations such that each of those situations is known to contain exactly one bride, the C-variable in the restrictor of the Q-adverb can be resolved to this predicate, and (97a) can accordingly be interpreted as shown in (97b) below:

- (97) a. The BRIDE usually wears a lovely DRESS.
 b. Most s [wedding(s)]
 $[\exists s' [s \leq s' \wedge \text{wears-a-lovely-dress}(\sigma\{x: \text{bride}(x, s')\}, s')]]$

Let us now assume that basically the same thing is done in the case of (89), the only difference being that in the case of (97a) a situation predicate that serves to satisfy the presupposition associated with the definite determiner is accommodated on the basis of the ordinary semantic value of the nuclear scope, while in the case of (89) such a predicate is accommodated on the basis of the topic semantic value of the nuclear scope. Admittedly, the situation is even more complicated, as the predicate to be accommodate is also necessary in order to fulfil presuppositions associated with the topic semantic value of the nuclear scope itself.

To be more precise, let us assume that the C-variable in (91) above is not directly resolved to the predicate that characterizes the set in (95) (as shown in (96)), but rather that a situation predicate for this C-variable to be resolved to is accommodated on the basis of the set in (95). It does not seem to be too hard to infer a suitable situation predicate from the information given via this set: It has to be a predicate that characterizes a set of situations such that for each of them there is a unique (with respect to that situation) piano player who is either intelligent or stupid, a unique (with respect to that situation) saxophone player who is either intelligent or stupid, etc. In other words, a situation predicate has to be accommodated on the basis of the alternatives to the constituent marked as the contrastive topic. An obvious choice for such a predicate is the following one: $\lambda s. \text{jazz-concert}(s)$. Let us therefore assume that the C-variable in (93) (repeated below as (98b) gets resolved to this predicate, and that (89) (repeated below as (98a) is accordingly interpreted as shown in (98c):

- (98) a. The [PIANO]_{CT} player is usually INTELLIGENT.
 b. Most s [C(s)] [$\exists s' [s > s' \wedge \text{is intelligent}(s', \sigma\{x: \text{piano player}(x, s')\})]$]
 c. Most s [jazz-concert(s)]
 $[\exists s' [s > s' \wedge \text{is intelligent}(s', \sigma\{x: \text{piano player}(x, s')\})]]$

It is important to note that it was the additional information made available by the topic semantic value of the clause that enabled us to accommodate a suitable situation predicate. As already mentioned in section 3.1, one could think of many predicates that characterize sets of situations such that each situation within the respective set contains exactly one piano-player. While it is of course true that one could also think of many predicates that characterize sets of situations such that each situation within the respective set contains exactly one piano player, exactly one saxophone player, etc., the choice is significantly more limited in the second case. I assume that this is the reason why marking the respective definite DP as a contrastive topic at least in many cases helps to make available “QV-like” readings: The introduction of alternatives to the respective definite DP via the topic semantic value of the nuclear scope helps the hearer to accommodate a suitable situation predicate. After all, the information that each of the situations quantified over not only has to contain exactly one individual that satisfies the respective “original” NP-predicate, but also exactly one individual that satisfies the respective “alternative” predicate for each alternative introduced by the respective topic semantic value in many cases significantly limits the choice of available situation predicates

as compared to the information that each of the situations quantified over has to contain exactly one individual that satisfies the respective “original” NP-predicate.

The same story applies to (70c), the second example mentioned at the beginning of section 3.2, which is repeated below as (99).

(99) The man who drives a [BLUE]_{CT} car is usually INTELLIGENT.

Starting from the initial representation in (100), we get the topic semantic value in (101) – under the obvious assumption that colour predicates like *red* are the natural alternatives to *blue*. After applying the operations from above to this object, we get the set given in (102) below⁴⁵.

(100) Most s [C (s)] [$\exists s' [s > s' \wedge \text{is-intelligent}(s', \sigma\{x: \text{man}(x, s') \wedge \exists s'' [\exists y [\text{car}(y, s'') \wedge \text{blue}(y, s'') \wedge \text{drive}(y, x, s'')]]]]]$]

(101) $\{ \{ \{ s: \exists s' [s > s' \wedge \text{is-intelligent}(s', \sigma\{x: \text{man}(x, s') \wedge \exists s'' [\exists y [\text{car}(y, s'') \wedge \text{blue}(y, s'') \wedge \text{drive}(y, x, s'')]]]] \}$,
 $\{ s: \exists s' [s > s' \wedge \text{is-stupid}(s', \sigma\{x: \text{man}(x, s') \wedge \exists s'' [\exists y [\text{car}(y, s'') \wedge \text{blue}(y, s'') \wedge \text{drive}(y, x, s'')]]]] \}$,
 $\{ \{ s: \exists s' [s > s' \wedge \text{is-intelligent}(s', \sigma\{x: \text{man}(x, s') \wedge \exists s'' [\exists y [\text{car}(y, s'') \wedge \text{red}(y, s'') \wedge \text{drive}(y, x, s'')]]]] \}$,
 $\{ s: \exists s' [s > s' \wedge \text{is-stupid}(s', \sigma\{x: \text{man}(x, s') \wedge \exists s'' [\exists y [\text{car}(y, s'') \wedge \text{red}(y, s'') \wedge \text{drive}(y, x, s'')]]]] \}$, ... }

(102) $\{ s: \exists s' [s > s' \wedge \exists P \in \text{ALT} (\lambda y \lambda s . \text{is-intelligent}(y, s)) [P(s', \sigma\{x: \text{man}(x, s') \wedge \exists s'' [\exists y [\text{car}(y, s'') \wedge \text{blue}(y, s'') \wedge \text{drive}(y, x, s'')]]]] \wedge$

⁴⁵ Note that I chose to interpret the relative clause internal verb episodically, i. e. I assume that the situation variable introduced by it gets bound by a covert existential quantifier. A generic interpretation, where this variable gets bound by a covert generic quantifier, is also possible. With respect to the point under discussion, it does not make much of a difference, so I chose the first option. Note furthermore that I assume that the situation variables contained within the relative clause internal NP and AP are interpreted as variables bound by the covertly inserted existential quantifier (which of course necessitates the insertion of an additional binding operator directly beneath this existential quantifier). Alternatively, one could also assume that they are resolved to w_0 by default.

$$\exists s''' [s > s''' \wedge \exists P \in \text{ALT} (\lambda y \lambda s . \text{is-intelligent} (y, s)) [P(s''', \sigma\{x: \text{man} (x, s''') \wedge \exists s'''' [\exists y [\text{car}(y, s''') \wedge \text{red} (y, s''') \wedge \text{drive} (y, x, s''')]]] \wedge \dots]$$

Now the final step consists in accommodating a suitable situation predicate on the basis of the information available via the set in (102). What is needed is a predicate that characterizes a set of situations such that each situation in this set contains exactly one man that drives a blue car, exactly one man that drives a red car, etc. While it is not as easy to come up with such a predicate in this case as it was in the case of (89), something like $\lambda s. \text{car-race}(s)$ might be a plausible option⁴⁶. This would give us (103) below as the final result.

$$(103) \quad \text{Most } s [\text{car-race}(s)] [\exists s' [s > s' \wedge \text{is-intelligent} (s', \sigma\{x: \text{man} (x, s') \wedge \exists s'' [\exists y [\text{car}(y, s'') \wedge \text{blue} (y, s'') \wedge \text{drive} (y, x, s'')]]]]]$$

Let me recapitulate quickly why marking singular definite DP as contrastive topics (at least in many cases) licenses a co-varying interpretation of the respective DP. The main ingredients of my analysis are given in (104) below:

- (104)
- (i) The definite DP marked as a contrastive topic may get reconstructed. This opens up the possibility of interpreting the NP-internal situation variable as being bound by the respective Q-adverb.
 - (ii) The topic semantic value of the nuclear scope is computed.
 - (iii) First, generalized set union is applied to each of the sets of sets of situations that list the focus alternatives with respect to each topic alternative.
 - (iv) Generalized set intersection is applied to the resulting object.
 - (v) A situation predicate is accommodated such that each situation characterized by this predicate can plausibly be assumed to contain for each alternative listed in the topic semantic value exactly one individual that satisfies the respective NP-predicate.

⁴⁶ If one is willing to take it for granted that for some reason only one man who drives a blue car, only one man who drives a red car etc. is participating at each car race.

Note that my account predicts that the availability of co-varying interpretations of singular definites should depend on the ease by which one is able to infer a predicate that characterizes the set of situations resulting from the application of the two operations above to the topic semantic value of the respective nuclear scope. That means, the easier it is to infer a type of situation from the presence of various people that fulfil the predicates in the set of alternatives, the better the respective sentence should get. This seems to be borne out. In both examples discussed so far it was relatively easy to accommodate a suitable situation predicate on the basis of the information made available. But now consider (105) below:

(105) #The man whose father is [CARPENTER]_{CT} usually has PALE skin.

(105) sounds rather strange out of the blue. I think that this is due to the difficulties one has to accommodate a situation predicate on the basis of the information that could possibly be obtained by applying the strategy from above to (105): We would get a set of situations such that each of them contains a plurality of men having workmen as their fathers. There is no predicate that comes to mind as an obvious candidate for characterizing such a set. But if the C-variable in the restriction of the Q-adverb cannot be resolved to a suitable predicate, the presupposition associated with the definite determiner is not satisfied if the NP-internal situation variable is interpreted as a bound variable. On the other hand, interpreting the definite DP as unique with respect to some other situation is in conflict with the matrix verb's being an individual level predicate. The oddity of (105) is therefore not surprising on my account.

Note that the oddity of (105) cannot be due to the absurdity of the generalization it expresses (given our real world knowledge), as (106a) and (106b), where the definite description has been replaced by a singular indefinite and a bare plural, respectively, are perfectly acceptable (albeit rather absurd).

- (106) a. A man whose father is [CARPENTER]_{CT} usually has PALE skin.
b. Men whose father is [CARPENTER]_{CT} usually have PALE skin.

I think that the contrast between (105) on the one hand, and (106a, b) on the other, offers additional evidence for my account: In (106a, b), there is no need to accommodate a situation predicate on the basis of the topic semantic value of the respective nuclear scope. Rather, the respective indefinite may (also) be interpreted in the restrictor of the respective Q-adverb, i. e.

it does not have to be reconstructed into its base position⁴⁷. This has the following consequences: (a) The topic semantic value only comes into play at the level of the discourse (as in the first reading of (77b) discussed in section 3.2.1.2). (b) The respective NP-internal situation variables cannot be interpreted as variables bound by the respective Q-adverb, but rather need to be resolved to w_0 by default. This, however, is unproblematic, as co-variation of the respective individuals with the situations quantified over in the case of indefinites is possible simply in virtue of the inherent semantics of the indefinite determiner⁴⁸: It may pick out a different individual in each situation even if the set it operates on remains constant.

This is just the other way around as in sentences with singular definites: While there we have to know which situations the respective Q-adverb quantifies over in order to interpret the DP, in the case of singular indefinites or bare plurals the situations quantified over are defined on the basis of the denotation of the respective DP. All that is known about those situations is that each of them is a minimal situation that contains an individual satisfying the predicate denoted by the respective NP. Let us assume that in the default case those situations, while being minimal in the sense that they do not contain anything apart from what is necessary to satisfy the respective situation predicate, are temporally maximal with respect to the individuals picked out, i. e. they in the case of individual level predicates comprise the whole time of existence of the respective individual. I will come back to this point in chapter 3, where the problem of temporally locating the situations quantified over will be discussed in more detail.

In this section I have given an account of why marking a singular definite DP as a contrastive topic increases the availability of QV-readings when the respective sentences are presented without any context. In section 4 I want to take up a problem that was left open at the end of section 3.2: Why do universally quantified DPs have to be c-commanded by Q-adverbs in order to get a co-varying interpretation, while this is not true for singular definites, in spite of the fact that co-variation in both cases is achieved by the respective NPs containing a situation variable that is bound by the respective Q-adverb? As already mentioned, in order to answer this question properly and at the same time offer an account of how sentences containing singular definites get QV-readings, I have to develop a mapping algorithm that

⁴⁷ We will see in section 4 how such an interpretation comes about in detail.

⁴⁸ Which is realized overtly in (106a) and – according to most theories of bare plurals (cf. Diesing (1992), Krifka et al (1995), Chierchia (1998) among many others) – covertly in (106b), irrespective of the question whether it is assumed to be part of the lexical semantics, or assumed to be inserted via a type shifting operation (see chapter 3 for additional discussion).

slightly deviates from the assumptions made within the situation semantics framework argued for in this dissertation.

4 A New Mapping Algorithm

4.1 The basic problem repeated

Remember the pattern repeated below. (107a), where the Q-adverb c-commands the quantificational DP is fine and easily gets a reading according to which the members of the set denoted by the first argument of the quantificational determiner vary with the situations bound by the Q-adverb, while (107b) is very strange: The quantificational DP can only be interpreted as having scope over the Q-adverb, and the sentence accordingly says that every man has long blond hair in most (relevant) situations. This is of course in conflict with the tendency to interpret the predicate *have long blond hair* as an individual level predicate.

- (107) a. Heavy-metal concerts are very funny: Usually, every man has long blond HAIR (and is very MUSCULAR).
b. Heavy-metal concerts are very funny: ^{??}Every man usually has long blond HAIR and is very MUSCULAR.

Remember that in section 2 I proposed that the (initially) free situation variables contained within the NP-complements of quantificational as well as definite determiners can only become bound by a Q-adverb if this Q-adverb c-commands the respective DP at LF. I argued that this is due to the following fact: A binding operator needs to be inserted directly beneath the Q-adverb. This has the consequence that every variable c-commanded by the binding-operator that bears the same index as this operator becomes lambda-bound.

This assumption explains immediately why (107a) is fine: Both the Q-adverb and the quantificational DP may stay in their surface positions at LF, and the situation variable contained within the NP-complement of *every* can be turned into a bound variable via the insertion of a binding operator directly beneath *usually*. Note, however, that it is less obvious why (107b) is bad: After all, the quantificational DP has been base generated in a position that is c-commanded by the Q-adverb, and we have already seen that DPs may in principle be reconstructed at LF. This is even more problematic in light of the following fact, which was already mentioned in sections 3.1 and 3.2: In the case of adverbially quantified sentences that contain definite DPs, co-varying interpretations are possible even if those DPs c-command the

respective Q-adverb overtly. The only constraint that has to be met in order for those readings to be available is that the respective DPs need to contain a focus-accent⁴⁹. The relevant pattern is repeated in (108) below.

- (108) a. I love going to jazz-concerts:
b. The PIANO-player is usually INTELLIGENT (and it's nice to talk to him after the show).
c. ^{??}The piano player is usually INTELLIGENT (and it's nice to talk to him after the show).

Note furthermore that in the case of adverbially quantified sentences that contain singular definites, fronting the Q-adverb sounds (a little) less natural in a neutral context than it does in the case of adverbially quantified sentences with universally quantified DPs. Furthermore, a co-varying interpretation is again only available if the respective definite DP bears a focus-accent:

- (109) a. I love going to jazz-concerts:
b. ^(?)Usually, the PIANO-player is INTELLIGENT (and it's nice to talk to him after the show).
c. ^{??}Usually, the piano player is INTELLIGENT (and it's nice to talk to him after the show).

In order to explain the pattern under discussion, it might be useful to have a closer look at the behaviour of singular indefinites in adverbially quantified sentences, as there is a rich body of literature that deals with the influence of word order and/or intonation on the interpretation of those sentences (Diesing (1992), de Swart (1993), von Stechow (1994), Chierchia (1995a), Krifka (1995, 2001), Kratzer (1995), Rooth (1995), Herburger (2000) a. o.).

4.2 The role of word order and intonation in adverbially quantified sentences with indefinites

Remember that in English it is only the accent pattern that decides whether an indefinite gets mapped onto the restriction or onto the nuclear scope of a Q-adverb: Indefinites that are de-

⁴⁹ Let us ignore contrastive topicality for the moment. I will come back to this point at the end of section 4.

accented with respect to the matrix verb get mapped onto the restriction (see especially Rooth (1995), von Stechow (1994), Krifka (1995, 2001) and Herburger (2000) for discussion), while definites that bear a strong (i. e. focus-) accent are exclusively interpreted in the nuclear scope. Therefore, (110a) below gets a reading that intuitively can be paraphrased as “Most dogs chase cats”, while (108b) below says that most cats are chased by dogs

- (110) a. A dog usually chases a CAT.
b. A DOG usually chases a cat.

Note furthermore that this generalization is also true of sentences where the respective Q-adverb has been fronted. (111a) therefore gets the same reading as (110a), while (111b) is interpreted like (110b).

- (111) a. Usually, a dog chases a CAT.
b. Usually, a DOG chases a cat.

In German, on the other hand, word order plays a decisive role in determining whether an indefinite gets mapped onto the restriction or onto the nuclear scope: An indefinite that has been scrambled across a Q-adverb gets mapped onto the restriction, while an indefinite that occupies a VP-internal position gets mapped onto the nuclear scope of the respective Q-adverb (see Diesing (1992) and Kratzer (1995)). Therefore, (112a) gets the same reading as (110a) (and (111a)), while (112b) is interpreted like (110b) (and (111b)):

- (112) a. ... weil ein Hund meistens eine KATZE jagt.
because a dog usually a cat chases
b. ... weil eine Katze meistens ein HUND jagt.
because a cat usually a dog chases

But in cases where the Q-adverb has been fronted, it is also the intonation that decides on the interpretation of the respective indefinites: Ones that are de-accented get mapped onto the restriction, while ones that bear a focus-accent get mapped onto the nuclear scope. (113a) is therefore interpreted like (110a), while (113b) gets the same reading as (110b):

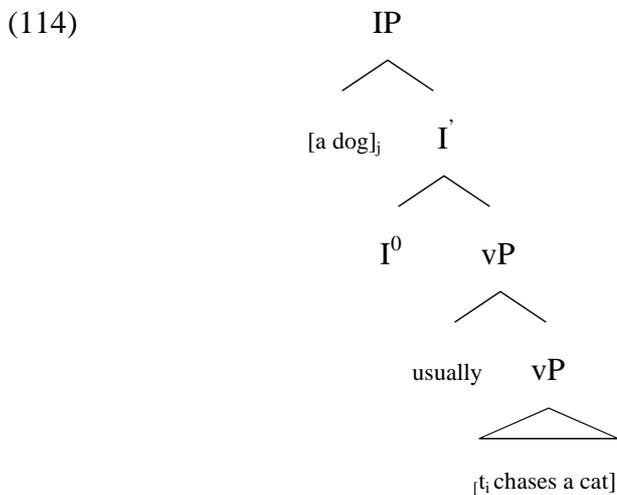
- (113) a. Meistens jagt ein Hund eine KATZE.

Usually chases a dog a cat.

b. Meistens jagt ein HUND eine Katze

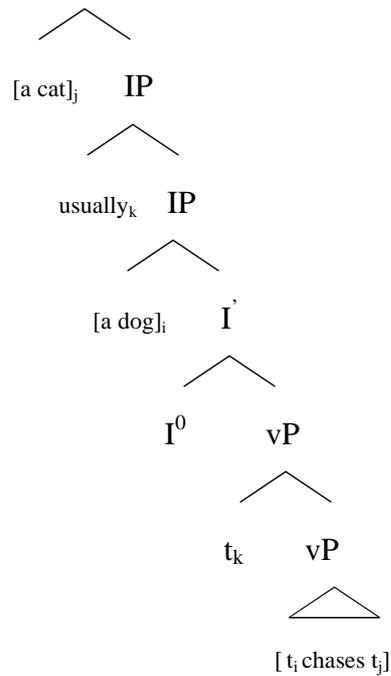
Building on Diesing (1992), Chierchia (1995a) proposes a mapping algorithm that is intended to account for the role of intonation as well as the role of word order. He assumes that what happens overtly in German happens at LF in English: Indefinites that c-command a Q-adverb are mapped onto the restriction of this Q-adverb, while ones that are c-commanded by it get mapped onto the nuclear scope.

Chierchia (ibid.: 137) assumes that in English, where there is no overt scrambling, the respective configurations come about by means of the following types of movement: On the one hand, the Q-adverb itself may move in a “QR-like” fashion and adjoin to any “propositional” constituent (i. e. VP (under the assumption that all arguments of the verb are contained therein), IP and CP), where this movement is optional. On the other hand, topical DPs (where topicality is signalled by de-accenting) have to be “LF-scrambled” to positions directly above the Q-adverb. That means, (110a) would (roughly) be represented as given in (114) at LF, while (110b) would be represented as given in (115) below⁵⁰.



(115) IP

⁵⁰Note that in the case of (115) it could also be assumed that the subject DP *a dog* gets reconstructed into its vP-internal base position. Then, the movement of the Q-adverb into its IP-adjoined position would not be necessary, as it would c-command the subject DP from its base position. I will come back to this point soon.



Note that according to this mapping algorithm, information structure does not directly determine the semantic representation of sentences that contain Q-adverbs. Rather, information structure regulates movement operations that result in an LF-configuration which finally feeds semantic interpretation.

Concerning the interpretation of LFs like the ones above, Chierchia (ibd.) assumes that Q-adverbs may not only bind situation variables, but also individual variables, and that indefinites, while being born at the type of generalized quantifiers, may be turned into open expressions containing a free individual variable via a mechanism called *existential disclosure*, which he borrows from Dekker (1990). As these assumptions are incompatible with the view argued for in this dissertation that Q-adverbs may only bind situation variables, I will not go into the details any further. Suffice it to say that the semantic representations Chierchia (1995a) finally arrives at are very similar to the ones assumed by proponents of more standard unselective binding theories like Diesing (1992) and Kratzer (1995).

I will for the moment set aside the question of how LFs like the ones above are interpreted in a situation semantics framework (I will come back to this point soon), and concentrate on the question how adverbially quantified sentences are represented at LF. Let us in the next section try to find out whether Chierchia's (1995a) mapping algorithm – or, to be more precise, a mapping algorithm that is largely based on the one argued for by Chierchia (ibd.) – can help us explain the pattern repeated in section 4.1. As already mentioned in

sections 2 and 3, the mapping algorithm under consideration seems to be more promising in this respect than the ones standardly assumed in situation/event semantics approaches to adverbial quantification – for the simple reason that in those approaches the LFs of all adverbially quantified sentences are structurally identical insofar as the respective Q-adverb is moved into a peripheral position from which it c-commands the rest of the clause. This, however, is problematic, as it predicts the availability of co-varying interpretations to be independent of the surface c-command relations that hold between Q-adverbs and DPs that contain situation variables to be bound by those Q-adverbs. Let us therefore see in the next section how far we get if we assume that topical DPs need to c-command Q-adverbs at the latest at the level of LF.

4.3 The role of word order and intonation in adverbially quantified sentences that contain singular definites and universally quantified DPs

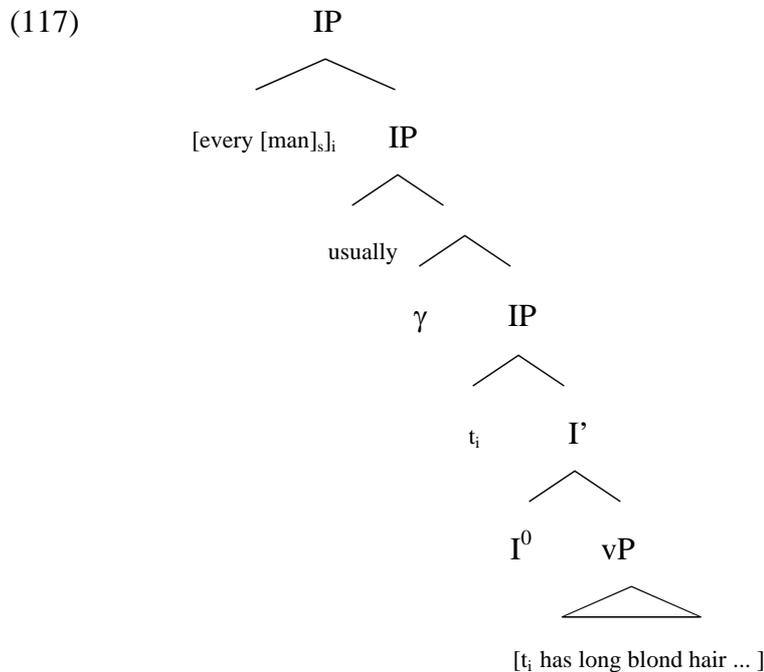
4.3.1 The situation in English

In (116) below the pattern repeated in section 4.1 is given again. Note that I – in contrast to Chierchia (1995a) – assume that the Q-adverbs in (116a) have been base-generated in left-peripheral position:

- (116) a. Heavy-metal concerts are very funny: Usually, every man has long blond HAIR (and is very MUSCULAR).
b. Heavy-metal concerts are very funny: ^{??}Every man usually has long blond HAIR (and is very MUSCULAR).
c. I love going to jazz-concerts: ^(?)Usually, the PIANO player is very INTELLIGENT (and it's nice to talk to him after the show).
d. I love going to jazz concerts: The PIANO player is usually very INTELLIGENT (and it's nice to talk to him after the show).

Let us have a closer look at (116a) first: The quantified DP is de-accented, and it is furthermore c-commanded by the Q-adverb, which presumably has been moved into an IP-adjoined position. Now the question of course is how the fact that the DP is de-accented is to be interpreted? Proceeding in a mechanical fashion, one would have to assume that this signals topicality. Now, according to the mapping algorithm tentatively assumed in this section, this would have the consequence that the DP needs to be moved into an IP-adjoined

position directly above the Q-adverb, as given in (117) below (Note that the (situation variable) binding operator that can optionally be inserted directly beneath the Q-adverb is given below as γ):



Note that I have indicated the fact that the NP complement of *every* contains a (free) situation variable by adding an *s*-subscript to the NP *man*. Of course the insertion of the binding operator in (117) does not have the consequence that this situation variable is turned into a variable bound by the Q-adverb, as it is not c-commanded by this operator. The LF in (117) does therefore not give rise to a co-varying interpretation of the universally quantified DP.

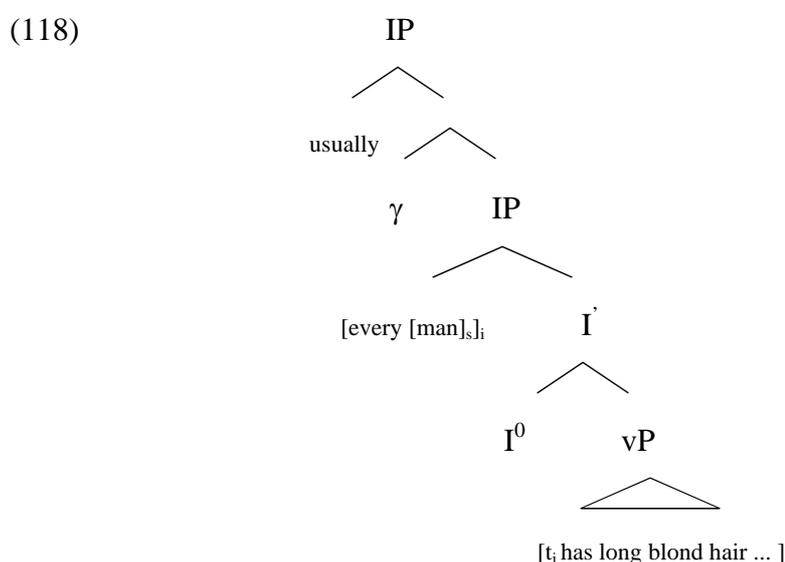
But now note that according to many theories the only quantificational DPs that can be topical are indefinites (Jäger (1995), Cresti (1995); but see Ebert and Endriss (2004) for a slightly different view). While I do not want to go into this discussion too deeply, as it would take us too far afield, I nevertheless want to remind the reader of the following well-known fact: In German, the only DPs that can be left-dislocated are proper names, definite DPs and (unmodified) indefinites, while other quantificational DPs are not allowed in this position⁵¹. It is furthermore often assumed that left-dislocation signals (aboutness-) topicality (see Frey

⁵¹ Left-dislocated constituents occupy the left-peripheral position of a clause and have to be taken up by a fronted D-pronoun, as shown in (i) and (ii) below:

- (i) Ihren Hund, den mag Maria.
Her-ACC dog, DEM-ACC likes Maria.
- (ii) Ein Hund, der ist meistens schlau.
A-NOM dog, DEM-NOM is usually smart.

(2002) for a recent overview over the discussion and further references). Let us therefore assume that in spite of being de-accented, the universally quantified DP in (116a) cannot be interpreted as topical. This has the consequence that it is not subject to the mapping algorithm under consideration, i.e. it does not have to be moved into a position where it c-commands the Q-adverb at LF⁵².

Under this assumption, (116a) gets the LF representation in (118), where no further covert movement has taken place. In (118) the Q-adverb does c-command the DP, and therefore also the situation variable within the NP, i. e. inserting a binding operator below the Q-adverb has the effect of turning the DP-internal situation variable into a bound variable:

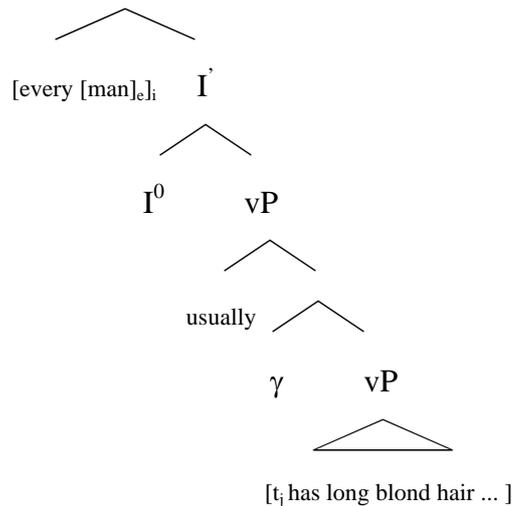


I therefore assume that the availability of the LF in (118) is the reason why (116a) can be interpreted in the desired way.

Let us now turn our attention to (116b). There, the quantificational DP is de-accented and furthermore c-commands the Q-adverb overtly. That means, the most plausible LF for (116b) is the one given in (119) below, where no covert movement operation has taken place:

(119) IP

⁵² Although this would of course be possible, as it is a quantificational DP and can therefore be moved via QR, irrespective of our mapping algorithm.



In (119) the insertion of the binding operator again does not have the effect of turning the DP-internal situation variable into a bound variable. So, if (119) was the only LF representation our mapping algorithm could possibly generate for (116b), we would have an account of the deviant status of the sentence: The DP-internal situation variable can only be resolved to w_0 (or to some salient situation, if the context makes available such a situation), which is in conflict with the matrix verb's being an individual level predicate.

But is (119) really the only LF that is available for this sentence? In other words, can the universally quantified DP be reconstructed into its base position at LF? Note that the mapping algorithm under consideration does not offer an answer to this question: As the universally quantified DP can not be considered a topic anyway, it is not forced to c-command the Q-adverb at LF. But interestingly, if we take a closer look at example (57) (from Chomsky (1993: 35)), which was already discussed in section (3.1), it turns out that the possibility to reconstruct the DP into its base position is largely influenced by whether it is focussed or de-accented. Consider the two variants of this example given in (120) below.

- (120) a. Someone from New York is likely to win the LOTTERY.
 b. Someone from New YORK is likely to win the lottery.

(120a), where the subject DP is de-accented relative to *lottery*⁵³, is preferably interpreted as saying there is a specific person such that this person is likely to win the lottery. In other words, the subject DP tends to remain in its surface position at LF, where it has scope over *likely*. (120b), on the other hand, is preferably interpreted as saying that it is likely that some

⁵³ Of course, being a subject, the DP in (120a) can not be completely de-accented, but has to receive at least a weak secondary accent (see Büring (2003) for discussion).

person or other from New York wins the lottery. In other words, the subject DP in this case prefers to be reconstructed into its base position at LF, where *likely* has scope over it. If we try to make sense of this fact as well as of the fact that the universally quantified DP in (116b) does not get a co-varying interpretation, the following principle suggests itself:

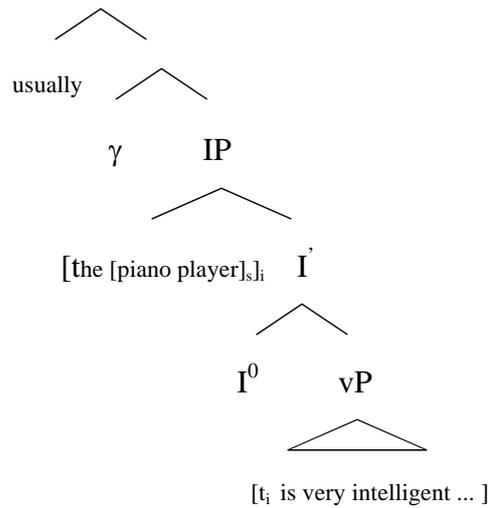
- (121) Focal DPs prefer to be reconstructed into their base positions, while non-focal DPs prefer to stay within their surface positions.

It would of course be interesting to see whether (121) – which only has the status of an unexplained observation – can be derived from some other, more basic principle⁵⁴. Likewise, one would like to know why in the case of (116b) it seems to be completely impossible to reconstruct the quantificational DP, whereas in the case of (120a) the quantificational DP only prefers to stay within its surface position. Unfortunately, I do not have a conclusive answer to those questions at the moment. Let us nevertheless assume that something like (121) is responsible for the fact that (119) is the only LF representation that is available in the case of (116b).

So the mapping algorithm under consideration in combination with the principle in (121) accounts quite successfully for the contrast between (116a) and (116b). Let us see whether it also accounts for the second part of the pattern, i. e. for the fact that a co-varying interpretation is available in the case of (116c) as well as in the case of (116d). Let us first have a closer look at (116c): The Q-adverb c-commands the DP overtly, which furthermore contains a focus accent itself – in addition to the focus accent on the matrix verb. This leads to the LF representation in (122) below, where no covert movement operation has taken place, as nothing more needed to be done in order to generate an LF that conforms to our mapping algorithm.

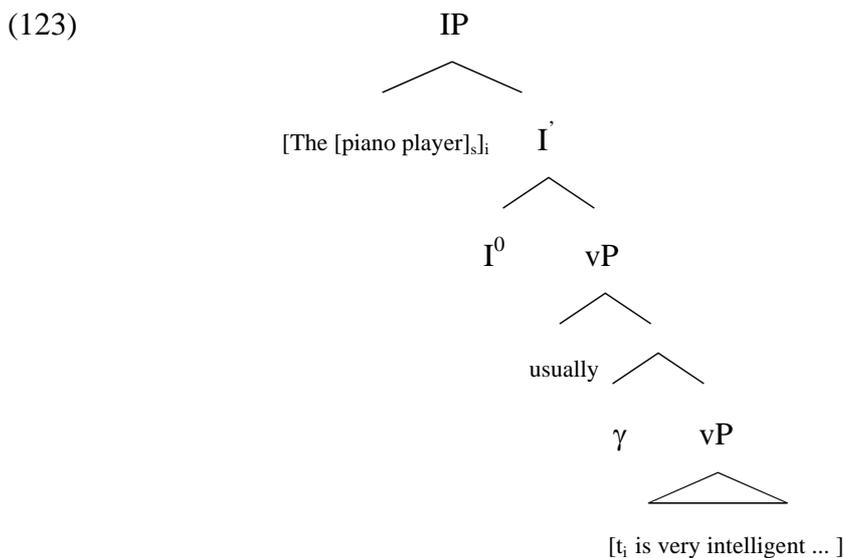
(122) IP

⁵⁴ It is obviously connected to the fact that VP (or vP) is the domain where focus accents are preferably assigned.



In (122) the DP-internal situation variable can of course be interpreted as bound by the Q-adverb, and everything is therefore fine.

Consider next (116d), where the definite DP c-commands the Q-adverb on the surface. The question now is whether at LF any additional operations are allowed/have to take place that alter the c-command-relations between the DP and the Q-adverb. If this were not the case, (116d) should be deviant – contrary to fact – , as it would get the LF-representation in (123), where the DP-internal situation variable cannot be interpreted as being bound by the Q-adverb.



But of course, according to the mapping algorithm (123) is not the only LF that is available in the case of (116d): As the definite DP contains a strong accent and is therefore focal, it does not have to c-command the Q-adverb at LF, but even prefers to be reconstructed into its vP-internal base position (see (121) above). If this is done, the situation variable contained within

it can be interpreted as being bound by the Q-adverb, and a co-varying interpretation is available. Let us therefore assume that (116d) is fine because the definite DP can be reconstructed at LF. Our mapping algorithm therefore also seems to be able to account for the acceptability of both (116c) and (116d).

Note that this makes the prediction already mentioned in section 3.1 that universally quantified DPs that c-command Q-adverbs overtly should be able to get co-varying interpretations when they contain a focus accent. In other words, the minimal variant of (116b) given in (124) below should be fine.

(124) Heavy-metal concerts are very funny: ^{?(?)}Every MAN usually has long blond HAIR (and is very MUSCULAR).

This, however, is not entirely borne out: (124) is still pretty odd, and does not give rise to a co-varying interpretation of the universally quantified DP easily. But why should this be so, i.e. why should there be such a striking contrast between singular definites and universally quantified DPs if we assume that both are subject to the same constraints as far as the availability of co-varying interpretations is concerned?

Remember from the discussion in section 3.1 that I have assumed⁵⁵ that singular definites need to contain a focus accent in order to indicate that they do not pick up a discourse referent that has already been introduced. As singular definites the denotation of which varies with the situations quantified over obviously do not take up a discourse referent that has already been introduced, they need to be focus marked.

Let us assume (as already alluded to in section 3.1) that this is the key to understand the different behaviour of singular definites and universally quantified DPs in adverbially quantified sentences: Because of inherent properties, singular definites always need to contain a focus accent in order to get a co-varying interpretation. This is a by-product of their being “non-given definites” (in the sense of Umbach (2001)). Furthermore, this focus marking enables them to be reconstructed into their base position in case they c-command the respective Q-adverb on the surface. In the case of universally quantified DPs, on the other hand, there is no inherent need to be focus marked, as they are not able to introduce or take up discourse referents anyway (because of their semantic type). But in order to receive a co-varying interpretation they need to be c-commanded by the respective Q-adverb at LF. This is assured in the case of (116a), where the Q-adverb already c-commands the universally

⁵⁵ Following Umbach (2001).

quantified DP on the surface, and there furthermore is no need to alter the c-command relations between the two quantifiers. While it would of course also be assured in the case of (123), because of the possibility to reconstruct the focus marked universally quantified DP at LF, there is no reason to focus mark the universally quantified DP in the first place. In other words, the problem with (124) is not that the focus marked universally quantified DP cannot be reconstructed into its base position, but that it is marked for focus.

That this speculation is on the right track is evidenced by the following fact: If we set up a context where it is rather natural to mark a universally quantified DP that is contained within an adverbially quantified sentence for focus (as in (125) below), this DP receives a co-varying interpretation – which according to our assumptions means that it can be reconstructed into its base position.

- (125) a. Who stands usually in the first row at a Michael Jackson concert?
b. Every girl that is less than FOURTEEN usually stands in the first row at a Michael Jackson concert.

In section 4.3.1 we have seen that the assumptions repeated in (126) can explain the pattern exemplified by the sentences in (116):

- (126) (i) At LF, topical DPs need to occupy a position where they c-command the respective Q-adverbs contained within the same clause.
(ii) In adverbially quantified sentences, DPs need to be focal in order to be reconstructed into their base position.
(iii) Singular definites that receive a co-varying interpretation need to be focus marked, as they do not take up discourse referents that have already been introduced before.
(iv) Universally quantified DPs that receive a co-varying interpretation do not need to be focus marked, as they are unable to take up/introduce discourse referents anyway.

Remember from the discussion in section 3.2 that I assume that also singular definites that are marked as contrastive topics can receive co-varying interpretations even if they c-command the respective Q-adverb at the surface. This is obviously compatible with the results obtained in this section if we (following Krifka (1998)) stick to the assumption already discussed in

section 3.2 that contrastive topics are inherently focus marked: Being focus marked enables them to be reconstructed into their base positions at LF.

In section 4.3.2 I will show quickly that my account of the word order differences between adverbially quantified sentences that contain singular definites, on the one hand, and adverbially quantified sentences that contain universally quantified DPs, on the other hand, also works for German. This will be especially instructive, as in German there is overt scrambling of DPs, i. e. the surface structure can be assumed to be closer to LF than in English.

4.3.2 *The situation in German*

As already mentioned, also in German universally quantified DPs only receive co-varying interpretations if the respective Q-adverb c-commands the DP (at least, if the latter does not contain a focus accent), while this is not true for singular definites. Consider the pattern in (127) and (128) below:

- (127) a. Heavy-Metal Konzerte sind lustig: Heavy metal concerts are funny:
b. Meistens hat jeder Mann lange blonde HAARE (und ist sehr MUSKULÖS).
Usually has every man long blond hair (and is very muscular).
c. ??Jeder Mann hat meistens lange blonde HAARE (...)
Every man has usually long blond hair.
d. ?(?) Jeder MANN hat meistens lange blonde HAARE (...)
Every man has usually long blond hair.
e. weil meistens jeder Mann lange blonde HAARE hat (...)
because usually every man long blond hair has.
f. ??weil jeder Mann meistens lange blonde HAARE hat (...).
because every man usually long blond hair has.
g. ??weil jeder MANN meistens lange blonde HAARE hat (...)
because every man usually long blond hair has.
- (128) a. Paul geht gern in Jazzkonzerte:
Paul goes gladly in jazz concerts:
b. Meistens ist der KLAVIERspieler INTELLIGENT (...)
Usually is the piano player intelligent

- c. ??Der Klavierspieler ist meistens INTELLIGENT.
 The piano player is usually intelligent.
- d. Der KLAVIERspieler ist meistens INTELLIGENT (...)
 The piano player is usually intelligent.
- e. ??weil meistens der KLAVIERspieler INTELLIGENT ist.
 because usually the piano player intelligent is
- f. ??weil der Klavierpieler meistens INTELLIGENT ist (...).
 because the piano player usually intelligent is
- g. weil der KLAVIERspieler meistens INTELLIGENT ist (...).
 because the piano player usually intelligent is

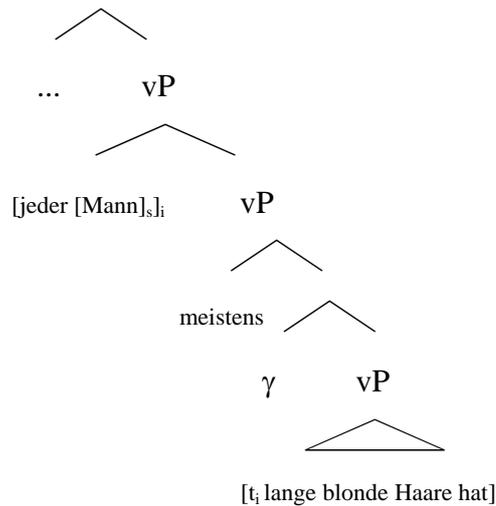
Let us first have a closer look at the sentences in (127). It does not matter whether the quantificational DP and the Q-adverb both remain in the middle field (as in (127e, f, g)) or whether one of the two is moved to Spec, CP (as in (127b, c, d)): The respective sentences are only (fully) acceptable (i. e. only get the “QV-like” reading that is required for their being acceptable) if the Q-adverb c-commands the DP overtly.

Remember that the mapping algorithm of Chierchia (1995a) is basically an extension of Diesing’s (1992) mapping algorithm, which was primarily based on data taken from the German middle field⁵⁶. It is therefore natural to start with (127 e, f, g), where both the Q-adverb and the DP stay within the middle field. As in German scrambling is allowed to take place overtly, we expect the vPs of the embedded clauses in the two sentences to directly reflect the relations that hold at LF between the Q-adverbs and the DP⁵⁷. Under the assumption that this is correct, (129) is the LF representation of (the relevant parts of) (127f, g), and (130) the LF representation of (the relevant parts of) (127e):

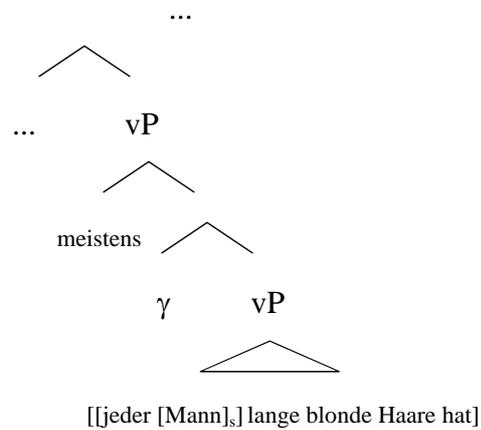
(129) ...

⁵⁶ According to Diesing (1992) (see chapter 1 of this dissertation), bare plurals (which she simply takes to be plural indefinites) that have been scrambled out of the VP get mapped onto the restriction of (overt or covert) Q-adverbs, while bare plurals that stay within the VP get mapped onto the nuclear scope.

⁵⁷ Note that this explains immediately why in the case of (127g) reconstruction is not allowed in spite of the DP’s being focussed, i. e. why also (127g) only gets the LF representation in (129).



(130)



It is by now clear what is wrong with (129): The (free) situation variable contained within the universally quantified DP cannot be turned into a variable bound by the Q-adverb. In (130), on the other hand, this is unproblematic. The only open question concerning those two sentences is the following one: What might have been the trigger for scrambling the universally quantified DP across the Q-adverb?

As we have already seen in the last section, it is rather implausible to assume that universally quantified DPs can be topics. Therefore, scrambling cannot have occurred in order to satisfy the condition in (126i) above. But of course there is another plausible reason why the universally quantified DP might have been moved into a position where it c-commands the Q-adverb: As in German a quantificational DP A can only be interpreted as having scope over a quantificational DP B if either A c-commands B on the surface, or A c-commands the base position of B (see Frey (1993)), the only possibility for the universally quantified DP to be interpreted as having scope over the Q-adverb consists in scrambling it across the Q-adverb.

This view of scrambling is of course incompatible with a view according to which scrambling has a specific trigger, like for example the need to check some kind of “topic feature” (as argued for by Meinunger (2000), for example). It is, however, compatible with the view that scrambling is a freely available process that does not need any specific trigger (cf. Haider and Rosengren (1998)), but which nevertheless must have some effect on the output in order to be licensed – where this effect may either be semantic or phonological (see also Buring (2001a, b) and the references therein for related discussion). Note furthermore that seen in this light the English “LF-scrambling” discussed in the last section and the more familiar type of movement called “QR” can be assumed to be nothing but covert instances of the type of movement that happens overtly in German – namely, scrambling. If this is correct, it is only natural that the economy condition that Fox (2000) assumes to constrain QR⁵⁸ constrains this type of movement in general: While not being feature driven, it nevertheless is only allowed to apply if it has an effect on the output – where in English this effect can of course only be semantic.

So (127e, f, g) behave just as expected. Let us turn next to (127b, c, d). Consider (127b) first, where the Q-adverb occupies the specifier of CP. From there it c-commands the DP, which either – depending on assumptions about German syntax which are not relevant to my concerns here – stays in its vP-internal position or has been moved into Spec, IP. Now the question is whether the Q-adverb in this sentence has been base generated in Spec, CP, or has been moved into that position from a vP-adjoined base position?

There are good reasons to assume that the Spec., CP position in German (that is, in “non-wh-clauses”) is neither associated with a particular (morpho-)syntactic or semantic feature, nor with a particular discourse function: After all, a wide variety of XPs that do not seem to have anything in common (apart from being XPs) are acceptable in this position (see Fanselow (2004)). For this reason, Fanselow (2004) suggests (based on a similar analysis proposed by Holmberg (2002) for Icelandic) that C⁰ in German may either host a wh-feature (in wh-sentences), a focus feature, or an abstract EPP-feature that can be checked by any XP whatsoever. From these assumptions it follows that in the former two cases the closest XP that bears a wh-feature or a focus feature gets attracted, in the latter case it is simply the XP that is closest to C⁰ which gets attracted.

Let us follow Fanselow (*ibid.*), and assume that the Q-adverb in (127b) has neither been base generated in Spec, CP nor been moved into that position in order to serve a

⁵⁸ Fox (2000) offers evidence (mainly from elliptical sentences) that QR in English is only allowed to apply if it has an interpretative effect.

particular discourse function or to make available a particular interpretation, but rather has been base generated in vP-adjoined position, and only occupies Spec, CP because it has been moved there in order to check the EPP-feature hosted by C^0 . But if this is the case, the fact that the Q-adverb in (127b) has been attracted by C^0 is just a reflection of the fact that in the middle field there was no constituent that c-commanded the Q-adverb prior to this attraction. This however means that there has been no scrambling out of vP, and that (127b) has been derived from the vP given in (127e). For that reason, the c-command relations that obtained within the middle field can still be taken as decisive with respect to the mapping algorithm. In other words, let us assume that the EPP-related movement into Spec, CP does not affect interpretation, and that therefore (127b) gets the same LF-representation as (127e) – namely the one given in (130). This explains why (127b) is fine.

In the case of (127c), on the other hand, the quantificational DP has been moved into Spec, CP, which, according to the story above, shows that there was no constituent that c-commanded this DP within the middle field. (127c) therefore must have been derived from the vP given in (129), and is accordingly represented as shown in (129) at LF. This explains why (127c) is odd.

Let us finally turn to (127d). As the quantificational DP in (127d) is focus marked, it does not necessarily follow that it has been attracted by C^0 because of being the closest XP c-commanded by C^0 . Rather, it is also possible that C^0 in this case has been endowed with a focus feature, and therefore did not attract the closest XP whatsoever, but the closest XP that is marked for focus. From this it follows that the quantificational DP might have been attracted from a position where it was c-commanded by the Q-adverb. It therefore should in principle be able to get the LF-representation in (130). But why is it still odd, then – albeit not quite as bad as (127c)?

I assume that the answer to this question is basically the same as the answer to the question why (124) (repeated below as (131)) is bad: There is no plausible reason why the universally quantified DP should be focus marked in the first place.

(131) Heavy-metal concerts are very funny: ^{?(?)}Every MAN usually has long blond
HAIR (and is very MUSCULAR).

That this assumption may be on the right track is evidenced by the fact that the sentence in (132b) below, where (via (132a)) a context has been provided that justifies the focus marking

of the universally quantified DP, though being stilted, is quite acceptable – or at least much better than (127c) (cf. (125) above).

- (132) a. Wer steht bei einem Michael Jackson Konzert meistens in der ersten
Who stands at a Michael Jackson concert usually in the first
Reihe?
row?
- b. ^(?)Jedes Mädchen unter VIERZEHN steht bei einem Michael Jackson
Every girl below fourteen stands at a Michael Jackson
Konzert meistens in der ersten Reihe.
concert usually in the first row.

Therefore also the pattern in (127b-d) can be accounted for by our mapping algorithm, if it is supplemented by independently justified assumptions concerning the German prefield.

Let us turn to the examples in (128) next. I will again start with the embedded clauses. Consider (128e) first: Somewhat unexpectedly, this sentence, where the definite DP stays within its vP-internal base position, is degraded. This seems strange, because normally DPs that contain a focus accent are even strongly preferred to stay within their vP-internal base position. Note furthermore that in the case of (133b) below, where the matrix predicate is de-accented (because it is contextually given via (133a)), is perfectly acceptable with the definite DP staying within the vP – as well as the variant in (133c)), where the definite DP has been scrambled across the Q-adverb.

- (133) a. Welches Bandmitglied ist bei Konzerten meistens gut gekleidet?
Which band member is at concerts usually well dressed?
“Which member of a band is usually well dressed at concerts?”
- b. Peter sagt, dass meistens der PIANIST gut gekleidet ist.
Peter says that usually the piano player well dressed is.
“Peter says that usually the PIANO player is well dressed.”
- c. Peter sagt, dass der PIANIST meistens gut gekleidet ist.
Peter says that the piano player usually well dressed is.
“Peter says that the PIANO player is usually well dressed.”

Also in (134a), where the focus marked definite DP is the direct object of the verb, it is perfectly acceptable within the vP – while the minimal variant in (134b), where it has been scrambled across the Q-adverb, is highly deviant:

- (134) a. Claudia geht mit ihrem Freund nicht gern in Jazzkonzerte,
 Claudia goes with her friend not gladly in jazz concerts,
 b. weil der meistens die PIANISTIN anhimmelt.
 because DEM usually the piano player-FEM adores.
 c. * weil der die PIANISTIN meistens anhimmelt.
 because DEM the piano player-FEM usually adores.
 “Claudia does not like to go to jazz-concerts with her boy-friend, because he usually adores the piano player”.

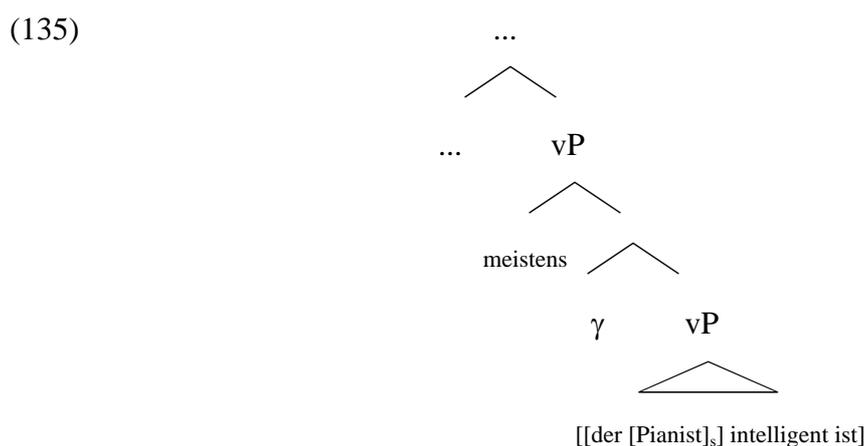
Note that (134b) is most plausibly interpreted as saying that most jazz concerts where Claudia is present together with her boy-friend are such that he adores the piano player. That means, the focus on the definite DP projects to the VP-level, which is only possible because the DP is the direct object of the verb (see Selkirk (1995)). That means, the focus accent within the DP serves two functions at the same time: It signals that the definite DP is to be interpreted as non-given, and it furthermore enables the whole VP to be interpreted as focus marked. This is not possible in the case of (128e): As there the definite DP is the subject of the verb – i.e. it is generated in Spec, vP –, focus cannot project beyond the DP-level. Rather, a focus accent has to be placed on the verb in order for the whole constituent c-commanded by the Q-adverb to be interpretable as focus marked. But now remember our assumption that in order to be marked as non-given, definite DPs have to receive a focus accent themselves. I therefore speculate that it is this extra (focus) accent on the definite DP which is responsible for the fact that it may not remain within the vP in (128e), while this is perfectly acceptable in (133b), and even required in (134b), where the respective matrix predicates are de-accented.

To be more precise, I assume that for some reason the vP-segment c-commanded by a Q-adverb (i.e. the nuclear scope of this Q-adverb) may not contain more than one focus accent – perhaps because it corresponds to a prosodic domain (see Büring (2001a) for related discussion). In other words, I assume that (128e) is bad because it violates a purely phonological constraint.

Let us turn to (128f): According to our assumptions it is out because the de-accented definite DP can only be interpreted as given, i.e. as taking up a discourse referent that has

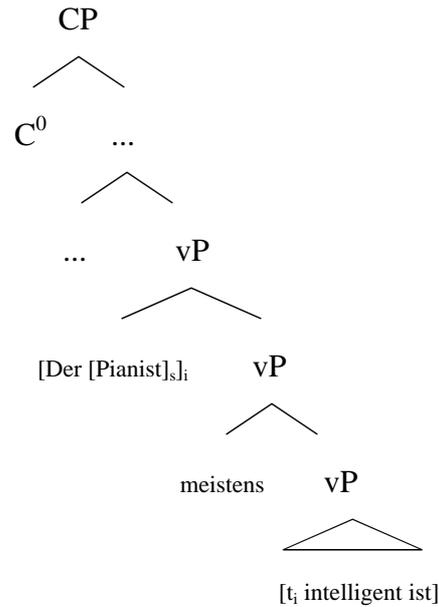
already been introduced. This, however, has the consequence that it cannot receive a co-varying interpretation. (128f) is therefore odd, as the matrix predicate is an individual level predicate that can not be applied to one and the same individual more than once.

(128g), on the other hand, is perfectly acceptable: Containing a focus accent, the definite DP can be interpreted as non-given, and the sentence furthermore does not violate the phonological constraint mentioned above, as the definite DP has been scrambled across the Q-adverb. Note that in this case, it is plausible to assume that scrambling is not licensed because it has an interpretative consequence, but rather because it serves to create a phonologically well formed representation. Let us assume that for this reason, i. e. because scrambling did not serve a purpose related to semantic interpretation in the first place, the definite DP in (128g) may be reconstructed into its vP-internal base position (remember the reconstruction principle in (121))– which is necessary for it to be interpreted as co-varying with the situations quantified over. The resulting LF-representation is given in (135) below:



Let us finally consider the examples in (128b-d). (128c) and (128d) are both unproblematic: (128c) is odd for the same reason as (128f) (see above), while (128d) is fine for the same reason as (128g). What is unexpected is the acceptability of (128b): In order to fulfil the phonological constraint mentioned above, the focus marked definite DP must be scrambled across the Q-adverb (as in (128g)). But then, C^0 should be forced to attract the definite DP in order to check its EPP-feature, as this DP is the closest XP (This is shown in (136) below). In other words, only (128d) should be well formed, while (128b) should be odd.

(136)



Unfortunately, I cannot offer a real solution to this problem. One possible route would be to claim that two phrases that have been adjoined to the same maximal projection count as equally close to a c-commanding attractor. But unfortunately, I know of no syntactic theory that formulates such a principle and at the same time allows a phrase that has been adjoined to a maximal projection to be closer to a c-commanding attractor than the specifier of that maximal projection⁵⁹.

Another option would be to assume that after the definite DP has been scrambled across the Q-adverb, an additional movement operation places the latter in front of the former, thereby turning it into the closest XP that is able to check C⁰'s EPP-feature. But unfortunately there does not seem to be any independent evidence for such a movement operation, nor do I know which position it would trigger, so this also does not seem to be an attractive solution.

The same applies to the third possible solution that I can imagine: As already mentioned above, Fanselow (2004) assumes that in addition to C⁰'s that host unspecific EPP-features, there are also C⁰'s that are specified for more specific (strong) features like [+focal] or [+wh]. This has the consequence that C⁰ no longer attracts the closest XP, but the closest XP *that bears the respective feature*. So, following Fanselow (ibid.) one might claim that in the case of (128b), C⁰ does not bear an EPP-feature, but is specified for a feature that can only

⁵⁹ In Chomsky (1995), for example, the specifier of an XP belongs into the same minimal domain as any phrase adjoined to XP – which means that they are equally close to a c-commanding attractor. This, however, is problematic as it would lead us to expect that (127c) is as acceptable as (127b): Occupying Spec, vP, the universally quantified DP would be in the same minimal domain as the Q-adverb, which presumably has adjoined to vP. C⁰ should therefore be able to attract either of them.

be checked by the Q-adverb, but not by the definite DP. But while there is independent empirical evidence for the existence of focus- and wh-features, I know of no evidence for the existence of features that are exclusively carried by Q-adverbs.

As none of the three conceivable solution strategies sketched above seems to really work out, I can only acknowledge the existence of a problem here – which however is a problem that is not specific to my account of how “QV-like” readings in sentences with singular definites and universally quantified DPs come about. In order to see this, consider the sentences in (137) below:

- (137) a. ..., weil ein Hund meistens blaue AUGEN hat
 because a dog usually blue eyes has
 “... , because a dog usually has blue eyes.”
- b. ..., *weil meistens ein Hund blaue AUGEN hat.
 because usually a dog blue eyes has
- c. Ein Hund hat meistens blaue AUGEN.
 A dog has usually blue eyes
 “A dog usually has blue eyes”.
- d. Meistens hat ein Hund blaue AUGEN.
 Usually has a dog blue eyes.
 “Usually, a dog has blue eyes”.

As the contrast between (137a) and (137b) shows, the de-accented indefinite DP *ein Hund* can only be interpreted as topical, and therefore has to be scrambled across the Q-adverb. But that means that we would only expect (138c) to be well formed, because after scrambling the indefinite is the closest XP that is able to check C^0 's EPP-feature. Nevertheless, (138d) is also fine. I take this as evidence that the well-formedness of (128c) is a real problem that also manifests itself elsewhere, and not an indication that my analysis is on the wrong track.

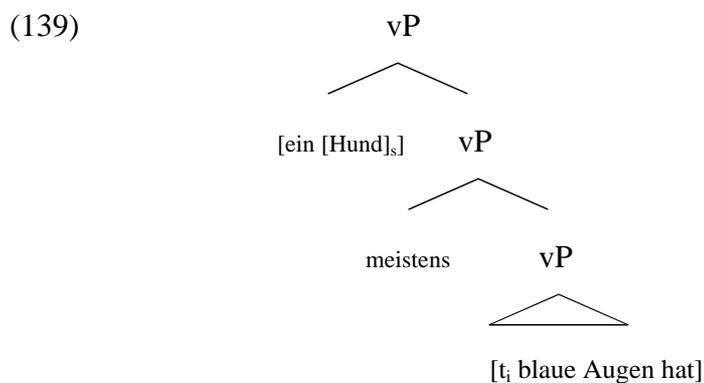
In light of this fact, it seems to me that the most promising option would be to try to formulate a principle like the one alluded to above, according to which two XPs that have been adjoined to the same maximal projection count as equally close to a c-commanding attractor, while they at the same time count as closer to this attractor than an XP in the specifier of this maximal projection (see footnote 55). I will, however, not try to formulate such a principle in this dissertation, as this would take us too far afield.

This concludes my account of the word order contrasts between adverbially quantified sentences that contain universally quantified DPs, and ones that contain singular definites, as far as the availability of co-varying interpretations is concerned. In this section, we have seen that the mapping algorithm under consideration also works for German, if it is combined with independently justified assumptions concerning German syntax. But before I will return to adverbially quantified sentences that contain FRs and plural definites in chapter 3, I want to take up a loose end: Remember that according to our assumptions, topical DPs need to c-command their clause-mate Q-adverb at LF. This, however, leaves open the question how the resulting LFs are to be interpreted compositionally within our situation semantics framework, i.e. how the QV-readings of adverbially quantified sentences that contain topical indefinites are to be generated. In the next section I will try to give an answer to this question.

4.4 The interpretation of adverbially quantified sentences that contain topical indefinites

Consider a simple example like (138) below, which gets a QV-reading easily. Taking the fact that the indefinite DP is de-accented and has been scrambled across the Q-adverb as an indication of its topicality, this DP has to remain within its surface position, where it c-commands the Q-adverb, at LF. The relevant parts of the LF-representation of (138) are given in (139) below.

- (138) ... weil ein Hund meistens blaue AUGEN hat.
 ... because a dog usually blue eyes has.
 “... because a dog usually has blue EYES.”



The first thing to note about (139) is of course that according to our assumptions the situation variable contained within the NP-complement of the indefinite determiner cannot be turned

into a variable bound by the Q-adverb, as the binding operator can only be inserted *below* the Q-adverb. This, however, is unproblematic, as already mentioned: In virtue of its lexical meaning, the indefinite determiner – in contrast to *every* and the definite determiner, which both exhaust the sets they are applied to – is able to pick out a different individual from one and the same set in each of the situations quantified over. Let us therefore assume that the DP-internal situation variable in (139) is simply resolved to w_0 by default.

More problematic, however, is the fact that it is unclear how an LF like (139) is to be interpreted compositionally in our situation semantics framework: In Chierchia's (ibid.) framework, where Q-adverbs can quantify over situations as well as over individuals, the denotation of a Q-adverb can be applied to the denotation of a topical indefinite, after the latter has been turned into a predicative expression via existential disclosure (Dekker (1990)), but this is of course not an option available to us. We therefore have to look for another solution.

First of all, note that in order to arrive at a compositional interpretation of LFs like (139) as well as of ones where the respective Q-adverb is not c-commanded by anything, we have to assume that Q-adverbs come in two varieties: They may either be defined so as to take only one argument (the one corresponding to the nuclear scope) explicitly in the syntax, while the other one – the restriction – is only represented in the form of a pronominal variable ranging over situation predicates, or they may be defined so as to take both arguments explicitly. The first version is the one assumed so far. It is repeated below as (140a). The second one is given in (140b).

$$\begin{aligned}
 (140) \quad & \text{a. } [[\text{usually}]]_1 = \lambda Q_{\langle s, t \rangle} \lambda s. | \{s' : s' \leq s \wedge s' \in \min\{s'' : C(s'')\} \cap \\
 & \quad \{s''' : \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s'''' : Q(s''''')\}]\} | \\
 & \quad \geq \frac{1}{2} | \{s' : s' \leq s \wedge s' \in \min\{s'' : C(s'')\}\} | \\
 & \quad \text{b. } [[\text{usually}]]_2 = \lambda Q_{\langle s, t \rangle} \lambda P_{\langle s, t \rangle} \lambda s. | \{s' : s' \leq s \wedge s' \in \min\{s'' : P(s'') \wedge C(s'')\} \\
 & \quad \cap \{s''' : \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s'''' : \\
 & \quad Q(s''''')\}]\} | \geq \frac{1}{2} | \{s' : s' \leq s \wedge s' \in \min\{s'' : P(s'') \wedge C(s'')\}\} |
 \end{aligned}$$

Note that while at first glance it might seem stipulative to claim that Q-adverbs come in two varieties, this is not a problem specific to my analysis: After all, any theory of adverbial quantification has to account for the fact that in adverbially quantified conditional clauses the antecedent clause must be interpreted as the restrictor of the Q-adverb, while the consequent has to be interpreted as the nuclear scope (see von Stechow (1994), Chierchia (1995a) and the

references therein for discussion). In other words, there are clear cases where both arguments of a Q-adverbs are explicitly given in the syntax. On the other hand, as we have seen in this chapter, it is also plausible to assume that this is not always so, i. e. that there are cases where only the nuclear scope is explicitly given, while the restrictor has to be determined on the basis of contextual and/or clause internal information. Let us therefore assume that it is indeed true that Q-adverbs systematically come in two varieties, as shown above for the case of *usually*.

But even with this assumption in place it is not clear how an LF like (139) is to be interpreted. There are two problems: First, it is unclear how the trace left behind by the indefinite is to be interpreted. Second, the indefinite is not of the right type to function as an argument of the Q-adverb.

Let us first concentrate on the second problem: Under the assumption that the NP-internal (free) situation variable gets resolved to w_0 by default, the indefinite DP in (139) denotes the object given in (141) below:

$$(141) \lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s. \exists x [\text{dog}(x, w_0) \wedge Q(x, s)]$$

Now, in order for the object in (141) to become an argument of the Q-adverb, its own argument of type $\langle e, \langle s, t \rangle \rangle$ has to be saturated first. Let us assume that this comes about via a process of existential abstraction familiar from cases like the ones given in (142)⁶⁰, where the object arguments of the respective verbs are not saturated by a syntactic argument. Nevertheless, (142a) is automatically understood as saying that Paul ate *something*, (142b) is automatically understood as saying that Mary always reads *something* for about half an hour before she goes to bed, etc.

- (142) a. Yesterday, Paul ate at home.
 b. Mary always reads for about half an hour before she goes to bed.

Let us assume that in both cases basically the same happens: An existential quantifier over arguments of the respective type is covertly inserted. To be more concrete, let us assume that in cases like (141) the object given there is applied to a covertly inserted predicate like $\lambda y \lambda s'$. $\exists R [R(y, s)]$, as shown in (143a) below. This gives us the result in (143b): The characteristic

⁶⁰ I would like to thank Sigrid Beck for pointing out this analogy to me.

function of a set of situations such that in each of those situations there is dog such that this dog stands in some relation to this situation. In other words, the characteristic function of the set of situations that contain a dog.

- (143) a. $\lambda Q_{\langle e, \langle s, t \rangle \rangle} \lambda s. \exists x [\text{dog}(x, w_0) \wedge Q(x, s)] (\lambda y \lambda s'. \exists R [R(y, s')])$
 b. $\lambda s. \exists x [\text{dog}(x, w_0) \wedge \exists R [R(x, s)]]$

As (143b) is of the right type to become an argument of *meistens* (*usually*), the first part of our problem is solved. But what about the second part? How is the trace left behind by the indefinite to be interpreted? If we interpret it in the usual way, i.e. as an individual variable that gets bound by a lambda operator inserted directly below the landing position of the moved indefinite (as in Heim and Kratzer (1998)), we do not get the QV-reading we are after. Rather, all we are able to generate in this way is a reading according to which the indefinite has scope over the Q-adverb (if we do not apply the indefinite to the covertly inserted predicate in (143a), that is). This, however, is not what we want. (In principle, sentences where a topical indefinite c-commands a Q-adverb can of course be interpreted this way – if the respective matrix verb is not an individual level predicate. I will come back to this point). We therefore have to look for another option.

Note first that there is an inconsistency in the view of movement operations adopted in this dissertation anyway: On the one hand, I followed Heim and Kratzer (1998) in assuming that moved items leave behind traces that are interpreted in the way mentioned above in order to account for the cases where a quantificational DP is interpreted as having scope over a Q-adverb. On the other hand, I claimed in the last sections that it is possible to interpret a moved DP in its base position via deleting the higher copy, and spelling out the lower copy at the level of LF (as in Chomsky (1993, 1995)). But these two claims are of course inconsistent: Either moved items leave behind full copies of themselves, or they leave behind traces.

It is of course possible to reconcile those two claims easily, by simply assuming that moved DPs always leave behind copies, but that the resulting chains can be dealt with in two different ways at LF: Either the higher copy is deleted, and only the lower one is spelled out, or the lower one is deleted and replaced by a variable of type e, while a (co-indexed) lambda-operator is inserted directly beneath the higher copy (see Chomsky (1993)).

But now note that for reasons entirely independent of the issues dealt with in this dissertation⁶¹, Fox (2002) has argued for a different interpretation of chains created by QR. According to Fox (*ibid.*), two things happen to the respective lower copy in these cases:

1. The respective determiner is replaced by the definite article.
2. The following predicate is inserted next to the respective NP-node: $\lambda y. y = x$, where x is a free variable.

The predicate in 2. is then combined with the respective NP-predicate via the rule of Predicate Modification (Heim and Kratzer (1998)) in the process of interpreting the respective LF, resulting in an interpretation that can be paraphrased as “the NP identical to x ”. Concerning the higher copy, everything proceeds as usual, i. e. a lambda-operator is inserted directly beneath it that binds the free variable contained within the definite description that the lower copy has been replaced with. This has the consequence that the results obtained via Fox’s (*ibid.*) mechanism are truth-conditionally equivalent to the results obtained by interpreting chains in the way proposed by Heim and Kratzer (1998).

Building on Elbourne (to appear: chapter 3)⁶² I want to suggest the following slight modification of Fox’s (2002) mechanism: An index is adjoined to the NP contained within the respective lower copy before the determiner contained within this copy is replaced by the definite article. According to Elbourne (*ibid.*), indices are interpreted as given in (144) below (from Elbourne (*ibid.*: 127)):

⁶¹ The reason why Sauerland (1998, 2004) and Fox (2002) propose that lower copies in A’-chains are not simply replaced by variables (as suggested by Chomsky (1993); see above), but treated in the more complicated manner discussed above is the following: In ACD-constructions it seems to be required that the noun contained within the relative clause internal definite description is identical to the noun-complement of the quantificational determiner, as is evidence by the contrast between (i) and (ii) below. As shown in detail by Fox (2002) (see also Sauerland (2004)), this can be accounted for if chains are interpreted in the way suggested by him, while it would be mysterious if the respective lower copies left behind by quantificational DPs were replaced by simple variables of type e .

(i) Paul visited every lake near the lake Mary did.

(ii) *Paul visited every city near the lake Mary did.

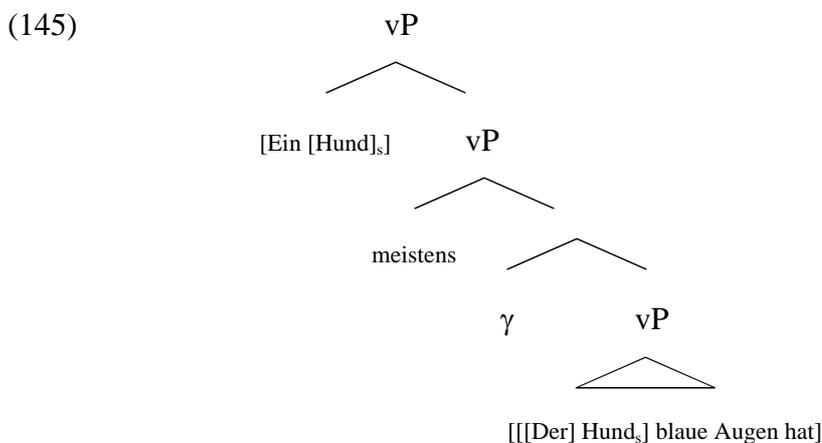
⁶² Actually, for reasons entirely independent to our present concerns, Elbourne (to appear: 148ff.) suggests that definite determiners always take an index (which is interpreted in the way explained above) as a second argument in addition to an NP.

- (144) For all indices i and variable assignments a such that $i \in \text{dom}(a)$, $[[i]]^a = \lambda x. x = a(i)$.

The denotation of an index thus interpreted can then be combined with the denotation of the respective NP it has been applied to via *Predicate Modification*. Let us furthermore assume that the adjunction of an index to the NP contained within the respective lower copy of a moved DP goes hand in hand with the insertion of a co-indexed lambda-operator directly beneath the higher copy. Everything else proceeds as usual, i. e. the index is interpreted as a variable bound by the lambda-operator, turning the sub-tree c-commanded by the higher copy into a predicate that the denotation of this DP can be applied to.

Let us now assume that replacing the determiner contained within the lower copy of a moved DP with the definite article is obligatory, while adjoining an index to the NP contained within the respective lower copy (as well as the corresponding insertion of a co-indexed lambda-operator) is only optional: It is not required if an interpretable result can also be obtained without doing it.

This last assumption solves our second problem immediately: If in a sentence like (138) the lower copy of the indefinite DP is simply turned into a definite DP, while no index is adjoined to the NP contained within the lower copy (and accordingly no co-indexed lambda-operator is inserted directly beneath the higher copy), the QV-reading we are after can be generated easily. Consider the LF-representation that (138) would get in this case in (145) below. (Note that I assume that a (situation variable) binding operator is inserted beneath the Q-adverb, the purpose of which will become clear in a minute):



Let us now turn to the interpretation of the vP-segment c-commanded by the Q-adverb. Consider the definite DP first: Applying the denotation of the definite determiner to its NP-complement gives us the object in (146a), to which the predicate $\lambda y \lambda s. \text{has-blue-eyes}(y, s)$ can be applied, as shown in (146b).

$$(146) \quad \begin{array}{l} \text{a. } \lambda P_{\langle e, \langle s, t \rangle \rangle} . \sigma\{x: P(x, s_1)\} (\lambda y \lambda s. \text{dog}(y, s)) = \\ \quad \sigma\{x: \text{dog}(x, s_1)\} \\ \text{b. } \lambda y \lambda s. \text{has-blue-eyes}(y, s) (\sigma\{x: \text{dog}(x, s_1)\}) = \\ \quad \lambda s. \text{has-blue-eyes}(\sigma\{x: \text{dog}(x, s_1)\}, s) \end{array}$$

Now, the object given in the last line of (146b) is of course of the right type to become an argument of the Q-adverb, namely its nuclear scope. Furthermore, the presence of the (situation variable) binding operator in (145) has the consequence of turning the free situation-variable contained within the definite description into a variable bound by the Q-adverb. The sub-tree c-commanded by the Q-adverb is therefore interpreted as given in (147) below:

$$(147) \quad \lambda s. \text{has-blue-eyes}(\sigma\{x: \text{dog}(x, s)\}, s)$$

Note that according to our assumptions, the lower copy of the moved indefinite is interpreted as a co-varying definite description. It should by now be clear why this is a good result: It (in combination with our above assumptions concerning interpretation of the higher copy of the moved indefinite) enables a sentence like (138) to get an interpretation that can be paraphrased as follows: “Most (minimal) situation s that contain an individual that is a dog in w_0 can be extended to (minimal) situations s' such that the unique individual that is a dog in s' has blue eyes in s' .” Note that the minimality condition ensures that the definite description in the nuclear scope in each of the situations quantified over picks up the individual introduced by the indefinite in the restrictor. We thus get the QV-reading we were looking for.

(148) gives the full derivation: In (148a) the denotation of *usually* is applied to the sub-tree c-commanded by it (i. e. its nuclear scope), while (148b) gives the result of applying the object thus created to the sub-tree that c-commands the Q-adverb. Note that I assume that the I-node plays no role in the process of semantic interpretation, and is therefore ignored (alternatively, it could also be assumed to denote the identity function).

$$(148) \quad \text{a. } \lambda Q_{\langle s, t \rangle} \lambda P_{\langle s, t \rangle} \lambda s. \lambda \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge C(s'')\}$$

$$\begin{aligned} & \cap \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': \\ & Q(s''''')\}] \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge C(s'')\} | \\ & (\lambda s. \text{has-blue-eyes}(\sigma\{x: \text{dog}(x, s)\}, s) = \\ & \lambda P_{\langle s, \triangleright \rangle} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge C(s'')\} \\ & \cap \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': \\ & \text{has-blue-eyes}(\sigma\{x: \text{dog}(x, s''''')\}, s''''')\}] \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \\ & \min\{s'': P(s'') \wedge C(s'')\} | \end{aligned}$$

$$\begin{aligned} \text{b. } & \lambda P_{\langle s, \triangleright \rangle} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge C(s'')\} \\ & \cap \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': \\ & \text{has-blue-eyes}(\sigma\{x: \text{dog}(x, s''''')\}, s''''')\}] \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \\ & \min\{s'': P(s'') \wedge C(s'')\} | (\lambda s. \exists x [\text{dog}(x, w_0) \wedge \exists R [R(x, s)]] = \\ & \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': \exists x [\text{dog}(x, w_0) \wedge \exists R [R(x, s'')]] \wedge C(s'')\} \\ & \cap \{s''': \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s''''': \\ & \text{has-blue-eyes}(\sigma\{x: \text{dog}(x, s''''')\}, s''''')\}] \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \\ & \min\{s'': \exists x [\text{dog}(x, w_0) \wedge \exists R [R(x, s'')]] \wedge C(s'')\} | \end{aligned}$$

A schematic, simplified representation of the end result in (148b) is given in (149) below (note that I have suppressed the minimality condition for simplicity).

$$(149) \text{ Most } s [\exists x [\text{dog}(x, w_0) \wedge \exists R [R(x, s)]] \wedge C(s)] \\ [\text{has-blue-eyes}(\sigma\{x: \text{dog}(x, s)\}, s)]$$

This concludes my account of how QV-readings of adverbially quantified sentences that contain topical indefinites come about. Note that it rests on the following assumptions:

1. Q-adverbs are not automatically fronted at LF, but rather rest in their surface position.
2. Q-adverbs are systematically ambiguous: They either denote an object that takes only one argument explicitly in the syntax (the nuclear scope), or an object that takes two arguments. In each case, the choice depends on whether an interpretable result can be obtained: If a Q-adverb is c-commanded by a DP or an if-clause at

LF, the second version can be chosen (but it does not have to be; see below), while otherwise the first version has to be chosen.

3. The unsaturated arguments of quantificational DPs can in principle be existentially abstracted over, which has the consequence of turning the respective DPs into situation predicates.
4. The lower copies of moved DPs are obligatorily turned into definite descriptions (in the way discussed above), while the adjunction of a corresponding index to the respective NP as well as the insertion of a co-indexed lambda-operator is only optional.
5. The situation variable contained within the definite description that the lower copy of a moved DP has been turned into can become a variable bound by the respective Q-adverb (via the insertion of a situation variable binding operator directly beneath the Q-adverb).
6. The situation variable contained within the higher copy of moved DP gets resolved to w_0 by default.

Note that this account does not run into the re-quantification problem (von Fintel (1994), Rooth (1995), Krifka (2001)⁶³) already mentioned in chapter 1. This problem occurs in situation semantics analyses of sentences like (138) which assume that Q-adverbs are obligatorily fronted at LF, taking only the clause they then c-command as syntactic argument, while their restrictor is obtained on the basis of the focus semantic value of this clause (as in Rooth (1988, 1992, 1995) and von Fintel (1994)). This, however, has the consequence that the respective indefinite is interpreted twice if it is non-focal: Once in the restrictor, and once in the nuclear scope, leaving open the possibility that a different individual is picked out in each of the two cases. While the minimality condition suggested by von Fintel (1994) (and also adopted in this dissertation) makes sure that we nevertheless get the right truth conditions, a second, related problem remains: The empirically well supported novelty condition (see Heim (1982)) is violated, according to which an indefinite may not pick up an individual that has already been introduced in prior discourse (but see Krifka (2001) for a suggestion how this problem can be dealt with). It is obvious why my account avoids this problem: There simply is no second occurrence of a topical indefinite in the nuclear scope, as the lower copy has been translated into a definite description (that contains a bound situation variable).

⁶³ But see Herburger (2000) for the claim that this problem can be avoided if a Neo-Davidsonian event semantics (see Parsons (1990), Schein (1993), Landman (2000)) framework is chosen.

On the other hand, my account seems to be in trouble when it is confronted with sentences that contain two topical indefinites, like the one given in (150) below:

- (150) ... weil ein Hund eine Katze meistens JAGT.
 ... because a dog a cat usually chases.
 “... because a dog usually CHASES a cat”.

According to the analysis proposed in this chapter, the overtly spelled out copies of the two indefinite DPs in (150) both have to be interpreted in their respective surface position, where they c-command the Q-adverb. This is insofar unproblematic as they both can be turned into situation predicates in the way already discussed. But then we face the following problem: Even the second version of *usually* defined in (140) is only able to take two situation predicates as arguments. This, however, has the consequence that in a case like (150) the situation predicate $\lambda s. \exists x[dog(x, w_0) \wedge \exists R [R(x, s)]]$ (which is the denotation of the indefinite DP *ein Hund*) cannot be combined with the rest of the clause.

We therefore need yet more flexibility as far as the number of situation predicates is concerned that Q-adverbs take as arguments. In other words, it needs to be possible that the respective “restrictor situations” are not only defined by their satisfying two situation predicates (as in (140b), which is repeated below as (151a)), but by their satisfying a principally open-ended number of situation predicates, as is shown in (151b) below⁶⁴:

- (151) a. $[[usually]]_2 = \lambda Q_{\langle s, t \rangle} \lambda P_{\langle s, t \rangle} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge C(s'')\} \cap \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': Q(s''''')\}]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge C(s'')\} |$
 b. $[[usually]]_2 = \lambda Q_{\langle s, t \rangle} \lambda P^1_{\langle s, t \rangle} \dots \lambda P^n_{\langle s, t \rangle} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': P^1(s'') \wedge \dots \wedge P^n(s'') \wedge C(s'')\} \cap \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': Q(s''''')\}]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': P^1(s'') \wedge \dots \wedge P^n(s'') \wedge C(s'')\} |$

⁶⁴ Note that the necessity to keep the number of arguments of Q-adverbs flexible is not special to my analysis. It also shows up in an approach like the one of Chierchia (1995a), where Q-adverbs are able to quantify over situations as well as over individuals.

Let us therefore assume that *usually*₂ actually denotes the object that is given schematically in (151b), and that it depends on the number of constituents (denoting situation predicates) that c-command the respective Q-adverb at LF how many situation predicates this Q-adverb takes as arguments. This has the consequence that (150) can be interpreted as given in (152) below:

$$(152) \lambda s. | \{s' : s' \leq s \wedge s' \in \min\{s'' : \exists x [\text{dog}(x, w_0) \wedge \exists R [\text{R}(x, s'')]] \wedge \exists y [\text{cat}(y, w_0) \wedge \exists R [\text{R}(y, s'')]] \wedge C(s'')\} \cap \{s''' : \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s'''''' : \text{chases}(\sigma\{y : \text{cat}(y, s''''')\}, \sigma\{x : \text{dog}(x, s''''')\}, s''''')]\} | \geq \frac{1}{2} | \{s' : s' \leq s \wedge s' \in \min\{s'' : \exists x [\text{dog}(x, w_0) \wedge \exists R [\text{R}(x, s'')]] \wedge \exists y [\text{cat}(y, w_0) \wedge \exists R [\text{R}(y, s'')]] \wedge C(s'')\} |$$

(150) thus gets a reading that can (roughly) be paraphrased as follows: “Most (minimal) situations *s* that contain a dog and a cat are extendable to (minimal) situations *s'* such that the unique dog in *s'* chases the unique cat in *s'*”. This seems to be correct.

Note furthermore that my account runs into the same problem as all kinds of “E-type approaches” (including the ones by Heim (1990) and Elbourne (2001)), when it is confronted with sentences exemplifying “the problem of indistinguishable participants” (Elbourne (to appear: chapter 4)). This problem can be illustrated with a sentence like the one given in (153) below (cf. Heim (1990)):

(153) If a bishop meets a bishop, he usually blesses him.

In an approach like the one of Elbourne (2001) (see chapter 1, section 3.2 in this dissertation), both pronouns in the consequent clause get interpreted as “the unique bishop in *s*”. This is of course highly problematic, as the situations quantified over do not contain a unique bishop, but rather two bishops. The respective uniqueness presuppositions would therefore not be fulfilled and the sentence should be odd – contrary to fact.

Note that while I am not forced to analyse pronouns in the way proposed by Elbourne (2001) – I could in principle also analyse them as free variables that are dynamically bound by the respective indefinites (as in Staudacher (1987), Groenedijk and Stokhof (1990) and Chierchia (1995a)) – , my analysis nevertheless faces the same problem when it is confronted with a sentence like the following variant of (153):

(154) A bishop usually BLESSES a bishop.

According to my analysis, the two indefinites in (154) both have to be interpreted in a position where they c-command the Q-adverb at LF (because of being topical). This, however, has the consequence that their respective lower copies get the same interpretation as the pronouns in (153).

While I do not have a fully satisfactory solution to this problem, I would at least like (a) to point out that while theories of dynamic binding like the ones mentioned above do not have a problem with sentences like (153), they run into a complementary problem when they are confronted with a variant of (153) to be introduced below, and (b) offer a few speculative remarks as to what a solution might look like.

Paul Elbourne (to appear: 190ff.) draws attention to the contrast between sentences like (155a) and (155b):

- (155) a. *If a bishop and a bishop meet, he blesses him.
b. If a bishop and a nun meet, he blesses her.

As pointed out by Elbourne (*ibid.*), theories of dynamic binding are unable to deal with this contrast: Either two conjoined indefinites are able to establish separate discourse markers that can be used for the interpretation of pronouns, or they are unable to do so. But, crucially, the descriptive content of the respective NP should not make any difference. From the perspective of E-type-pronoun analyses, on the other hand, (155a) and (155b) behave exactly as expected: Only in (155b) are the respective uniqueness presuppositions fulfilled.

Paul Elbourne (*ibid.*: 192-205) offers a rather complicated technical solution to the problem under discussion that makes use of additional situation variables introduced by the respective items: More concretely, he sets his system up in such a way that there is minimal situation that consists only of the respective subject DP instantiating the respective property, and a minimal situation that includes only the object DP instantiating the respective property plus the relation holding between those DPs. This has the consequence that uniqueness is guaranteed with respect to the respective minimal situations.

As the technical details of this analysis are not compatible with the technical details of my approach⁶⁵ – apart from the fact that carving up situations in this way seems extremely

⁶⁵ It is quite important for my analysis of the word order facts discussed in this chapter that the situation variables present in DPs are treated as free pronouns (which is also independently justified; see above) that can become

unintuitive to me – , I cannot adopt it. Nevertheless, I consider the three-way contrast between (153) and (155a, b) to be an important clue as to what a solution to the problem under discussion might look like.

Let us assume that the definite descriptions that I take to be the denotations of the pronouns in (153) and (155a, b) as well as of the lower copies of the moved indefinites in (154) include a covert C-variable that can be resolved to a contextually retrievable property. (In the way proposed by von Stechow (1994), Stanley (2000, 2002) and Marti (2003) for determiner as well as adverbial quantifiers.) Let us furthermore assume that some such property can be retrieved from the fact that the first indefinite in (153) as well as in (154) is the subject of the respective clause, while the second indefinite in (153) and (154) is the direct object. In the case of (155a), on the other hand, no such property is available, and the sentence is accordingly odd. This would explain the pattern under discussion.

Clearly, more work would have to be done in order to determine the precise nature of the property under discussion: It might be related to different thematic roles (cf. Ludlow (1994) and Schein (1983) for related suggestions) as well as to salience⁶⁶. Furthermore, it would have to be tested systematically whether other grammatical relations have the same potential. This, however, is beyond the scope of this dissertation. I therefore leave a technically precise implementation of the suggestions above to another occasion and merely repeat that it is neither the case that the problem of indistinguishable participants is specific to my analysis, nor that theories of dynamic binding have a real advantage in this domain.

Before concluding this chapter, I would like to point out that the account given in this section predicts that a topical indefinite in an adverbially quantified sentence can in principle always be interpreted in one of two ways⁶⁷: While it – because of its topicality – has to occupy a position where it c-commands the respective Q-adverb at LF (see sections 4.2 and 4.3), the resulting tree can nevertheless give rise to two different interpretations, depending on whether an index is adjoined to the NP contained within the lower copy before the indefinite article is replaced by the definite article. If this is not the case, we get the QV-reading the derivation of which was just given in detail. If, on the other hand, an index is adjoined to the respective NP, and a corresponding lambda-operator is inserted directly beneath the higher

bound by Q-adverbs only under c-command. In Elbourne's (ibid.) system, on the other hand, all basic semantic types are equipped with an additional situation argument and are thus treated as functions from situations into expressions of the respective type.

⁶⁶ Centering Theory (s. Grosz, Joshi and Weinstein (1995) and Gundel (1998) a. o.) might be relevant here.

⁶⁷ This issue is dealt with in more detail in Endriss and Hinterwimmer (in preparation).

copy, we get an interpretation according to which the indefinite DP has scope over the Q-adverb, i. e. the respective indefinite is interpreted as a specific indefinite.

This second interpretation is of course not available in the case of (138), as the matrix verb is an individual level predicate. But it is available in a case like (156a) below, where the matrix verb is a stage level predicate. The sentence is therefore ambiguous between a QV-reading and a reading according to which there is a specific piano player who is well dressed in most (relevant) situations. This second reading comes about if the sentence is interpreted in a way parallel to the interpretation of sentence (17) (given in (18)) (repeated below as (156b)), which was discussed in section 2.2 – the only relevant difference being that now the lower copy/trace of the moved DP is not simply interpreted as x , but as *the NP identical to x* :

- (156) a. ... weil ein Pianist meistens gut gekleidet ist.
 because a piano player usually well-dressed is.
 b. Every dog usually BARKS.

Adjoining an index to the NP contained within the lower copy of the indefinite DP in combination with the insertion of a co-indexed lambda-operator directly beneath the higher copy has the consequence that the sub-tree c-commanded by this higher copy is interpreted as a predicate to which the denotation of this higher copy can be applied. Note that in this case, the Q-adverb has to be interpreted as an object that takes only one of its arguments explicitly in the syntax (namely, the nuclear scope), while the other one (the restrictor) is only given in the form of a C-variable that needs to be resolved on the basis of information given in the nuclear scope. Accordingly, (156a) in addition to a QV-reading also gets a reading that can be paraphrased as follows: “There is a piano-player x such that most relevant situations s where x is present can be extended to minimal situations s' such that the unique piano-player in s' that is identical to x is well-dressed in s' .”

In section 4.4 I have shown how the mapping algorithm discussed in section 4.3, according to which Q-adverbs are interpreted in their surface-position and topical DPs have to c-command the respective Q-adverb at LF, can be made to account for the QV-readings of adverbially quantified sentences that contain topical indefinites. My account has not only the advantage of avoiding the re-quantification problem that other analyses that are formulated within a situation semantics framework run into. It is also able to account for the fact that such sentences not only receive QV-readings, but (at least sometimes) also get readings according to which the respective topical indefinite has scope over the Q-adverb.

5 Chapter Summary

In this chapter I have dealt with the interpretation of adverbially quantified sentences that contain singular definites and universally quantified DPs. More specifically, I have concentrated on the conditions under which those DPs may receive co-varying interpretations. We have seen that in contrast to indefinites, the denotations of universally quantified DPs and singular definites alike may not vary with the situations quantified over by a clausemate Q-adverb if the sets denoted by the NP complements of the respective determiners remain constant. In both cases, this is due to the semantics of the respective determiners: While the denotation of the definite determiner may only be applied to a set of atoms if this set is a singleton, the truth conditions of a sentence that contains a universally quantified DP require checking whether the set denoted by the NP complement of the quantificational determiner is included in the set denoted by its second argument. That means, in both cases the set is exhausted completely when the truth conditions of the respective sentences are computed. This has the consequence that in both cases a relativization of the respective sets to the situations quantified over by the respective Q-adverbs is the only option to get a QV-reading.

I assume that this necessary relativization comes about in the following way: The free situation variables contained within the respective DPs are turned into variables bound by the respective Q-adverbs via the insertion of a situation variable binding operator directly beneath those Q-adverbs. This has two consequences: On the one hand, it is required that either a situation predicate has been introduced explicitly or can be accommodated (on the basis of contextual information or due to contrastive topic marking) that guarantees the presence of various individuals (in the case of universally quantified DPs) or exactly one individual (in the case of singular definites) of the right kind in each of the situations quantified over. This is necessary in order for the presuppositions associated with the respective determiners to be fulfilled.

On the other hand, the respective Q-adverb has to c-command the DP that contains the situation variable to be bound at LF. This is where (my version of) the mapping algorithm of Chierchia (1995a) comes into play: According to this mapping algorithm, topical DPs need to c-command clause-mate Q-adverbs at LF, while only focal DPs can be reconstructed into their vP-internal base positions. Furthermore, Q-adverbs do not have to be moved to a clause-peripheral position at LF, but can (in my version: have to) be interpreted in their respective surface position.

This has the consequence that there are two ways in which universally quantified DPs or singular definites may end up in the c-command domains of the respective Q-adverbs: The first option is that they c-command the Q-adverb overtly, but contain a focus accent themselves. This allows them to be reconstructed into their respective vP-internal position base positions, where they are c-commanded by the Q-adverb. The other option is that the respective Q-adverb has been fronted overtly, which means that it already c-commands the respective Q-adverb on the surface.

At this point, an additional factor comes into play: As singular definites that contain a bound situation variable introduce novel discourse referents in the type of sentence under discussion, they need to contain a focus accent in order to be marked as non-given definites (cf. Umbach (2001)). Regarding universally quantified DPs, on the other hand, there is no such requirement, as they are unable to introduce discourse referents anyway. I assume that this difference is the key to understanding the differences between adverbially quantified sentences that contain universally quantified DPs and those that contain singular definites, as far as word order is concerned: As singular definites (of the type under discussion) contain a focus accent anyway, it does not matter whether they c-command a Q-adverb overtly or are c-commanded by it: In the first case, they get reconstructed into their base position at LF, while in the second case nothing more needs to be done. Either way, it is ensured that they are c-commanded by the respective Q-adverb at LF.

Regarding universally quantified DPs, matters are different. If they are c-commanded by a Q-adverb overtly, everything is fine: As they cannot be interpreted as being topical, anyway, it is clear that they do not have to be moved into a position where they c-command the respective Q-adverb at LF when they are de-accented. If, on the other hand, they c-command a Q-adverb on the surface, they have to contain a focus accent in order for the required reconstruction to be allowed. But, in contrast to singular definites, in the case of universally quantified DPs there has to be an independent reason why they contain a focus accent. Therefore, sentences where a universally quantified DP c-commands a QV-adverb overtly only get the interpretation under discussion if (a) the universally quantified DP contains a focus accent and (b) this focus accent is “justified” on independent grounds. This difference between universally quantified DPs and singular definites holds in English as well as in German.

In the last section of this chapter I have discussed QVEs in adverbially quantified sentences that contain (de-accented) singular indefinites. According to my assumptions, those readings come about if the respective indefinites are interpreted as being topical, and therefore

occupy a position where they c-command the respective Q-adverb at LF. It was, however, not clear how to interpret such LFs if one does not want to give up the assumption that Q-adverbs are only able to quantify over situations. In order to solve this problem, I had to assume a systematic ambiguity in the interpretation of Q-adverbs (which, however, is independently justified, as I have argued) and make a non-standard proposal concerning the interpretation of chains, which was based on suggestions made by Sauerland (1998, 2004), Fox (2002) and Elbourne (to appear). This proposal, however, is not only justified on theory-internal grounds, but has the following two advantages over other situation semantics approaches to QVEs: It avoids the re-quantification problem, and it is able to account for the fact that topical indefinites in adverbially quantified sentences cannot only be interpreted in the restrictor of the respective Q-adverb (giving rise to a QV-reading), but can also be interpreted as having scope over the Q-adverb. In other words, my analysis at least offers the prospect to see two seemingly unrelated phenomena under a common perspective: The fact that topical indefinites are interpreted in the restrictor of Q-adverbs (see Chierchia (1995a) and Krifka (2001) a. o.), and the fact that topical indefinites are interpreted specifically (see Jäger (1995), Cresti (1995) and Ebert and Endriss (2004))⁶⁸.

Let me close this section by pointing out once more the decisive difference between indefinites on the one hand, and singular definites and universally quantified DPs, on the other hand, as far as adverbial quantification is concerned. Singular definites and universally quantified DPs that contain a situation variable which is bound by a Q-adverb are *in principle* (i. e. independently of the issue of how variable binding by the Q-adverb is achieved) unable to contribute anything to the restriction of a Q-adverb. In other words, interpreting such DPs in the restrictor would always be redundant: In order for the presuppositions associated with the respective determiners to be fulfilled, it has to be guaranteed that the situations quantified over contain exactly one/at least one individual that satisfies the respective NP-predicate anyway.

Concerning indefinites, the situation is different: It is very well possible to make use of the denotation of an indefinite DP in order to define a set of situations to quantify over, i. e. it is not necessary that a situation predicate is retrieved from the context or accommodated. On the contrary, in the “classical” examples that are used to argue for the existence of QVEs, it is often the case that the denotation of the indefinite is the only information that can be made use of in order to fix a domain of quantification for the Q-adverb. Therefore, indefinite DPs are

⁶⁸ This issue is dealt with in more detail in Endriss and Hinterwimmer (in preparation), where we propose an extension to sentences where other quantificational DPs co-occur with topical indefinites.

actually able to make a semantic contribution to the restriction of Q-adverbs, as a consequence of which it makes a difference whether they are mapped onto the restriction or onto the nuclear scope of Q-adverbs. I assume that this is the reason why singular indefinites can be de-accented in adverbially quantified sentences, even though they also introduce new discourse referents, just as singular definites that contain a bound situation variable do (which therefore have to be focus marked, according to my assumptions): The fact that the domain of quantification of a Q-adverb (i. e. its restrictor) may be determined on the basis of the denotation of an indefinite allows such singular indefinites to be topic-marked. Concerning singular definites that contain a bound situation variable, on the other hand, the notion “topicality” does not make any sense, as they are in principle unable to contribute anything to the domain of quantification of the Q-adverb that binds the respective situation variable. Therefore, such singular definites can never be topic marked (which would be signalled by de-accenting⁶⁹), and the fact that they introduce discourse referents has to be signalled by focus marking.

In the next chapter I return to the interpretation of adverbially quantified sentences that contain FRs and plural definites. Remember that in chapter 1 I have given empirical evidence that sentences containing FRs and plural definites show QVEs under far less strict conditions than singular definites (and universally quantified DPs): Neither marking FRs/plural definites as contrastive topics nor embedding sentences that contain them in a context that introduces a suitable set of situations for the respective Q-adverb to quantify over seem to be necessary prerequisites. As we are now in a position where we understand the source of the restrictions that constrain the availability of QVEs in adverbially quantified sentences that contain singular definites (and universally quantified DPs), we can at least say how QVEs in sentences that contain FRs or plural do *not* come about: Namely, via binding the situation variable contained within the respective NP/CP-predicate. In the next chapter I will try to be more positive.

⁶⁹ Note that givenness cannot be the only factor that licenses de-accenting: Otherwise, indefinites (which cannot be given by definition) could never be de-accented.

Chapter 3:

QVEs in Sentences that Contain FRs and Plural Definites

In this chapter I will try to be more precise as far as the conditions under which FRs and plural definites are able to get QV-readings are concerned. In the first section I will clarify the merely structural conditions.

1 Word Order and Intonation

1.1 The basic facts

Remember that according to Berman (1994) FRs are exclusively mapped onto the restriction of Q-adverbs (see chapter 1 for details). In this section I want to show that this is not true: Rather – as a closer look at German data will reveal –, a delicate interplay of intonation and word order determines whether FRs are interpreted in the restriction or in the nuclear scope of a Q-adverb. Furthermore, I will give additional evidence (cf. chapter 1) that FRs clearly pattern with plural definites, not with indefinites: When they are interpreted in the restriction of Q-adverbs, they (at least potentially) give rise to QVEs, but when they are interpreted in the nuclear scope, they clearly do not get an existential interpretation, but denote maximal sum individuals.

As word order is more free in German than it is in English, it is easy to construct sets of example sentences that only differ from each other with respect to the position where an FR occurs and with respect to the distribution of focus accents. It is then possible to test the intuitions of native speakers concerning the readings that the resulting sentences are able to get. In the following I will present the results of this mini-experiment.

There are four positions to experiment with:

- The vP-internal base position.
- The position above the Q-adverb, which I assume to be a vP-adjunction site.
- The specifier of CP.
- A position to the right of the verbal projection where relative clauses can optionally occur in German.

It will turn out that there are two “ambiguous” positions, i. e. two positions where intonation decides whether the respective FRs are mapped onto the restriction or onto the nuclear scope:

The specifier of CP and the position to the right of the matrix verb. In these positions, FRs are exclusively interpreted in the nuclear scope of a Q-adverb when the main accent of the clause is realized on the most deeply embedded FR-internal constituent, while they are also interpreted in the restriction of the respective Q-adverb when their most deeply embedded constituent is de-accented relative to the matrix predicate. The other positions, i. e. the vP-internal base position and the position above the Q-adverb are “unambiguous”: FRs that remain vP-internally are mapped onto the nuclear scope, while FRs that are adjoined to the vP above the Q-adverb are mapped onto the restriction. Consider the examples in (1) – (3) below: In all of them the FR receives the main accent of the clause. In (1), the FR remains within vP. In (2), it occupies the specifier position of the C-projection, and in (3) it has been moved to the right of the verbal projection.

- (1) [Wer LINGUISTIK studiert]_F, ist meistens fröhlich.
 Who linguistics studies is usually happy.
 „Who(ever) studies LINGUISTICS is usually happy“.
- (2) (Peter sagt), dass meistens [wer LINGUISTIK studiert]_F fröhlich ist.
 (Peter says) that usually who linguistics studies happy is
- (3) (Peter sagt), dass meistens fröhlich ist, [wer LINGUISTIK studiert]_F.
 (Peter says), that usually happy is who linguistics studies.
 “(Peter says), that who(ever) studies LINGUISTICS is usually happy”.

(1) and (3) are two-way ambiguous (under the assumption that the focus accent in the direct object (*Linguistik*) projects to the level of the (FR-)CP): According to the first reading, they say that for each of the persons who study linguistics (in contrast to some other sum individuals) it is the case that most (suitably restricted) situations where this person is included is a situation where she/he is happy in this reading the FR is interpreted outside of the scope of the Q-adverb, it is irrelevant for our present concerns, and I will therefore not go into the details of how the respective LFs are generated and interpreted¹. The second reading (which is the only reading (2) gets) is paraphrased in (4).

- (4) Most (relevant) situations where someone is happy are situations where all the people present at those situations who study linguistics are happy.

¹ Note, however, that the existence of this reading presents further evidence that FRs are interpreted as maximal sum individuals (cf. chapter 1).

In light of the discussion in the last chapter, it is pretty clear how the second reading comes about: Remember that we have assumed that all predicates (nominal as well as verbal and adjectival ones) contain an additional situation argument, and that the definite determiner accordingly is interpreted as repeated in (5) below:

$$(5) \quad \lambda P_{\langle e, \langle s, t \rangle \rangle} . \sigma\{x: P(x, s_1)\}$$

Remember furthermore that the free situation variable introduced by the definite determiner can either be resolved to a contextually salient situation, to w_0 by default, or it can be turned into a bound variable if a suitable binding operator is inserted above the respective definite DP. Now, in chapter 1 I have argued that FRs are nothing but definite DPs where a covert definite determiner is present that gets applied to the predicate denoted by the respective overtly given CP. In chapter 1 I followed the standard assumption that relative clause CPs are expressions of type $\langle e, t \rangle$. But this is of course no longer consistent with the view we have arrived at in the previous chapter: We need to ensure that relative clause CPs are of type $\langle e, \langle s, t \rangle \rangle$. This is not only necessary in order for them to serve as arguments of a covert definite determiner (as in the case of FRs), but also in order for them to be able to combine with nominal predicates via Predicate Modification (as in the case of restrictive relatives).

I therefore suggest that relative pronouns are interpreted as shown in (6) below (cf. Caponigro (to appear: 10)):

$$(6) \quad \begin{array}{l} \text{a. } [[\text{who}]] = \lambda P \lambda x \lambda s [\text{human}(x, s) \wedge P(x)] \\ \text{b. } [[\text{what}]] = \lambda P \lambda x \lambda s [\text{non-human}(x, s) \wedge P(x)] \end{array}$$

Now note that in order to be consistent with the view of DP-chains arrived at by the end of chapter 2, we have to assume that also the chains created by moving relative pronouns into Spec, CP are treated in the same way as other DP-chains are treated (under the plausible assumption that relative pronouns are DPs with a covert NP-complement): The respective determiner is deleted and replaced by a definite determiner, and an index is (in this case: obligatorily, because otherwise we would not arrive at an interpretable result) adjoined to the respective NP-node. This furthermore triggers the insertion of a co-indexed lambda-operator directly beneath the higher copy, turning the sub-tree c-commanded by this copy in a predicate that its denotation can be applied to.

Let us assume that in the case of the relative pronoun *who*, the covert NP denotes the predicate $\lambda x \lambda s. human(x, s)$, in the case of *what* it denotes the predicate $\lambda x \lambda s. non-human(x, s)$, etc.² This has the consequence that after an index has been adjoined to the respective NP-node, and after the denotation of this index has been combined with the denotation of the covert NP via Predicate Modification, the NP as a whole denotes something like $\lambda y \lambda s. human/non-human(y, s) \wedge is-identical-to-i(y, s)$. The next step consists in applying the denotation of the definite determiner – which replaces the original determiner – to this object, which gives us something like $\sigma\{x: human/non-human(x, s_1) \wedge is-identical-to-i(x, s_1)\}$. As the index *i* contained within the respective definite description finally gets replaced by a variable that is bound by the lambda-operator inserted beneath the higher copy of the moved relative pronoun, the end result is equivalent to treating the copy left behind by the relative pronoun as a simple individual variable. For that reason, I will henceforth pretend for simplicity that the copies left behind by relative pronouns are simply translated as individual variables (as in Heim and Kratzer (1998)).

The denotation for relative pronouns given above in combination with the procedure just described has the consequence that the relative clause CPs in (1-3) are interpreted as given in (7) below (in a slightly simplified version; see above):

$$(7) \quad \lambda x \lambda s [human(x, s) \wedge \exists s' [study-linguistics(x, s')]]$$

This object is of the right type to serve as the argument of the covert definite determiner mentioned above. The FR as a whole therefore denotes the object given in (8):

$$(8) \quad \sigma\{x: human(x, s_1) \wedge \exists s' [study-linguistics(x, s')]\}$$

² In other words: The denotations given in (6) are the results of applying the denotations of the respective overtly realized determiners *who*, *what* etc. to their respective covert NP-complement, i. e. the determiners themselves have the following denotation:

$$(i) \quad \lambda P \lambda Q \lambda x \lambda s [Q(x, s) \wedge P(x)]$$

Let us furthermore assume that the fact that the respective determiners are spelled out differently is the result of a morpho-syntactic agreement process, i. e. the determiners have to agree with their covert NP-complements, which are specified for phi-features.

With these assumptions in place, let us now return to the question how the reading given in (4) comes about, which is one of the two readings that are available in the case of (1) and (3), and the only reading that is available in the case of (2). We can assume that this proceeds in complete analogy to the corresponding cases with focus marked singular definites discussed in the last section: In each case, the focus marked FR occupies a position where it is c-commanded by the Q-adverb at LF. This has two consequences: First, the version of *usually* has to be employed that takes only one argument in the syntax. Second, the FR-internal situation variable can be turned into a variable bound by the Q-adverb via the insertion of a binding operator. The reading paraphrased in (4) can therefore be given more formally as in (9) below (note that I again have suppressed the respective minimality conditions for simplicity) – under the assumption that the C-variable in the restrictor has been resolved to a predicate like $\lambda s'. \exists x [is\text{-}happy(x, s')]$ ³, which has been accommodated on the basis of clause internal information:

- (9) Most s [$\exists x [is\text{-}happy(x, s)]$
 $[\exists s' [s \leq s' \wedge is\text{-}happy(\sigma\{x: human(x, s') \wedge \exists s'' [study\text{-}linguistics(x, s'')]]\}, s)]$]

Consider next the examples in (10) – (12) below: In all of those sentences the FR is de-accented relative to the most deeply embedded element (*fröhlich*) inside the matrix clause. In (10), the FR occupies the specifier position of the C-projection, in (11) it has been adjoined to the vP-segment that includes the Q-adverb, and in (12) it has been moved to the right of the verbal projection of the matrix clause.

- (10) [Wer Linguistik studiert], ist meistens FRÖHLICH.
 Who linguistics studies is usually happy.
 „Who studies linguistics is usually HAPPY“.
- (11) (Peter sagt), dass [wer Linguistik studiert] meistens FRÖHLICH ist.
 (Peter says) that who linguistics studies usually happy is.
- (12) (Peter sagt), dass meistens FRÖHLICH ist, [wer Linguistik studiert].
 (Peter says), that usually happy is who linguistics studies.

³ Namely on the basis of the fact that the matrix predicate *fröhlich* (*happy*) is de-accented and therefore must be given. This can be taken as evidence that a set of situations where someone is happy is under discussion.

“(Peter says) that who(ever) studies linguistics is usually HAPPY.

The sentences in (10) – (12) are all two-way ambiguous: According to first reading they say that for each of the persons who study linguistics it is the case that in most (relevant) situations where this person is present, he/she is happy. Note that this reading only differs from the first reading (1) and (3) above insofar as here the maximal sum individual consisting of the people who study linguistics is not contrasted with other sum individuals. I will therefore ignore it for the same reason as I ignored the first reading of (1) and (3) above. The second reading is a classical “QV-reading” and can informally be paraphrased as in (13) below:

(13) Most people who study linguistics are happy.

I will not give a formal representation of this reading at this point, since the question of how exactly it is generated is the topic of this chapter. At the moment, it is entirely unclear how it comes about.

Remember that in all the cases discussed so far QV-readings (and “QV-like” readings) are a consequence of the fact that the respective clauses contain a constituent that is able to introduce different individuals in each of the situations quantified over: In the case of indefinites, the indefinite determiner can pick out a different individual from the set denoted by its NP-complement in each of those situations. In the case of singular definites⁴ and universally quantified DPs, on the other hand, the set denoted by the NP-complement of the respective determiner varies with those situations if the respective DP-internal situation variable gets bound by the Q-adverb.

Of course none of these strategies can be responsible for the reading paraphrased in (13). The first one is excluded for the trivial reason that there is no existential quantifier around (but only a covert sum-operator), and the second one is excluded because none of the conditions discussed extensively in the last chapter are met in (10) – (12): Neither is there a suitable situation predicate inferable from the context (or with the help of the mechanism discussed in chapter 2, as the FR is not marked as a contrastive topic), nor is it plausible to assume that the FR occupies a position at LF where the situation variable contained within it

⁴ Of course, this option is basically also open to plural definites if the necessary conditions are met, i. e. if a situation predicate can be accommodated/is available and if the plural definite occupies a position where it is c-commanded by the Q-adverb.

could be bound by the Q-adverb. The second point becomes clear if one remembers the discussion in chapter 2: As the FRs are de-accented with respect to the main predicate, they cannot be interpreted as being in focus, which means that reconstructing them into their vP-internal base position is not licensed. This has the consequence that at LF they (ore more precisely: a copy of them) have to remain in a position where they c-command the Q-adverb overtly and accordingly are (also) interpreted in the restriction of the Q-adverb.

Before presenting a semantic analysis that is compatible with this fact and nevertheless allows us to stick to the assumption that Q-adverbs are only able to quantify over situations I will conclude the discussion of the purely structural conditions under which FRs get their respective readings in the next section.

1.2 The LF representations of adverbially quantified sentences that contain FRs

1.2.1 Sentences where the FR gets mapped onto the nuclear scope

Let us have a closer look at the sentences introduced in the last section. Consider first example (1), which is repeated below as (14)⁵:

- (14) [_{CP}[Wer LINGUISTIK studiert]_i ist_k [_{vP} meistens [_{vP} t_i fröhlich t_k]]].
 Who linguistics studies is usually happy

In (14), the FR, which contains a focus accent, has been moved to Spec, CP. It is plausible to assume (cf. the discussion in chapter 2) that this movement is due to the fact that C⁰ contains a [+foc]-feature that needs to be checked overtly by the closest constituent that bears a corresponding feature, and that the FR therefore gets attracted by C⁰ because it is the closest constituent c-commanded by the Q-adverb that bears the relevant feature. As this movement is most plausibly considered as an instance of purely formal feature-checking without any semantic significance, and as (cf. chapter 2) focal DPs are preferably reconstructed at LF, I assume that the FR in (14) is reconstructed into its vP-internal base position at LF. Consider next example (2), which is repeated below as (15):

- (15) [_{CP} dass [_{vP} meistens [_{vP} [wer LINGUISTIK studiert] fröhlich ist]]].
 that usually who linguistics studies happy is

⁵ Note that for simplicity I continue to represent copies left behind as traces.

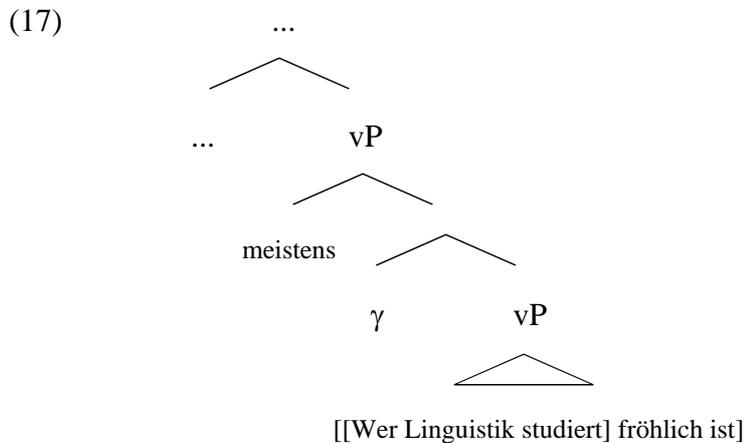
In this case, a configuration that is in accordance with the mapping algorithm already obtains on the surface, and therefore nothing more needs to be done at LF.

Consider (finally example (3), which is repeated below as (16).

- (16) [_{CP} dass [_{vP} meistens [_{vP} [_{vP} t_i fröhlich ist] [wer LINGUISTIK studiert]]]]
 that usually happy is who linguistics studies

In (16) the FR seems to have been shifted to the right. This is problematic, as in most current syntactic theories movement to the right is not considered to be a legitimate option⁶. I do not want to go into this discussion here, but will simply assume that extraposition is nothing but a reordering operation that takes place (after Spell-Out) at PF in order to facilitate processing. That means, I assume that at the level where the LF-part of the derivation starts, the FR still is within its vP-internal position where it is c-commanded by the Q-adverb (as in (15) above)).

As neither the movement of the FR to Spec, CP nor the movement of the finite verb to C⁰ or the extraposition of the FR have any semantic significance, I assume that the examples (14) – (16) all get the (simplified) LF representation given in (17) below:



The computation of the truth conditions of (17) can then proceed as already indicated in section 1.1: The FR-internal situation variable becomes bound by the Q-adverb (via the insertion of the binding operator given as γ in (17) above), and the denotation of the Q-adverb is applied to the situation predicate denoted by the sub-tree that it c-commands. The result is given formally in (18) below, which becomes the object in (19) if the C-variable in the

⁶ Kayne (1994) argues for an analysis where extraposed relative clauses have not been moved to the right, but where all other constituents have been moved to the left. As this only works if one is willing to assume a massive amount of unmotivated movement, I consider this analysis to be implausible and will not consider it here.

restrictor of *usually* is resolved in the way indicated in section 1.1, and if furthermore the situation argument of the Q-adverb is caught by existential closure (cf. the simplified representation given in (9) above).

- (18) $\lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} \cap$
 $\{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': is\text{-happy}(\sigma\{x:$
 $human(x, s''''') \wedge \exists s'''''' [study\text{-linguistics}(x, s''''''')]\}, s''''''')]\} |$
 $\geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': C(s'')\} |$
- (19) $\exists s [| \{s': s' \leq s \wedge s' \in \min\{s'': \exists x [is\text{-happy}(x, s'')]\} \cap$
 $\{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': is\text{-happy}(\sigma\{x:$
 $human(x, s''''') \wedge \exists s'''''' [study\text{-linguistics}(x, s''''''')]\}, s''''''')]\} |$
 $\geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': \exists x [is\text{-happy}(x, s'')]\} |$

1.2.2 Sentences where the FR gets mapped onto the restriction

Let us next take a closer look at the examples (10) – (12). Consider example (10) first, which is repeated below as (20):

- (20) $[_{CP} [Wer Linguistik studiert]_i ist_k [_{vP} t_i [_{vP} meistens [_{vP} t_i FRÖHLICH t_k]]]$.
 Who linguistics studies is usually happy

In (20), the FR, which is de-accented relative to the most deeply embedded constituent inside the matrix-vP, has been moved into Spec, CP. As it does not contain the main focus-accent of the clause, the FR must have been moved to Spec, CP because of being the closest XP c-commanded by the Q-adverb that is able to check the latter's EPP-feature (cf. the discussion in chapter 2, section 4.3)). I take this as evidence that it has been scrambled across the Q-adverb in a previous step because of being topical, and has been adjoined to vP (cf. chapter 2, section 4.3).

Consider next example (11), which is repeated below as (21):

- (21) $[_{CP} dass [_{vP} [wer Linguistik studiert]_i] [_{vP} meistens [_{vP} t_i FRÖHLICH ist]]]$
 that who linguistics studies usually happy is

Being an embedded clause, where C^0 is filled by a complementizer that does not contain any formal features in need of being checked, (21) represents the same configuration that obtains in (20) after the FR has been scrambled across vP (and before the C^0 has been introduced).

Consider finally (12), which is repeated below as (22):

- (22) [_{CP} dass [_{vP} [_{vP} t_i' [_{vP} meistens [_{vP} t_i FRÖHLICH ist] [wer Linguistik studiert]]]]]
 that usually happy is who linguistics studies

(22) presents the same problem as (16), and I will argue for (almost) the same solution: I assume that also in this case the FR has been moved to the right of the matrix verb after Spell Out (i.e. at PF) in order to facilitate processing. The only difference to (16) is that in the case of (22) the non-focal FR has already been adjoined to vP above the Q-adverb in the overt component (as in (20) and (21)). This means that right-adjunction now has to be to the highest vP-segment. Furthermore, it has the consequence that at the point where the LF-branch of the derivation is reached, the FR still occupies the position above the Q-adverb, i.e. at LF the same configuration obtains as in (21).

Thus, if we maintain the assumption that also the movement of the FR to Spec, CP and the movement of the finite verb to C^0 do not have any semantic significance, all three sentences above get the LF-representation given in (23) below (Remember that according to the assumptions spelled out in section 4.4 of chapter 2, moved DPs leave behind full copies):

- (23)
-
- ...
- ... vP
- ... vP
- [Wer L. stud.] vP
- meistens vP
- [[Wer L. stud.] fröhlich ist]

It is entirely unclear how the LF in (23) can be interpreted in such a way that the QV-reading paraphrased in (9) (*Most linguists are happy*) can be obtained.

Let us consider in detail what happens if we proceed in analogy to the case of topical indefinites discussed in section 4.4 of chapter 2. Note first that we have to assume that the second version of *usually* is employed in this case, which is repeated below as (24).

$$(24) \quad [[\text{usually}]_2] = \lambda Q_{\langle s, t \rangle} \lambda P_{\langle s, t \rangle} \lambda s. | \{s' : s' \leq s \wedge s' \in \min\{s'' : P(s'') \wedge C(s'')\} \\ \cap \{s''' : \exists s'''' [s'''' \leq s \wedge s''' \leq s'''' \wedge s'''' \in \min\{s'''' : \\ Q(s''''')]\} \} | \geq \frac{1}{2} | \{s' : s' \leq s \wedge s' \in \min\{s'' : P(s'') \wedge C(s'')\} |$$

Concerning the interpretation of the higher copy, an additional complication comes into play: Remember that in the case of topical indefinites (which are of type $\langle\langle e, \langle s, t \rangle \rangle, \langle s, t \rangle \rangle$) an object of the required type (namely a situation predicate) could be obtained via existential closure of the argument of type $\langle e, \langle s, t \rangle \rangle$. This is of course impossible in the case under discussion, as the FR that c-commands the Q-adverb denotes an object of type e .

But of course it is well known since Partee (1987) (who builds on Montague (1970)) that objects of type e can easily be shifted into the type of generalized quantifiers. Let us therefore assume that the higher copy of the FR in (23) is shifted into an object of type $\langle\langle e, \langle s, t \rangle \rangle, \langle s, t \rangle \rangle$, as shown in (25) below:

$$(25) \quad \sigma\{x : \text{human}(x, s_1) \wedge \exists s' [\text{study-linguistics}(x, s')]\} \Rightarrow \\ \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda s. P(\sigma\{x : \text{human}(x, s_1) \wedge \exists s' [\text{study-linguistics}(x, s')]\}, s)$$

From now on, we can proceed in complete analogy to the case of topical indefinites: The shifted FR can be turned into a situation predicate via applying it to the predicate $\lambda y \lambda s'. \exists R [R(y, s')]$, as shown in (26) below:

$$(26) \quad \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda s. P(\sigma\{x : \text{human}(x, s_1) \wedge \exists s' [\text{study-linguistics}(x, s')]\}, s) \\ (\lambda y \lambda s'. \exists R [R(y, s')]) = \\ \lambda s. \exists R [R(\sigma\{x : \text{human}(x, s_1) \wedge \exists s' [\text{study-linguistics}(x, s')]\}, s)]$$

The object given in the last line of (26) is of course of the right type to serve as an argument of *usually*: Under the assumption that the free situation variable s_1 is resolved to w_0 by default (remember that it cannot be turned into a variable bound by the Q-adverb, as the latter does not c-command it), it is the characteristic function of a set of situations that stand in some relation to the maximal sum individual consisting of people who study linguistics in the actual

world. I.e. the characteristic function of a set of situations such that each of those situations contains all the people who study linguistics in the actual world.

Concerning the interpretation of the lower copy, the original denotation of the FR is not altered at all, if we stick to the assumptions argued for in chapter section 4.4 of chapter 2: According to those assumptions, the respective determiner contained within the lower copy of the respective DP is deleted and replaced by the definite determiner. Remember furthermore that we assumed that the insertion of an index (and a corresponding co-indexed lambda-operator) is only optional. Therefore, if we do not insert an index, the lower copy of the FR denotes the object given in the first line of (25) above.

If we furthermore assume that the free situation variable contained within it is resolved to w_0 by default⁷, the vP-segment c-commanded by the Q-adverb is interpreted as given in (27) below:

$$(27) \lambda s. \text{is-happy}(\sigma\{x: \text{human}(x, w_0) \wedge \exists s'[\text{study-linguistics}(x, s')]\}, s)$$

Finally, we have to apply the denotation of *usually* given in (24) above to the situation predicate in (27), and to the one given in the last line of (26), which (after existential closure) gives us (28a) as the final result – a simplified version of which is given in (28b):

$$(28) \text{ a. } \exists s \left[\left| \{s': s' \leq s \wedge s' \in \min\{s'': \exists R [R(\sigma\{x: \text{human}(x, w_0) \wedge \exists s''[\text{study-linguistics}(x, s'')]\}, s')]\} \cap \{s''': \exists s''''[s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': \text{is-happy}(\sigma\{x: \text{human}(x, w_0) \wedge \exists s''[\text{study-linguistics}(x, s'')]\}, s''''')]\} \right| \geq \frac{1}{2} \left| \{s': s' \leq s \wedge s' \in \min\{s'': \exists R [R(\sigma\{x: \text{human}(x, w_0) \wedge \exists s''[\text{study-linguistics}(x, s'')]\}, s')]\} \right| \right]$$

$$\text{ b. Most } s \left[\exists R [R(\sigma\{x: \text{human}(x, w_0) \wedge \exists s'[\text{study-linguistics}(x, s')]\}, s) \right. \\ \left. [\exists s'' [s \leq s'' \wedge \text{is-happy}(\sigma\{x: \text{human}(x, w_0) \wedge \exists s''[\text{study-linguistics}(x, s'')]\}, s'')]] \right]$$

⁷ Note that in principle it is of course also possible to turn it into a variable bound by the Q-adverb via the insertion of a binding operator. In the case at hand, this, however, would not make any difference, as the situation predicate that serves as the restrictor of the Q-adverb ensures that the same maximal sum individual is contained in each of the situations quantified over.

But (28) is of course not what we want, as it does not correspond to a QV-reading. It can be paraphrased as follows: Most (minimal) situations that contain all the people who study linguistics in the actual world can be extended to (minimal) situations where all those people are happy⁸. Therefore, according to (28), the Q-adverb quantifies over a set of situations such that in each of those situations the same plurality of people is present. Note furthermore that the reading given in (28) is very hard, if not impossible to get for the sentences (20) – (22) – presumably because it is very unlikely that there is a set of situations such that each of those situations contains all the people who study linguistics in the actual world.

This means that the mechanism that gives us plausible readings of adverbially quantified sentences that contain topical indefinites is not able to derive the QV-readings of adverbially quantified sentences with topical FRs (and of course also plural definites). Therefore, an additional mechanism has to be invoked to interpret an LF where the higher copy of a moved DP c-commands a Q-adverb.

1.3 Two failed attempts

This section recapitulates in a more systematic way some conclusions already arrived at on a more intuitive basis in chapter 1 (in sections 2.2.2 and sections 3.3). I will show why two rather obvious solutions do not work (at least not in general): The first one because it can only be applied to a subset of the phenomena that need to be explained, and the second one because it cannot explain some rather subtle, but nevertheless real restrictions that constrain the availability of QV-readings for a subset of the type of sentences under discussion. Furthermore (as already mentioned in section 3.3 of chapter 1), it turns out that the two subsets complement each other. This will be of some importance later on in this chapter: I will argue that the solution discussed in section 1.3.1 (of this chapter) is the correct one as far as a subset of adverbially quantified sentences that contain topical FRs is concerned, but that a different mechanism has to be assumed in order to account for QVEs in the complementary subset.

⁸ Let us for the moment abstract away from the fact that a distributivity-operator (as in Lasersohn (1998), which is based on Link (1983, 1987)) must be attached to the predicate *be happy*, as *be happy* cannot be interpreted collectively. This produces the result given below, which can then be applied to the maximal sum individual denoted by the FR:

(i) $\text{D}[[\text{be happy}]] = \lambda x \lambda s. \forall y \in \text{Atom}(x) [\exists s' \leq s [\text{happy}(y, s')]]$

1.3.1 Quantification over situations that contain a realization of the kind denoted by the FR

With respect to the examples under discussion, it makes sense to say that the FR involved denotes a kind – the kind of linguistics students. This is evidenced by the fact that the FR in (29a) below (which corresponds to the German examples under discussion) is most naturally replaced by a bare plural (as in (29b)), not by a plural definite (as in (29c)): The plural definite in (29c) can only be understood as referring to a specific plurality of students, i. e. to a plurality which has either been introduced into the discourse explicitly or is present in the utterance situation. If neither of those conditions is satisfied, the sentence is odd. This result is significant, as it is well-known since Carlson (1977) that bare plurals in English can be used to refer to kinds – which is evidenced by the fact that they can be combined with *kind level predicates* like *be extinct*, *be widespread*, etc. (see section 2.2.2 in chapter 1 of this dissertation):

- (29) a. Who(ever) studies linguistics is usually HAPPY.
b. People who study linguistics are usually HAPPY.
c. ^(??)The people who study linguistics are usually HAPPY.

Note that in German this contrast cannot be observed: In this language, kinds can be referred to by bare plurals as well as by plural definites (see Krifka et al. (1995) and the references cited therein; see also Dayal (2004) for further discussion), as is evidenced by (30 a, b) below.

- (30) a. Dinosaurier sind ausgestorben.
Dinosaurs are extinct.
b. Die Dinosaurier sind ausgestorben
The dinosaurs are extinct.

The FR in sentence (20) (repeated below as (31a)), for example, can therefore be replaced by a bare plural as well as by a plural definite without producing any contrast as far as the truth conditions/presuppositions are concerned. In both cases, a QV-reading is easily available. This is shown in (31 b, c).

- (31) a. Wer Linguistik studiert, ist meistens FRÖHLICH.
Who linguistics studies is usually happy.

- b. Leute, die Linguistik studieren sind meistens FRÖHLICH.
 People who linguistics study are usually happy.
- c. Die Leute, die Linguistik studieren, sind meistens FRÖHLICH.
 The people who linguistics study are usually happy.

Now, according to the “Neo-Carlsonian” analysis proposed by Chierchia (1998) (see also Krifka (2004) and Dayal (2004) for related proposals and discussion), kinds are nothing but “intensionalized” sum individuals, i. e. they denote functions from possible worlds into the maximal sum individuals that satisfy the respective predicate in the world they are applied to. Let us follow this proposal, but adapt it slightly to our purposes, i. e. let us assume that in English there is a covert determiner the denotation of which contrasts minimally with the denotation of the definite determiner: It denotes a function from predicates of type $\langle e, \langle s, t \rangle \rangle$ into a function from situations (remember that worlds also count as (maximal) situations) into the maximal sum individual that satisfies the respective predicate in the respective situation, while the definite determiner denotes a function from predicates of type $\langle e, \langle s, t \rangle \rangle$ into the maximal sum individual that satisfies the respective predicate at *some situation* (which is given in the form of a free variable that needs to be assigned a value). The denotation of this covert determiner is given in (32a) below, while the denotation of the definite determiner is repeated for comparison in (32b):

- (32) a. $[[D_{\text{KIND}}]] = \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda s. \sigma \{x: P(x, s)\}$
 b. $[[\text{The}]] = \lambda P_{\langle e, \langle s, t \rangle \rangle} \cdot \sigma \{x: P(x, s_1)\}$

Let us furthermore assume that in German the definite determiner is ambiguous between the denotation in (32a) and the one in (32b), and that furthermore the covert determiner D_{KIND} is also available. This explains the fact that in German kinds can be referred to by bare plurals as well as by plural definites.

Finally, I want to propose that (in English as well as in German) FR-CPs can in principle be combined with a covert version of the definite determiner (which has to be employed for the reasons discussed in section 1 of chapter 1) as well as with D_{KIND} : This has the consequence that FRs can not only denote objects of type e , but also objects of type $\langle s, e \rangle$, depending on whether the covert definite determiner or D_{KIND} is chosen.

According to Chierchia (1998), kind denoting expressions have to be type-shifted when they are combined with object level predicates, as the latter can only be applied to objects of

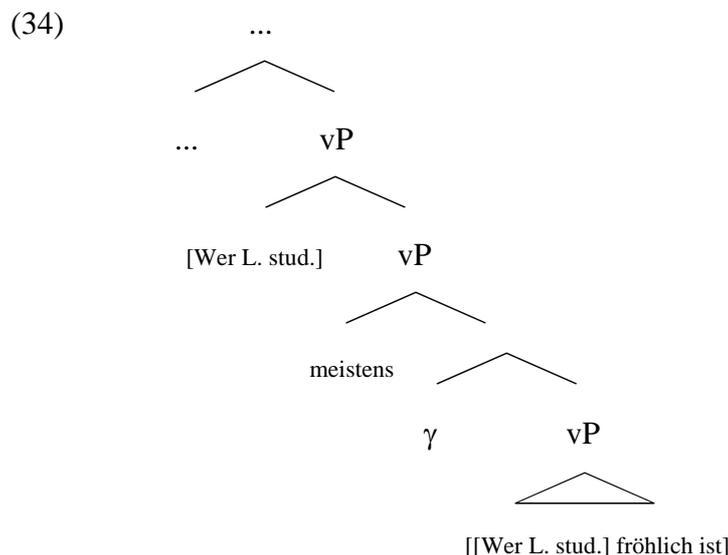
type e (while kind level predicates like *be extinct* can only be applied to objects of type $\langle s, e \rangle$): Existential quantification over instances of the respective kind is triggered.

Let us again follow the spirit of Chierchia (ibd.), but depart slightly from the technical details of his proposal and assume that expressions denoting kinds can be shifted into existential quantifiers over *realizations* of the respective kind (cf. Carlson (1977) and Krifka et al. (1995)). This is shown in (33) below:

$$(33) \quad k \Rightarrow \lambda P \lambda s. \exists x [Real(x, k, s) \wedge P(x, s)],$$

where k stand for “kind denoting expression” and $Real(x, k, s)$ for “ x realizes k at s ”.

With these assumptions in place, let us now consider what happens if it is assumed that in our examples (20) – (22) the FR-CP is not combined with a covert definite determiner, but with D_{KIND} . In (34) below a slightly modified version of the LF-representation (23) is given, where a (situation variable) binding operator has been inserted beneath the Q-adverb (for reasons that will become clear soon):



Let us concentrate on the interpretation of the higher copy first. It now denotes the object given in (35).

$$(35) \quad \lambda s. \sigma\{x: human(x, s) \wedge \exists s' [study\text{-}linguistics(x, s')]\}$$

Let us assume that as this object is not of the right type to serve as an argument of the Q-adverb (which needs objects of type $\langle s, t \rangle$), it is shifted in the way suggested in (33). This is shown in (36) below:

$$(36) \text{ a. } \lambda s. \sigma\{x: \text{human}(x, s) \wedge \exists s'[\text{study-linguistics}(x, s')]\} \Rightarrow \\ \lambda P \lambda s. \exists x [\text{Real}(x, \lambda s. \sigma\{x: \text{human}(x, s) \wedge \exists s'[\text{study-linguistics}(x, s')]\}, s) \\ \wedge P(x, s)]$$

The result of this type shifting operation can now easily be turned into an object of the right type via existential abstraction. The result is given in (37) below: The characteristic function of a set of situations such that each of those situations contains a realization of the kind LINGUISTICS STUDENT. This object is of course of the right type to serve as the restrictor of *usually*.

$$(37) \lambda s. \exists x [\text{Real}(x, \lambda s. \sigma\{x: \text{human}(x, s) \wedge \exists s'[\text{study-linguistics}(x, s')]\}, s) \\ \wedge \exists R [\text{R}(x, s)]]$$

Let us now turn to the vP-segment c-commanded by the Q-adverb. As far as the lower copy of the FR is concerned, it is turned into the object given in (38) by our (version of the) trace (or, rather: copy) conversion mechanism, which replaces D_{KIND} by an ordinary definite determiner.

$$(38) \sigma\{x: \text{human}(x, s_1) \wedge \exists s'[\text{study-linguistics}(x, s')]\}$$

At this point it should be clear why I have assumed in (34) above that a binding operator is inserted beneath the Q-adverb: This has the consequence of turning the free situation variable in (38) into a variable bound by the Q-adverb. We thus get (39) as the denotation of the vP-segment c-commanded by *usually*.

$$(39) \lambda s. \text{is-happy}(\sigma\{x: \text{human}(x, s) \wedge \exists s'[\text{study-linguistics}(x, s')]\}, s)$$

The only thing that remains to be done now is to apply the denotation of *usually* to the situation predicates given in (37) and (39) successively, which gives us the simplified

semantic representation in (40) (where the two minimality conditions have been suppressed for simplicity) as the final result.

$$(40) \text{ Most } s [\exists x [\text{Real}(x, \lambda s'. \sigma\{x: \text{human}(x, s') \wedge \exists s''[\text{study-linguistics}(x, s'')]\}], s) \\ \wedge \exists R [\text{R}(x, s)]] \\ [\exists s''' [s \leq s''' \wedge \text{is-happy}(\sigma\{x: \text{human}(x, s''') \wedge \\ \exists s''[\text{study-linguistics}(x, s'')]\}], s''')]]$$

(40) can be paraphrased as follows: Most (minimal) situations s that contain a realization of the kind LINGUISTICS STUDENT can be extended to minimal situations s' such that the maximal sum of linguistics students contained in s' is happy in s' .

This is the correct result: The two minimality conditions ensure that each of the situations quantified over contains an atomic individual that realizes the kind denoted by the FR, and that with respect to each of those situations the definite in the nuclear scope picks up the individual that has been introduced in the restrictor. This has the consequence that the sentences in (20) – (22) under their QV-readings are truth-conditionally equivalent to corresponding sentences where the respective FR has been replaced by an indefinite like *Ein Linguistikstudent* (*A linguistics student*). This is of course what we wanted: We can explain the fact that sentences containing FRs and ones containing singular indefinites (and, by the way, also ones that contain bare plurals) get QV-readings under the same conditions without having to postulate that FRs and singular indefinites have the same meaning (as claimed by Berman (1994) and Wiltschko (1999)).

Furthermore, this result comes at a relatively low price: We only have to be willing to accept that FR-CPs can not only be combined with a covert version of the definite determiner (as we have assumed so far), but also with the covert determiner D_{KIND} , the denotation of which is given in (32a) above. Everything else follows from the combination of my approach to the interpretation of DP-chains with independently justified assumptions concerning kind denoting expressions.

Nevertheless, we are not done yet: As already mentioned in section 3.3 of chapter 1, it is not plausible to assume that QVEs in sentences containing FRs always come about in the way

suggested in this section – for the simple reason that there are FRs which cannot plausibly be assumed to denote kinds⁹, but which nevertheless induce QV-readings.

In order to see this, consider the examples in (41) below:

- (41) a. Who was kissed by Mary at the party yesterday was usually BLOND.
b. The people who were kissed by Mary at the party yesterday were usually BLOND.
c. ?People who were kissed by Mary at the party yesterday were usually BLOND.

As is evidenced by the contrast between (41b) and (41c), the FR in (41a) does not correspond to a bare plural, but to a plural definite. I take this as evidence that the overtly given CP cannot be combined with the covert determiner D_{KIND} , but only with the covert version of the ordinary definite determiner.

It is of course an interesting question why an NP like *people who were kissed by Mary at the party yesterday* has to be combined with a definite determiner, while an NP like *people who study linguistics* can be realized as a bare plural (in our terms: can be combined with the covert determiner D_{KIND}). I can only offer a few remarks within the limitations of this dissertation (but see Endriss and Hinterwimmer (in preparation) for more details). The relevant factor seems to be the temporal specificity/non-specificity of the respective predicate, while concepts like “being well-established” or “forming a natural class” do not seem to play any role. This is evidenced by the contrast between (42a) and (42b) below (cf. Greenberg (2003)): In spite of the fact that the NP in this case can certainly not be claimed to denote a well-established or “natural” property, it does not have to be combined with a definite determiner. Rather, if it is combined with a definite determiner, the resulting DP can only be taken to denote a specific plurality of Norwegian students who wear thick green socks, and the sentence does not get a QV-reading anymore: It can only be interpreted as saying that the individual members of this plurality are happy in most (relevant) situations.

- (42) a. Norwegian students who wear thick green socks are usually HAPPY.
b. (??)The Norwegian students who wear thick green socks are usually HAPPY.

⁹ As already noted by Carlson (1977), there are also bare plurals that cannot plausibly be analysed as kind-denoting, like for example *parts of this machine*.

It is also clear that the size of the respective set is not the relevant factor: Even NPs that denote characteristic functions of sets that have a very large cardinality are not acceptable as bare plurals (in our terms: cannot be combined with D_{KIND}) if set membership is determined on the basis of being contained in a situation that is located within a highly specific time interval. This is evidenced by the contrast between (43a) and (43b) below:

- (43) a. The mosquitoes at the open-air concert yesterday evening were surprisingly LARGE.
b. ^{??}Mosquitoes at the open-air concert yesterday evening were surprisingly LARGE.

On the other hand, neither spatial specificity nor being located within a time interval that is large enough seems to hurt: Both (44a) and (44b) are fine and get QV-readings easily.

- (44) a. People who enter this room always like the paintings on the WALL.
b. People who studied linguistics in the eighties usually admire CHOMSKY.

I therefore suggest tentatively (see Endriss and Hinterwimmer (in preparation) for further discussion) that D_{KIND} can only be applied to properties if it can be assumed that the resulting function of type $\langle s, e \rangle$ yields a defined result for a large enough number of situations, i.e. if there are enough situations that contain individuals which satisfy the respective predicate. Otherwise, the definite determiner has to be used.

But let us set these speculations aside and simply take it for granted that there are FRs that do not denote kinds (as is evidenced by the fact that they correspond to plural definites, not to bare plurals; see (41) above), but can nevertheless induce QV-readings if the relevant structural conditions are met. How do those QV-readings and ones of the corresponding sentences with plural definites come about?

1.3.2 The second attempt: Quantification over the atomic individuals the plural individual denoted by the respective FR consists of

In this section I simply want to remind the reader of some facts already discussed in section 3.3. It might be tempting to propose the following solution to our problem: If one gives up the

assumption that Q-adverbs are only able to quantify over situations, one could make the claim that QVEs in sentences that contain plural definites and non-kind denoting FRs come about via quantification over the atomic parts of the respective sum individuals. That is, we could stick to the assumption that neither singular nor plural definites and FRs are predicative expressions, but objects of type *e* (or, in the case of FRs, sometimes also $\langle s, e \rangle$), and that therefore QVEs in sentences with singular definites can only come about in the way described in chapter 2, because singular definites do not introduce objects that Q-adverbs are able to operate on directly. But nevertheless one could claim that in principle Q-adverbs may operate on sets of individuals as well as on sets of situations, and that they therefore may take plural definites as arguments, because there is a simple type shift available that maps plural individuals onto the sets of atoms they consist of (cf. Link (1983) and Landman (2000)).

But, as already discussed in section 3.3 of chapter 1, this proposal can be dismissed immediately for the following reason: It predicts that adverbially quantified sentences with topical plural definites or FRs should behave in the same way as sentences where a quantificational determiner of corresponding quantificational force is combined with the same NP as the one contained within the respective plural definite/with an NP that denotes (almost) the same property as the respective FR-CP. This, however, is not the case, as is evidenced by the examples in (45) below:

- (45) a. ^{??}The people who lectured on kangaroos at the conference last summer are usually OPEN-MINDED.
 b. ^{??}Who lectured on kangaroos at the conference last summer is usually OPEN-MINDED.
 c. Most of the people who lectured on kangaroos at the conference last summer are OPEN-MINDED.

Both (45a) and (45b), where the tense of the respective relative clause verb does not agree with the tense of the respective matrix verb, do not get QV-readings and are therefore odd (if the matrix predicate *open-minded* is understood as an individual level predicate). In the case of (45c), on the other hand, it does not seem to do any harm that the relative clause verb is marked for past tense, while the matrix verb is marked for present tense. That a lack of tense agreement is the relevant factor is evidenced by the fact that (46a, b), where both verbs are marked for past tense, get QV-readings and are therefore as fine as (46c).

- (46) a. Who lectured on kangaroos at the conference last summer was usually OPEN-MINDED.
- b. The people who lectured on kangaroos at the conference last summer were usually OPEN-MINDED.
- c. Most of the people who lectured on kangaroos at the conference last summer were OPEN-MINDED.

As already said in section 3.3 of chapter 1, this difference between adverbially quantified sentences with FRs and plural definites on the one hand, and sentences that contain corresponding quantificational DPs, on the other hand, would be hard to explain if Q-adverbs and quantificational determiners both quantified over the same objects (namely individuals) in this case. If, on the other hand, Q-adverbs unambiguously quantified over situations, it would be possible to account for the difference between (45a, b) on the one hand, and (46c) on the other, by appealing to a constraint that only concerns quantification over situations, but not quantification over individuals.

That this is indeed a promising strategy is further evidenced by the fact that also in the case of adverbially quantified sentences that contain singular indefinites modified by relative clauses the tense markings of the respective relative clause verbs – with some qualifications, as we will see in section 2 – have to agree with the tense markings of the respective matrix verbs. In order to see this, consider the examples in (47) below: While (47a) easily gets a QV-reading that is equivalent to the meaning of (47b), (47c) does not get an interpretation that is equivalent to the meaning of (47d), but is rather odd in a neutral context, as it seems to require that there is a single specific car which changes its colour extremely often.

- (47) a. A car that was bought in the eighties was usually blue.
- b. Most cars that were bought in the eighties were blue.
- c. ^(??)A car that was bought in the eighties is usually blue.
- d. Most cars that were bought in the eighties are blue.

But interestingly, this tense agreement constraint does not seem to be in effect in adverbially quantified sentences that contain bare plurals or “temporally unspecific” FRs, as is evidenced by the fact that all the sentences in (48) below are fine:

- (48) a. Cars that were bought in the eighties are usually BLUE.

- b. What was bought in the eighties is usually BLUE.
- c. People who studied linguistics in the eighties are usually BLOND.
- d. Who studied linguistics in the eighties is usually BLOND.

We will see in section 4, after I have presented my analysis of QVEs in sentences that contain “temporally specific” FRs and plural definites, and after I have presented my account of the tense agreement constraint in those sentences as well as in ones that contain singular indefinites, that the analysis presented in section 1.3.1 offers the potential to account for the absence of tense agreement effects in adverbially quantified sentences that contain bare plurals and “temporally unspecific” FRs. Thus, what at first seemed to be a disadvantage of this analysis will eventually turn out to be an advantage: That it can only be applied to a subset of the relevant data.

But let us first return to plural definites and “temporally specific” FRs: Apart from the above mentioned facts concerning tense agreement, there is a further difference between adverbially quantified sentences containing FRs or plural definites, and sentences with quantificational DPs. Consider the contrast between (49 a, b), on the one hand, and (49c) on the other:

- (49) a. ^{??}Who listened to Peter’s lecture on kangaroo tails at the conference last summer was usually OPEN-MINDED.
- b. ^{??}The people who listened to Peter’s lecture on kangaroo tails at the conference last summer were usually OPEN-MINDED.
- c. Most of the people who listened to Peter’s lecture on kangaroo tails at the conference last summer were OPEN-MINDED.

(49a, b) are both odd, in spite of the fact that the tense markings of the respective matrix verbs agree – just as in (46a, b), which are both fine. Intuitively, the relevant difference between (46a, b) on the one hand, and (49a, b) on the other, can be stated as follows: Note first that both the predicate *listen to Peter’s lecture on kangaroo tails* and the predicate *lectured on kangaroos at the conference last summer* have to be interpreted distributively. Let us assume that a distributive interpretation comes about in the following way: A covert distributivity-operator is applied to the respective predicates (as in Laserson (1998), who builds on Link (1983, 1987)). This has the consequence that they are shifted to predicates that distribute the atomic parts of the sum individuals they take as one of their arguments over smaller situations

contained within the situation they take as their other argument (the technical details will be spelled out below), requiring that those small situations satisfy the respective predicate, i.e. that each of them is a situation where an atomic part of the respective sum individual listens to Peter's lecture on kangaroo tails/lectures on kangaroos at the conference last summer.

But now note that in the case of (49a, b) it is clear that the respective small situations all took place at the same time, while in the case of (46 a, b) it is plausible to assume that they are distributed over a larger time interval: The definiteness of the DP *Peter's lecture on kangaroo tails* makes it clear that all atomic parts of the respective sum individual listened to one and the same lecture. If it is furthermore assumed that listening to a lecture means listening to it from start to finish, it follows that in the case of (49a, b) the above mentioned small situations all coincide temporally. Concerning (46a, b), on the other hand, this is not the case: There is no plausible reason to assume that all lectures on kangaroos that were given at the conference mentioned there took place at the same time (though there might of course have been some overlap).

While it is of course entirely mysterious why the internal constitution of the situations introduced in the respective clauses plays any role as far as the availability of QV-reading is concerned (an explanation will be offered in section 3), the difference between adverbially quantified sentences that contain plural definites or "temporally specific" FRs and sentences that contain corresponding quantificational DPs is a fact and has to be accounted for. I therefore regard this effect as well as the above mentioned tense agreement constraint as strong evidence against the claim that QVEs in adverbially quantified sentences that contain "temporally specific" FRs and plural definites come about via quantification over individuals: If this was the case, we would not expect to see any difference between those sentences and ones with corresponding quantificational DPs.

Furthermore, I assume that a proper understanding of those effects is the key to understanding how QVEs in sentences with "temporally specific" FRs and plural definites comes about, and vice versa. I will therefore in the next section be concerned with the first effect (the tense agreement constraint), which also obtains in adverbially quantified sentences containing singular indefinites. I will then return to the second effect, which concerns the internal constitution of the respective complex relative clause situations, in section 3, after I have presented my account of how QVEs in sentences with FRs and plural definites come about. The discussion of the tense agreement effects mentioned above will be based on sentences with singular indefinites for the following reason: In this case there already is a

theory available that can explain QVEs as the by-product of quantification over (minimal) situations.

2 How Tense Influences Adverbial Quantification: The Case of Singular Indefinites Modified by Relative Clauses¹⁰

2.1 Some data

As already mentioned above, the tense agreement effect observed in sentences with “temporally specific” FRs and plural definites also obtains in adverbially quantified sentences that contain singular indefinites:

- (50) a. ??A man who studied linguistics in the eighties is usually BLOND.
b. Most men who studied linguistics in the eighties are BLOND.

(50a), where the relative clause verb is marked for past tense, while the matrix verb is marked for present tense, is very strange: The indefinite is preferably interpreted specific, with scope over the Q-adverb. This, however, clashes with the tendency to interpret *blond* as an individual level predicate. A QV-reading, on the other hand, only seems to be available if the sentence is understood as saying that the respective men only became blond as a result of having studied linguistics – which is highly implausible. (50b), on the other hand, where the Q-adverb has been replaced by a quantificational determiner of corresponding quantificational force, is perfectly fine, and does not force the hearer to assume any causal relation between having studied linguistics in the eighties and being blond.

Consider the examples in (51) next:

- (51) a. A man who studied linguistics in the eighties was usually BLOND.
b. Most men who studied linguistics in the eighties were BLOND.

¹⁰ The results reported in this section are based on joint work with Cornelia Endriss (Endriss and Hinterwimmer (to appear)).

(51a), where both verbs are marked for past tense, easily gets a QV-reading without any special demands, while (51b) is just as good as (50b) (though slightly different, as far as the range of available interpretations is concerned, as we will see soon).

While the difference between (50a) and (50b) certainly presents additional evidence against the claim that QVEs in sentences with singular indefinites come about via unselective binding of individual variables, it is not at all clear how event or situation semantics approaches to QVEs in sentences with indefinites – including the one I have argued for in chapter 2 of this dissertation – can account for the contrast between (50a) and (51a) (cf. Berman (1987), de Swart (1993), von Stechow (1994), Herburger (2000)).

According to the analysis presented in section 4.4 of chapter 2, being de-accented keeps the indefinite in (50a) from being reconstructed. This has the consequence that the higher copy (i. e. the one that c-commands the Q-adverb) is interpreted as the characteristic function of a set of minimal situations such that each of those situations contains a (different) man who studied linguistics in the eighties. The lower copy on the other hand (i. e. the one that is c-commanded by the Q-adverb) is interpreted as a definite description that contains a situation variable which is bound by the Q-adverb: With respect to each of the situations quantified over, it denotes the unique man contained in the extension of the respective situation who studied linguistics in the eighties. Applying the denotation of the Q-adverb to the (denotation of the) constituent containing this lower copy first, and then to the (denotation of the) higher copy results in the (simplified) semantic representation given in (52) below:

$$(52) \text{ Most } s [\exists x [\text{man}(x, w_0) \wedge \exists s' [\text{study-linguistics}(x, s') \wedge \text{past}(s') \wedge \text{in-80s}(s') \wedge \\ \text{C}(s')] \wedge \exists R [\text{R}(x, s)]] \wedge \text{C}(s)] \\ [\exists s'' [s \leq s'' \wedge \text{is-blond}(\sigma\{x: \text{man}(x, s'') \wedge \exists s' [\text{study-linguistics}(x, s') \\ \wedge \text{past}(s') \wedge \text{in-80s}(s')]\}, s'') \wedge \text{pres}(s'')]$$

Note that I make the following assumptions concerning the interpretation of tense morphemes: I assume that verbs already enter syntactic derivations fully inflected (as in Chomsky (1995: chapter 4) and that verb movement to functional heads only serves the purpose to check off formal features present in those heads, without having any semantic consequences. *Studied*, for example, is thus interpreted as given in (53) below:

$$(53) \lambda x \lambda y \lambda s. \text{study}(x, y, s) \wedge \text{past}(s)$$

Furthermore, I assume that *past(s)* and *present(s)* are interpreted as given in (54a, b) below:

(54) a. $\text{past}(s) =: \tau(s) < t_0$,

b. $\text{pres}(s) =: t_0 \subseteq \tau(s)$

where τ is the temporal trace function, i.e. a function that maps situations onto intervals (see Ogihara (1998), building on Krifka (1989, 1992), $<$ encodes temporal precedence, \subseteq encodes the subinterval property and t_0 is the respective utterance time.

But now note that in the case of stative predicates like *be blond*, we are facing a problem already noted by Ogihara (1998) as soon as tense is taken into account. Remember that in order to get the truth conditions right, we want Q-adverbs to quantify only over minimal situations that satisfy the respective predicate, i. e. over situations s that satisfy the respective predicate P such that there is no situation s' that is included within s such that s' also satisfies P . This is unproblematic in the case of accomplishments and achievements (cf. Vendler (1957)) like *build a house* or *reach a mountain*, as there always is a minimal situation of someone building a house, reaching a mountain, etc. Concerning statives like *be blond*, *be happy* etc. and activities like *run*, on the other hand, it is not clear what counts as a minimal situation of someone being blond, being happy, running etc., because the respective predicates have the *subinterval property* (Bennett and Partee (1972)): If they are true of some interval, they are automatically true of every interval contained within that interval, no matter how small. So what to do?

Remember that the minimality condition was invoked in order to prevent the situations quantified over from containing any superfluous stuff. Let us therefore assume that if applying the original minimality condition (given in (55i)) to a set of situations gives us the empty set, it is turned into the condition given in (55ii) below, which does two desirable things at the same time: It filters out all situations that contain any individuals (in an abstract sense of the term) which are not necessary for determining whether the respective predicate is satisfied. Furthermore, it ensures that as far as temporal extension is concerned, the respective Q-adverb only quantifies over maximal situations. This second condition is necessary because the problem for adverbial quantification posed by stative predicates and activities is not solved by simply dropping the original minimality condition and replacing it by a condition that filters out situations containing superfluous participants: Due to the subinterval property, the set of situations that satisfy the respective predicate is now an infinite set the cardinality of which

can therefore not be determined. This, however, is necessary in order to compute the truth conditions of the respective sentence. As soon, however, as only “temporally maximal” situations are taken into account, this problem disappears.

$$(55) \text{ i. } \min\{s: P(s)\} = \{s: P(s) \wedge \neg \exists s' [s' < s \wedge P(s')]\}$$

$$\text{Iff } \{s: P(s) \wedge \neg \exists s' [s' < s \wedge P(s')]\} = \emptyset, \text{ then}$$

$$\text{ii. } \min\{s: P(s)\} = \{s: P(s) \wedge \neg \exists s' [s' \leq s \wedge P(s')] \wedge \{x: \exists R [R(x, s')]\} \subset \{x: \exists R [R(x, s)]\} \wedge \neg \exists s'' [s \leq s'' \wedge P(s'') \wedge \tau(s) \subset \tau(s'')]\}$$

Note that also in the case of the restrictor situations in (52) the original definition of minimality would give us the empty set, as the property of standing in some relation to a man who studied linguistics in the eighties also has the subinterval property: For each situation that stands in some relation to a man who studied linguistics in the eighties, i. e. for each situation that contains a man who studied linguistics in the eighties, there is a sub-situation that also contains a man who studied linguistics in the eighties. Therefore, the second definition of minimality in (55) above comes into play, and the Q-adverb accordingly quantifies over situations such that each of those situations contains nothing but a man who studied linguistics in the eighties, but is temporally maximal, i. e. it contains the respective man in his whole temporal extension.

Concerning temporal adverbials, I assume that they denote functions of type $\langle s, t \rangle, \langle s, t \rangle$, i. e. they take situation predicates as arguments and map them onto situation predicates. *In the eighties* is thus interpreted as given in (56) below:

$$(56) \text{ [[in the eighties]]} = \lambda P_{\langle s, t \rangle} \lambda s. P(s) \wedge \tau(s) \subseteq 80s$$

(52) can thus be paraphrased as follows: “Most temporally maximal situations s that contain (nothing but) a man x such that there is a situation s'' such that s'' is a situation that is located in the eighties where x studied linguistics can be extended to a temporally maximal situation s' that includes the speech time such that s' is a situation such that the unique man in s' who studied linguistics in the eighties is blond in s' , and s' contains nothing but this man.”

Now the problem is that – as the paraphrase above shows – there is nothing wrong with (52): That means, without additional assumptions also my approach, which is based on the assumption that QVEs in sentences with singular indefinites come about as a by-product of quantification over situations, cannot explain why sentences like (50a) are strange.

Before presenting a pragmatic explanation for the fact that sentences like (50a) are odd, I will quickly discuss some solution strategies that might come to mind at first, and will show why they do not work.

2.2 Conceivable solution strategies

2.2.1 Greenberg's (2002, 2003) restrictions regarding generic readings of sentences that contain singular indefinites

Greenberg (2002, 2003) notes that in contrast to bare plurals, singular indefinites cannot be interpreted generically if either (i) the respective NPs denote “extremely unnatural properties”, (ii) the respective “VPs denote extremely unconnected properties” (i.e. unconnected to the properties denoted by the respective NPs), or (iii) they are modified by a specific temporal adverbial” (Greenberg (2003: 295f.). Consider the sentences below:

- (57) a. A Norwegian student whose name ends with ‘s’ or ‘j’ wears thick green socks (ibd.: 30).
b. Norwegian students whose names end with ‘s’ or ‘j’ wear thick green socks (ibd.: 30).
- (58) a. A famous semanticist sings German arias in the shower (ibd.: 33).
b. Famous semanticists sing German arias in the shower (ibd.: 33).
- (59) a. An Italian restaurant is closed tonight (ibd.: 243).
b. Italian restaurants are closed tonight (ibd.: 243).

In all cases, the singular indefinite only gets a specific reading, while the bare plural easily can be interpreted generically. Greenberg (ibd.) accounts for this contrast as follows: On the one hand she assumes that both sentences with singular indefinites and bare plurals get generic readings via the binding of situation variables (introduced by the respective verbs) and individual variables (introduced by the respective indefinites or bare plurals, which she assumes to denote properties) by a covert generic quantifier. But on the other hand she assumes that the two kinds of sentences express different kinds of generalizations: “In virtue of” generalizations in the case of singular indefinites, and “descriptive” generalizations in the

case of bare plurals. According to her, “in virtue of” generalizations assert “that the generalization is non-accidentally true in virtue of some contextually determined property associated with the denotation of the subject”. “Descriptive” generalizations, on the other hand, assert “that the generalization is merely non-accidentally true, without implying or specifying the relevant property or factor in virtue of which this non-accidental truth holds” (ibd.: 289f.).

This is (very roughly) technically implemented as follows: In both types of sentences, a modal universal quantifier that quantifies over accessible worlds is present in addition to the quantifier over individuals and situations. But, crucially, there is a difference with respect to the sets of worlds accessible from the world of evaluation in the two cases.

In the case of “in virtue of” generalizations, the worlds quantified over have to fulfil the following condition: There has to be a property *S* such that in all those worlds every individual that has the property *P* denoted by the NP contained within the respective singular indefinite also has the property *S*. Furthermore, the generalization that “every *P* individual has *S*” itself has to follow “from what is known, commanded, stereotyped, etc.” (ibd.: 292) in the world of evaluation.

In the case of descriptive generalizations, on the other hand, the worlds quantified over have to be members of the union of the following two sets: The set of worlds which are inertia worlds to the world of evaluation *w* (i. e. very roughly, worlds where nothing unexpected happens in the future), and the set of worlds which are “maximally similar to *w*, except from what is needed to allow for the fact that the *P* set of individuals and the set of situations involving them are not identical to the sets of *P* individuals and relevant situations existing in *w*, respectively” (ibd.: 293).

Now according to Greenberg (ibd.), the condition associated with “in virtue of” generalizations, in combination with the Gricean maxims of conversation lead to a number of presuppositions, of which the following are relevant for our present concerns: the “natural classes” presupposition, and the “reasonable causation” presupposition (ibd.: 294). According to the first presupposition, there has to be a cluster of properties associated with the NP-property, i. e. *P* has to be a “natural” property, with which we associate other properties” (ibd.: 294). According to the second presupposition, there has to be “a good possibility that (...), relative to some general principle in our world, having” the subject property *P* and the property *S* associated with it “leads to having properties of the sort” of the V-property *Q* (ibd.: 294).

Greenberg argues that in cases like (57a), (58a) and (59a) above, one of those presuppositions is not fulfilled: In the case of (57a), the NP-property is so exotic that there is no cluster of properties associated with it from which a suitable *S*-property could be chosen. Therefore, the first presupposition is violated and the sentence accordingly does not get a generic reading. In the case of (58a), on the other hand, the second presupposition is violated: There is no general principle in our world available from which one could conclude that the NP-property in combination with some connected property *S* leads individuals to having properties of the sort denoted by the VP. Finally, in the case of (59a) the second presupposition is also responsible for the unavailability of a generic reading: As – without any further knowledge about the respective time interval – having the property denoted by the VP at a specific time interval is not generally associated with individuals that fulfil the NP-property, the “reasonable causation” presupposition is again violated.

One could now speculate that the conditions constraining generic quantification are also in effect in overt adverbial quantification, and try to derive the oddity of sentences like (50a) from those conditions. In principle, there are two possibilities: Either the NP-predicate can be argued to violate the “natural class” presupposition, or the “reasonable causation” presupposition can be argued to be violated because there is no general principle available that would lead one to expect a connection between the NP-property and the VP-property.

The first possibility can be dismissed immediately, for two reasons: First, it does not seem to constrain adverbially quantified sentences that contain indefinites, as is evidenced by the perfect acceptability of sentences like (60) below:

(60) A Norwegian student whose name ends with ‘s’ or ‘g’ is usually INTELLIGENT.

Secondly, even if for some reason the NP-property in (50a) could be argued to violate some presupposition associated with adverbial quantification, the perfect acceptability of (51a), which contains the same indefinite DP as (50a), would come as a complete surprise.

The second possibility does not work either. On the contrary, the facts seem to push in the opposite direction: If it *is* plausible to assume that there is a causal relation between the NP-property and the VP-property, different tenses in the relative clause and the matrix clause are acceptable (I will come back to this point). Remember that (50a) (repeated below as (61a)) only gets a QV-reading (and thereby becomes acceptable) if the hearer is willing to assume that there is a causal connection between having studied linguistics and being blond.

Furthermore, (61b), where it is much more natural to assume a causal connection between the two properties, easily gets a QV-reading:

- (61) a. ??A man who studied linguistics in the eighties is usually BLOND.
b. A man who studied linguistics in the eighties is usually COMPETENT.

So the principles Greenberg (convincingly) argues to constrain generic quantification do not seem to constrain adverbial quantification.

2.2.2 *Specificity?*

Another possibility that might come to mind is the following: For some (unknown) reason, indefinites containing NPs that denote temporally specified properties have to be interpreted specifically, i. e. outside of the scope of any clause-mate operator. This, however, is not very convincing, for two reasons: First, the indefinites in the two sentences below do not have to be interpreted specifically: Neither does the speaker have to have a particular individual in mind when uttering (62a), nor is it the case that for (62b) to be true every professor has to recognize the same student.

- (62) a. It is likely that a man who studied linguistics in the eighties is blond.
b. Every professor recognized a student who studied linguistics in the eighties.

Secondly, even if there was some reason to interpret the indefinite in (50a) specifically, it would be completely unexpected that the same indefinite can easily be interpreted inside the scope of the adverbial quantifier if the matrix verb is marked for past tense. So we have to look for another solution.

2.3 A pragmatic account

2.3.1 *Preliminaries*

In this section I will argue for a pragmatic account of the contrasts under discussion. I will stick to the account of how sentences containing singular indefinites get QV-readings argued for in section 4.4 of chapter 2, and will propose that there are further pragmatic principles that constrain adverbial quantification – principles that can naturally be derived from

- (a) the fact that Q-adverbs quantify over situations,
- (b) the fact that information available from the linguistic context is made use of as far as possible and
- (c) the fact that locality plays a role in the process of utilizing contextual information.

Remember that I assume adverbial quantifiers to come with a covert domain restriction in the form of a free variable ranging over properties of situations (cf. von Stechow (1994), Stanley (2000) and Marti (2003)) – no matter whether they take only one argument (the nuclear scope) explicitly in the syntax (in which case the restriction is solely given in the form of this C-variable), or whether they take an additional situation predicate as argument that is intersected with the property that the C-variable is resolved to.

It is natural to assume that situations/eventualities quantified over have to be located in time (cf. Lenci and Bertinetto (1999)). This can be implemented as follows: The C-variable introduced by the respective adverbial quantifier has to be resolved to a predicate that determines the temporal location of the situations quantified over. Let us furthermore assume that that contextually given information that can be made use of in order to specify the temporal location of the respective situations *has* to be made use of if there are no intervening factors. Empirical evidence for this claim comes from facts like the following one: In a context such as (63a), the situation where Peter learns something about presuppositions introduced in (63b) is automatically understood as taking place during Mary's lecture:

- (63) a. Yesterday, Peter listened to Mary's lecture for the first time.
- b. He learnt a lot about presuppositions.

In the remainder of section 2.3 I will show that the oddity of sentences like (50a) is due to the fact that there is a conflict between the information given by the immediately preceding linguistic context – i.e. the temporal information originating from the relative clause – , and the temporal information originating from the tense marking of the matrix verb.

2.3.2 *The interval resolution strategy*

As already mentioned, the C-variable that comes with situation quantifiers has to be resolved to a predicate that locates the situations quantified over within a time interval i_s . This means that C gets resolved to the predicate $\lambda s. s@i_s$, which is defined in (64) below.

$$(64) \quad s@i_s := \tau(s) \subseteq i_s,$$

The next step consists in determining the value of i_s . As already mentioned, I assume that this is done on the basis of overtly given as well as on the basis of contextually inferable information.

To be more specific, I assume that there is a pragmatic strategy that determines how exactly available information is made use of in order to determine the value of i_e . This strategy is called *interval resolution strategy*. It works according to the following principles:

- (65)
1. Make use of direct, overt information (where temporal adverbials that fulfil the following condition count as “direct, overt information”: They modify the verb that takes the variable ranging over the situations to be located as argument.)
 2. If not available: Make use of locally available indirect information, i.e. take the most specific contextual information originating from the same domain (i.e. the restrictor of an adverbial or a determiner quantifier on the one hand, and the nucleus of the respective quantifier on the other hand). In the cases under discussion this contextual information is given via the temporal locations of other salient situations.
 3. If not available: Take the most specific contextual information originating from the other domain or from preceding clauses, or take the default interval i_{world} , which denotes the whole time axis.

The principle behind this strategy is the following: Direct information is to be preferred over indirect one, and local information is to be preferred over less local one. Furthermore, more specific information is to be preferred over less specific one.

This has the consequence that if there is overt information about when a situation takes place, this information has to be used in order to instantiate i_s . Consider (63a) again: In this case, the (minimal) situation where Peter listens to Mary’s lecture has to be located during the interval denoted by the temporal adverb *yesterday*. In the case of (63b), on the other hand, there is no temporal adverb that denotes an interval within which the (minimal) situation where Peter learns a lot about presuppositions could be located. Therefore, indirect information has to be taken into account (which corresponds to points 2. and 3. of the interval resolution strategy). In this case, two kinds of indirect information are available: On the one

hand the interval denoted by the adverb *yesterday* introduced in the preceding clause, on the other hand the running time of the (minimal) situation introduced by the preceding clause. As the latter counts as more specific information, it has to be taken. I. e. the (minimal) situation where Peter learns a lot about presuppositions is not only understood to take place at some time during the day before the speech time, but during the time where Peter listens to Mary's lecture.

2.3.2.1 Quantification over individuals

Consider again (50b), repeated below as (66a). As can be seen from the (simplified) initial semantic representation given in (66b), there are two free variables ranging over time intervals that have to be resolved: $i_{s'}$ and i_s .

- (66) a. Most men who studied linguistics in the eighties are BLOND.
 b. Most x [$\text{man}(x, w_0) \wedge \exists s' [\text{study-ling.}(x, s') \wedge \text{past}(s') \wedge \text{in } 80s(s') \wedge e' @ i_{s'}]$
 $[\exists s [\text{blond}(x, s) \wedge \text{pres}(s) \wedge e @ i_s]]$

As far as $i_{s'}$ – the interval where the situations introduced by the relative clause verb have to be located – is concerned, there is direct, overt information available: the interval denoted by the PP *in the eighties*. Therefore, $i_{s'}$ has to be resolved to this interval. Concerning i_s – the interval where the situations introduced by the matrix verb have to be located – , on the other hand, there is neither any overt constituent that denotes an interval, nor is there any indirect information available within the same domain (which is the nucleus) that could be made use of in order to determine an interval i_s could be resolved to. Therefore, point (3.) of the interval resolution strategy becomes relevant. The first option given in (3.) would be to resolve i_s to the temporal location of the respective relative clause situations (this counts as information from the other domain, i.e. from the restrictor). This would have the consequence that relative to each man quantified over, the temporal location of the respective situation where this man is blond would be set to the temporal location of the respective situation where this man studied linguistics in the eighties:¹¹

¹¹ I assume here and in all the formulas to follow that the variable s' mentioned in the tense specification $s @ \tau(s')$ is dynamically bound by the existential quantifier that binds the situation variable introduced by the relative clause verb (s. Groenendijk and Stokhof (1990) and Chierchia (1995a) for details with respect to the principles of dynamic binding).

- (67) a. Most men that studied linguistics in the eighties are BLOND.
 b. Most x [$\text{man}(x, w_0) \wedge \exists s' [\text{study-ling.}(x, s') \wedge \text{past}(s') \wedge \text{in } 80s(s') \wedge s' @ 80s]$]
 $[\exists s [\text{blond}(x, s) \wedge \text{pres}(s) \wedge s @ \tau(s')]]$

The situations s would then be interpreted as being located within the same interval as the events s' – which is the eighties. But now there is a problem: This tense specification clashes with the semantics of present tense, as can be seen in (68b).

- (68) a. Most men that studied linguistics in the eighties are BLOND.
 b. #Most $_x$ [$\text{man}(x, w_0) \wedge \exists s' [\text{study-ling.}(x, s') \wedge \tau(s') < t_0 \wedge \text{in } 80s(s') \wedge \underline{\tau(s') \subseteq 80s}]$]
 $[\exists s [\text{blond}(x, s) \wedge \underline{t_0 \subseteq \tau(s)} \wedge \underline{\tau(s) \subseteq \tau(s')}]$

As the speech time t_0 is not contained within the eighties, the tense specification in the nucleus is contradictory:

$$t_0 \subseteq (\tau(s) \subseteq \tau(s') \subseteq 80s).$$

But remember that according to point (3.) of the interval resolution strategy, there is an additional option available: As the running time of s' is contained within the restrictor of the determiner quantifier, it does not count as indirect information from the same domain. Therefore, it can also be ignored, and i_s can be resolved to i_{world} , the interval denoting the whole time axis. This results in the following semantic representation:

- (69) Most x [$\text{man}(x, w_0) \wedge \exists s' [\text{study-ling.}(x, s') \wedge \tau(s') < t_0 \wedge \text{in } 80s(s') \wedge \tau(s') \subseteq 80s]$]
 $[\exists s [\text{blond}(x, s) \wedge \underline{t_0 \subseteq \tau(s)} \wedge \underline{\tau(s) \subseteq i_{world}}]$

This time, the tense specifications within the nucleus are not contradictory, and there is nothing wrong with this semantic representation. This means, the interval resolution strategy correctly predicts (50b) to be fine, as it makes available the reading shown in (69).

Consider next (51b) (repeated below as (70a)), the minimal variant of (50b) in which the matrix verb is also set to past tense. In this case, choosing the first option specified in point (3.) of the interval resolution strategy does not create any problems: Locating the matrix

situations s within the same intervals as the respective relative clause eventualities s' does not result in any contradiction, as being included within the interval denoted by *the eighties* and taking place prior to the speech time are two perfectly harmonizing conditions.

- (70) a. Most men who studied linguistics in the eighties were BLOND.
 b. Most x [$\text{man}(x, w_0) \wedge \exists s' [\text{study-ling.}(x, s') \wedge \tau(s') < t_0 \wedge \text{in } 80s(s') \wedge \underline{\tau(s')} \subseteq \underline{80s}]$
 $[\exists s [\text{blond}(x, s) \wedge \underline{\tau(s)} < t_0 \wedge \underline{\tau(s)} \subseteq \tau(s')]]$

The meaning then is: *Most men who studied linguistics in the eighties were blond at their time of studying*. Note that we do not get any information concerning the question whether those men are still blond at the speech time. This is simply left open.

But of course, also in this case it is possible to take the second option specified in point (3.) of the interval resolution strategy, and resolve i_s to i_{world} . This results in the semantic representation are given in (71b) below:

- (71) a. Most men who studied linguistics in the eighties were BLOND.
 b. Most x [$\text{man}(x, w_0) \wedge \exists s' [\text{study}(x, s') \wedge \tau(s') < t_0 \wedge \text{in } 80s(s') \wedge \tau(s') \subseteq 80s]$
 $[\exists s [\text{blond}(x, s) \wedge \underline{\tau(s)} < t_0 \wedge \underline{\tau(s)} \subseteq t_{world}]]$

Note that the past tense marking requires $\tau(s)$ to end before the speech time. Under the assumption that *be blond* is regarded as an individual level predicate, this in combination with our analysis of individual level predicates predicts that (51b) gets a reading according to which the men quantified over do not live anymore at the speech time – which seems to be correct. Why is such a reading predicted?

On the one hand, only the temporally maximal situations where the respective men are blond that are located within i_{world} are picked out. On the other hand, the past tense marking of the matrix verb requires those situations to end before the speech time. Both requirements are only met if the respective men do not exist any longer. Otherwise, there would be larger situations of those men being blond that lie within i_{world} : Namely those comprising the whole time of existence of those men, which would then extend beyond the speech time.

That means, using past tense one would not give as much information with respect to the chosen interval (which is i_{world}) as possible, if the men quantified over would still live. If, on the other hand, they were already dead at the time of utterance, past tense marking would

allow picking out the largest situations of the respective men being blond that lie within this interval. Therefore – if the sentence is presented without any context¹² – the hearer automatically assumes that the men quantified over are already dead.

This effect is reminiscent of the facts discussed by Kratzer (1995) and Musan (1997) under the label *life time effects*. Consider (72) below:

(72) Gregory was from America.

If (72) is uttered out of the blue, it implicates that Gregory is dead at the speech time. If, on the other hand, the sentence is embedded in a context like the one give in (73a), no such implication arises:

- (73) a. Yesterday, I met Gregory and Paul.
b. Gregory was from America, (while Paul was from Australia).

Phrased in our terms, this difference could be explained as follows (cf. Musan (1997) for a very similar solution)): In (72), the (temporally maximal) situation of Gregory being from America is located within i_{world} , which according to the reasoning above triggers the expectation on the side of the hearer that Gregory is already dead. In (73b), on the other hand, i_s is most likely resolved to the “meeting situation” mentioned in the immediately preceding clause.

Let me quickly summarize the results of this section:

(50b) is fine because

- (i) D(eterminer)-quantifiers do not quantify over situations.
- (ii) The predicate *be blond* in the nuclear scope of *Most* introduces a situation variable that gets bound by a covertly inserted existential quantifier.

¹² As pointed out by Manfred Krifka (p. c.), if the sentence is embedded in a context that makes another interval salient, i_s may well be resolved to this interval. Consider the mini-text below:

- (i) A: During my stay in Berlin I met a lot of former linguistic students. One thing was very strange: Most men who studied linguistics in the eighties were blond.

In the case above, it is quite natural to resolve i_s to the time when the respective meetings took place. This is predicted by the interval resolution strategy: According to point (3.) non-local information can be taken into account.

- (iii) As it is in a different domain than the one introduced by the relative clause verb (namely in the nuclear scope of *Most*, while the latter is located in the restriction), the matrix situation does not have to be located in the same interval as the relative clause situation (due to point (3.) of the interval resolution strategy).
- (iv) There is no interval information given within the nuclear scope of *Most*.
- (v) The interval i_s can therefore be resolved to the default time interval i_{world} .

2.3.2.2 Quantification over situations

Let us return to the question why (50a), which is repeated below as (74), is odd:

(74) ??A man who studied linguistics in the eighties is usually BLOND.

Remember that according to the mapping algorithm assumed in this dissertation, the sentence gets the initial semantic representation below:

(75) $Most\ s\ [\exists x\ [man(x, w_0) \wedge \exists s'\ [study\text{-}linguistics(x, s') \wedge past(s') \wedge in\text{-}80s(s') \wedge C(s')]] \wedge \exists R\ [R(x, s)]] \wedge C(s)$
 $[\exists s''\ [s \leq s'' \wedge is\text{-}blond(\sigma\{x: man(x, s'') \wedge \exists s'\ [study\text{-}linguistics(x, s') \wedge past(s') \wedge in\text{-}80s(s')]\}, s'') \wedge pres(s'')]]$

Note that with respect to our present concerns the important difference between (50a) and (50b) is the following: In the semantic representation of (50a) given in (75) above, the situation variable s is bound in the restrictor as well as in the nuclear scope of the adverbial quantifier. The fact that the de-accented indefinite DP is interpreted in the restrictor of *usually* has the consequence that the C-variable associated with this quantifier ends up in the same domain as the situation variable introduced by the relative clause verb contained within the indefinite DP – namely in the restrictor of *usually*.

In the case of (50b), on the other hand, matters were different: As determiner quantifiers do not quantify over situations, but over individuals, the situation variable introduced by the matrix verb does not get bound by the determiner quantifier, but by a covert existential quantifier introduced in the nuclear scope of the former. This has the consequence that the C-variable associated with this situation variable and the situation variable introduced by the relative clause verb get interpreted in different domains: The former in the nuclear scope, and

the latter in the restrictor of the determiner quantifier. This has the consequence that the interval resolution strategy works differently in the two cases.

Returning to (75) above, the next step consists in determining a value for the C-variable in the restrictor of *usually*. Because of the need to temporally locate the situations quantified over, C gets resolved to $\lambda s. s@i_s$. Now, what value can be assigned to the interval i_s ? As there is no direct interval information given within the matrix clause, the only available interval information originates from the situations s' in the relative clause contained within the indefinite DP, which have to be located in the interval denoted by *the eighties*. As this is information from the same domain, there is no other option but to resolve i_s to the intervals where the respective relative clause situations are located. This results in the semantic representation given in (76) below.

$$(76) \text{ Most } s [\exists x [\text{man}(x, w_0) \wedge \exists s' [\text{study-linguistics}(x, s') \wedge \text{past}(s') \wedge \text{in-80s}(s') \wedge \tau(s') \subseteq 80s] \wedge \exists R [\text{R}(x, s)]] \wedge \tau(s) \subseteq \tau(s')] \\ [\exists s'' [s \leq s'' \wedge \text{is-blond}(\sigma\{x: \text{man}(x, s'') \wedge \exists s' [\text{study-linguistics}(x, s') \wedge \text{past}(s') \wedge \text{in-80s}(s')]\}, s'') \wedge \text{pres}(s'')]]$$

As the relative clause situations s' take place within the eighties, and as the situations s are located within the intervals where the situations s' are located, only situations located in the eighties, i. e. situations that end before the speech time t_0 , will be considered in the restrictor. Now the question is whether this gives rise to a contradiction with the tense information in the nucleus. According to the restrictor, the Q-adverb quantifies over situations that end before the speech time. According to the nucleus, it quantifies over situations that can be extended to situations that include the speech time. This, however, is not necessarily contradictory: A situation that ends before the speech time can surely be part of a larger situation that includes the speech time. The question is therefore whether the nucleus situations are allowed to be “large” enough, i. e. whether they are allowed to be located at an interval that includes both the intervals where the respective relative clause situations are located, and the speech time.

According to the revised minimality condition in (55), which is repeated below as (77), they are: As the first definition of minimality would give us the empty set (because *be blond* is a stative predicate), the set of situations quantified over is determined on the basis of the second definition of minimality.

$$(77) \text{ i. } \min\{s: P(s)\} = \{s: P(s) \wedge \neg \exists s' [s' < s \wedge P(s')]\}$$

$$\text{Iff } \{s: P(s) \wedge \neg \exists s' [s' < s \wedge P(s')]\} = \emptyset, \text{ then}$$

$$\text{ii. } \min\{s: P(s)\} = \{s: P(s) \wedge \neg \exists s' [s' \leq s \wedge P(s')] \wedge \{x: \exists R [R(x, s')] \subset \{x: \exists R [R(x, s)]\} \wedge \neg \exists s'' [s \leq s'' \wedge P(s'') \wedge \tau(s) \subset \tau(s'')]\}$$

If the minimality condition in (77ii) is applied, we get the set of temporally maximal situations of the respective men being blond that include nothing but those men. As *be blond* is an individual level predicate, those situations surely include the situations where the respective men studied linguistics in the eighties. Therefore, our assumptions so far do not predict a contradiction to arise in cases like (50a). Nevertheless, I consider the idea very attractive that the oddity of such sentences is due to contradictory tense information. I therefore want to propose a slight adjustment of the denotations of adverbial quantifiers which will give us the result we want.

Let us assume that *usually*₂ is not interpreted as in (78a) below (which repeats (140b) from chapter 2), but as in (78b).

$$(78) \text{ a. } [[\text{usually}_2]]^g = \lambda Q_{<s, \triangleright} \lambda P_{<s, \triangleright} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge g(C)(s'')\} \cap \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': Q(s''''')]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge g(C)(s'')\}$$

$$\text{b. } [[\text{usually}_2]]^g = \lambda Q_{<s, \triangleright} \lambda P_{<s, \triangleright} \lambda s. | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge g(C)(s'')\} \cap \{s''': \exists s'''' [s'''' \leq s \wedge s'''' \leq s'''' \wedge s'''' \in \min\{s''''': P(s''''') \wedge g(C)(s''''') \wedge Q(s''''')]\} | \geq \frac{1}{2} | \{s': s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge g(C)(s'')\}$$

According to (78b), the nucleus situations are no longer just situations that can be extended to situations that satisfy the respective “nucleus” predicate *P*, but to situations that satisfy the respective “restrictor predicates” *P* and *C* plus the nucleus predicate *Q*. In many cases, this does not make any difference. But with respect to sentences like (50a), it gives rise to contradictory requirements in the nucleus.

According to the denotation of *usually*₂ given in (78b), (50a) gets an interpretation that is given in simplified form in (79) below:

$$(79) \text{ Most } s [\exists x [\text{man}(x, w_0) \wedge \exists s' [\text{study-linguistics}(x, s') \wedge \text{past}(s') \wedge \text{in } 80s(s') \wedge \tau(s') \subseteq 80s] \wedge \exists R [R(x, s)]] \wedge \tau(s) \subseteq \tau(s')$$

$$\begin{aligned}
& [\exists s'' [s \leq s'' \wedge \exists x [\text{man}(x, w_0) \wedge \exists s' [\text{study-linguistics}(x, s') \wedge \\
& \quad \underline{\tau(s')} < t_0 \wedge \text{in-80s}(s') \wedge \underline{\tau(s')} \subseteq 80\text{s}] \wedge \exists R [R(x, s'')]] \wedge \underline{\tau(s'')} \subseteq \\
& \quad \underline{\tau(s')} \wedge \text{is-blond}(\sigma\{x: \text{man}(x, s'') \wedge \exists s' [\text{study-linguistics}(x, s') \\
& \quad \wedge \tau(s') < t_0 \wedge \text{in-80s}(s')]\}, s'') \wedge \underline{t_0} \subseteq \underline{\tau(s'')}]
\end{aligned}$$

(79) can be paraphrased as follows: “Most situations that include (nothing but) a man who studied linguistics in the eighties and are furthermore located within the respective (minimal) studying-situations can be extended to situations that satisfy the following requirements: They have to (a) contain (nothing but) a man who studied linguistics in the eighties, (b) be located within the respective studying-situations, which are located in the eighties, (c) be situations such that the unique man contained within them that studied linguistics in the eighties is blond in them and (d) contain the speech time”.

It is clear that (b) and (d) cannot both be satisfied by one and the same situation. The set of nucleus situations s'' is therefore necessarily the empty set.

Let us assume that sentences like (50a) are odd for the following reason: Basically, two different readings are available: A QV-reading like the one given in (79) above, and a reading according to which the indefinite has scope over the Q-adverb. If the first option is chosen, we get the following result: Due to contradictory requirements, the “nucleus” set is necessarily (i.e. in all possible worlds) empty. Truth-conditionally, this has the strange consequence that the sentence is false, unless the restrictor set P is the empty set itself: No matter which (non-empty) restrictor set P we choose, intersecting P with the empty set gives us the empty set, and the cardinality of the empty set can of course not be larger than or equal to half the cardinality of the set P (unless P is the empty set). I suspect that therefore the hearer automatically tries the other available interpretation, according to which the indefinite DP is not interpreted in the restrictor of the Q-adverb, but has scope over it. This, however, does not result in a well-formed interpretation either, as the matrix predicate is an individual level predicate and as such cannot be applied to one and the same individual more than once.

Concerning the slightly altered denotation of *usually* given in (78b) above, I would like to add one more short remark: If also the denotation of $usually_1$ (the version that takes only one argument explicitly in the syntax) is modified in the same way, this has the desirable consequence that it is no longer necessary to leave the relation between the restrictor and the nucleus situations unspecified. Rather, this relation can be specified as \leq . Remember that in the case of sentences containing co-varying singular definites, the value assigned to C was often the characteristic function of a set of situations of which the respective nucleus

situations were intuitively felt to be sub-situations rather than extensions¹³. Therefore, *usually_I* was defined as given in (80) below (s. chapter 2, (64b)):

$$(80) \quad [[\text{usually}_I]]^g = \lambda Q_{\langle s, t \rangle} \lambda s. | \{s' : s' \leq s \wedge s' \in \min\{s'' : g(C)(s'')\} \cap \\ \{s''' : \exists s'''' [s'''' \leq s \wedge s''' R s'''' \wedge s'''' \in \min\{s'''' : Q(s''''')\}]\} | \\ \geq \frac{1}{2} | \{s' : s' \leq s \wedge s' \in \min\{s'' : g(C)(s'')\} |, \\ \text{where } R \in \{\leq, >\}.$$

If, on the other hand, the nucleus set is defined as the set of (minimal, in the above sense) situations that satisfy Q and $g(C)$, R can unambiguously be specified as \leq : If Q is the characteristic function of a set of situations that are sub-situations of the situations that satisfy $g(C)$, then any (minimal) situation that satisfies $g(C)$ is automatically guaranteed to be a minimal situation that satisfies both $g(C)$ and Q .

Let us now return to the question why (51a) (repeated below as (81a)), where both relative clause and matrix verb are marked for past tense, is fine. Consider in (81b) below the semantic representation this sentence gets according to our modified assumptions:

- (81) a. A man who studied linguistics in the eighties was usually BLOND.
 b. Most s [$\exists x$ [$\text{man}(x, w_0) \wedge \exists s'$ [$\text{study-linguistics}(x, s') \wedge \text{past}(s') \wedge \text{in-80s}(s') \wedge \tau(s') \subseteq 80s$]]] $\wedge \exists R$ [$R(x, s)$] $\wedge \tau(s) \subseteq \tau(s')$
 $[\exists s''$ [$s \leq s'' \wedge \exists x$ [$\text{man}(x, w_0) \wedge \exists s'$ [$\text{study-linguistics}(x, s') \wedge$
 $\tau(s') < t_0 \wedge \text{in-80s}(s') \wedge \tau(s') \subseteq 80s$]]] $\wedge \exists R$ [$R(x, s'')$] $\wedge \tau(s'') \subseteq$
 $\tau(s)$ $\wedge \text{is-blond}(\sigma\{x : \text{man}(x, s') \wedge \exists s' [\text{study-linguistics}(x, s') \wedge$
 $\tau(s') < t_0 \wedge \text{in-80s}(s')]\}, s'') \wedge \tau(s'') < t_0]$

(81b) can be paraphrased as follows: “Most situations that include (nothing but) a man who studied linguistics in the eighties and are furthermore located within the respective (minimal) studying-situations can be extended to situations that satisfy the following requirements: They have to (a) contain (nothing but) a man who studied linguistics in the eighties, (b) be located within the respective studying-situations, which are located in the eighties, (c) be situations

¹³ Note that in the case of *usually_I* it is of course not sufficient to resolve the C-variable to a predicate that determines the temporal location of the situations quantified over. Rather, such a predicate has to be part of a more complex predicate.

such that the unique man contained within them that studied linguistics in the eighties is blond in them and (d) be located before the speech time”. (51a) is therefore correctly predicted to be fine.

Let me summarize the results of this section before we proceed. (50a) is odd for the following reasons:

- (i) Q-adverbs quantify over situations.
- (ii) Those situations s need to be located in an interval i_s .
- (iii) As no direct, overt interval information is available (because the sentence does not contain a temporal adverbial that modifies the matrix verb), locally available indirect information has to be made use of.
- (iv) Being de-accented, the indefinite DP is interpreted in the restriction.
- (v) Therefore, the intervals where the respective relative clause situations are located end up in the same domain as i_s .
- (vi) This has the consequence that i_s gets resolved to the respective intervals.
- (vii) The respective nuclear scope situations do not only have to satisfy the respective “nucleus predicate”, but also the respective “restrictor predicates”. This gives rise to a contradiction: As the matrix verb, which is interpreted in the nucleus, is marked for present tense, the “nucleus situations” need to be located within the eighties and within an interval that includes the speech time at the same time.
- (viii) Therefore, the “nucleus set” is necessarily (i. e. in all possible worlds) empty.

2.4 Explicit interval setting

Interestingly, (82a) below easily gets a QV-reading, in spite of the fact that it is structurally almost identical to (50a): The matrix verb is marked for present tense, while the relative clause verb is marked for past tense. As can be seen by comparing (82a) to the minimally contrasting (82b), what makes the difference is the presence of the adverb *nowadays* in the matrix clause:

- (82) a. A car that was bought in the eighties is usually rusty nowadays.
- b. ??A car that was bought in the eighties is usually rusty.

I assume that *nowadays* is right-adjoined to the vP-projection below the adverb *usually*: It takes this vP-projection (which includes the lower copy of the “subject” argument and denotes a situation predicate) as argument. Furthermore, it introduces an interval of contextually specified size which is constrained to include the speech time, and locates the situation introduced by the vP it modifies within this interval. Formally, *nowadays* takes a situation predicate P as argument and maps it onto the characteristic function of the subset of the set of situations characterized by P which includes situations that satisfy P and are furthermore located at the interval t introduced by *nowadays*.

$$(83) \quad [[\text{nowadays}]] = \lambda P. \lambda s. P(s) \wedge \tau(s) \subseteq t.$$

Consider the preliminary (i.e. before i_s and $i_{s''}$ is resolved) semantic representation of (82a) given in (84) below:

$$(84) \quad \text{Most } s \left[\exists x [\text{car}(x, w_0) \wedge \exists s' [\text{was-bought}(x, s') \wedge \tau(s') < t_0 \wedge \text{in-}80s(s') \wedge \tau(s') \subseteq 80s] \wedge \exists R [\text{R}(x, s)]] \wedge \tau(s) \subseteq i_s \right] \\ \left[\exists s'' [s \leq s'' \wedge \exists x [\text{car}(x, w_0) \wedge \exists s' [\text{was-bought}(x, s') \wedge \tau(s') < t_0 \wedge \text{in-}80s(s') \wedge \tau(s') \subseteq 80s] \wedge \exists R [\text{R}(x, s'')]] \wedge \tau(s'') \subseteq i_{s''} \wedge \text{is-rusty}(\sigma\{x: \text{car}(x, s') \wedge \exists s' [\text{was-bought}(x, s') \wedge \tau(s') < t_0 \wedge \text{in-}80s(s')]\}, s'') \wedge t_0 \subseteq \tau(s'') \wedge \tau(s'') \subseteq t \right]$$

Note that there is a pretty clear intuition that the interval t does not extend far enough into the past to include the interval introduced by the adverb *the eighties*, i. e. the local context seems to influence the choice of the interval denoted by *nowadays*.

As the adverb *nowadays* counts as overt information, (82a) is predicted to be fine by the interval resolution strategy: The intervals i_s and $i_{s''}$ do not need to be resolved to the running times of the respective relative clause situations, but – according to point (1.) of the interval resolution strategy – have to be resolved to the interval t introduced by *nowadays* (as shown in (85) below). Therefore, no contradiction arises in the nuclear scope, as there is no conflict between the information contributed by the present tense marking of the matrix verb and the information that the “nucleus situations” have to be located within t : After all, t has to include the speech time itself (see above).

$$(85) \quad \text{Most } s \left[\exists x [\text{car}(x, w_0) \wedge \exists s' [\text{was-bought}(x, s') \wedge \tau(s') < t_0 \wedge \text{in-}$$

$$\begin{aligned}
& 80s(s') \wedge \tau(s') \subseteq 80s] \wedge \exists R [R(x, s)] \wedge \tau(s) \subseteq t] \\
& [\exists s'' [s \leq s'' \wedge \exists x [\text{car}(x, w_0) \wedge \exists s' [\text{was-bought}(x, s') \wedge \\
& \tau(s') < t_0 \wedge \text{in-80s}(s') \wedge \tau(s') \subseteq 80s] \wedge \exists R [R(x, s'')]] \wedge \tau(s'') \subseteq \\
& t \wedge \text{is-rusty}(\sigma\{x: \text{car}(x, s') \wedge \exists s' [\text{was-bought}(x, s') \\
& \wedge \tau(s') < t_0 \wedge \text{in-80s}(s')\}], s'') \wedge t_0 \subseteq \tau(s'') \wedge \tau(s'') \subseteq t]
\end{aligned}$$

An obvious question is whether this also works with our initial example (50a), i.e. whether the addition of the adverb *nowadays* also improves the status of (50a) (repeated below as (86a):

- (86) a. ^{??}A man who studied linguistics in the eighties is usually BLOND.
b. ^(??)A man who studied linguistics in the eighties is usually BLOND nowadays.

In spite of its improved status compared to (86a), (86b) is still strange. This seems to be due to the fact that (86b) strongly implicates that the respective men were not already blond at the time when they studied linguistics, i. e. *be blond* can no longer be interpreted as an individual level predicate¹⁴.

Note that the same implicature is triggered in the case of (82a) – the only difference being that it is quite natural to assume that cars are not already rusty at the time when they are bought. A possible explanation for this implicature runs as follows: Adding the adverb *nowadays* causes interval resetting in the restrictor (otherwise i_s would simply be resolved to $\tau(s')$). Therefore, the hearer assumes that there is a reason why this resetting takes place, i. e. why the speaker wants to indicate that contextually salient information is not to be made use of. The most obvious reason is that resolving i_s to $\tau(s')$ would lead to a claim the speaker does not want to make, because she does not want to say that the respective predicate was already true of the entities introduced by the indefinite at $\tau(s')$, but only from some later point onwards.

2.5 Interval resetting induced by presuppositions

Consider next (87a) below, which is just as fine as (82a) – again in spite of the fact that the matrix tense and the relative clause tenses do not agree. In this case, the presence of the

¹⁴ For this reason, the following sentence is fine:

- (i) A man who studied linguistics in the eighties is usually GREY nowadays.

adverb *still* in the matrix clause seems to be the relevant factor (as is evidenced by the oddity of (87b)):

- (87) a. A car that was bought in the eighties is usually still roadworthy.
 b. ??A car that was bought in the eighties is usually roadworthy.

I assume that the truth conditional content of *still* is identical to that of *nowadays*: It takes a situation predicate P as its argument and maps it onto a situation predicate which characterizes a subset of the set characterized by P : Namely the set of situations which satisfy P and which are furthermore located at an interval t .

$$(88) \quad [[\text{still}]] = \lambda P \lambda s. P(s) \wedge \tau(s) \subseteq t.$$

But in contrast to *nowadays*, *still* triggers a presupposition (cf. König (1977), Löbner (1989, 1999), Smessaert and ter Meulen (2004), a. o.; see also Zybatow and Malink (2003)): Namely, that

- (a) the situation predicate P was already true of a contextually given salient situation which is located before the interval t , and that
 (b) P remains true of all situations which are located between this salient past situation and the interval t .

I implement the fact that this presuppositions is triggered by the presence of *still* by assuming that *still* can only be applied to a situation predicate P if P is also true of a contextually salient situation which is located before the interval t introduced by *still*. Otherwise, it does not denote anything. This presupposition is given formally in (89) below.

$$(89) \quad \exists t' [\text{salient}(t') \wedge t' < t \wedge \forall t'' [t' \leq t'' < t \rightarrow \exists s' [\tau(s') \subseteq t'' \wedge P(s')]],$$

where t is the time interval introduced by the truth conditional content of *still*.

For this presupposition to be satisfied in the case of (87a), there for each car x introduced by the indefinite has to be a contextually salient time interval t' which is located before t such that there is a situation s' of this car being roadworthy at t' . Furthermore, the property of being *roadworthy* with respect to each car x has to persist during the time until t starts. In this case, the temporal location of the respective relative clause situations can serve to locally

satisfy the presupposition: It is plausible to assume that the respective cars already had the property of being *roadworthy* at the time when they were bought.

More formally, in (87a) it needs to be checked whether *still* can be applied to the situation predicate given in (90) below:

$$(90) \quad \lambda s. \text{is-roadworthy}(\sigma\{x: \text{car}(x, s) \wedge \exists s' [\text{was-bought}(x, s') \wedge \tau(s') < t_0 \wedge \text{in-80s}(s')]\}, s) \wedge t_0 \subseteq \tau(s).$$

In order for this to be possible there needs to be a contextually salient interval t' such that a situation that satisfies the predicate in (90) is located at t' . Now, under the plausible assumption that cars are roadworthy at the time when they are bought, the respective relative clause situations can of course be considered to be such situations. Therefore, for each x which is the unique car in s that was bought in the eighties the time when the respective car x was bought can serve as the interval t' that satisfies the presupposition associated with *still*. *Still* can thus be applied to the predicate in (90), which gives us (91):

$$(91) \quad \lambda s. \text{is-roadworthy}(\sigma\{x: \text{car}(x, s) \wedge \exists s' [\text{was-bought}(x, s') \wedge \tau(s') < t_0 \wedge \text{in-80s}(s')]\}, s) \wedge t_0 \subseteq \tau(s) \wedge \tau(s) \subseteq t.$$

Note that due to the presupposition binding discussed above (cf. van der Sandt (1992)), the interval denoted by t needs to be located after *the eighties*.

Consider now in (92b) the semantic representation (87a) (which is repeated below as (92a)) gets according to our assumptions before i_s and $i_{s'}$ have been resolved.

$$(92) \quad \begin{array}{l} \text{a. A car that was bought in the eighties is usually still roadworthy.} \\ \text{b. Most } s [\exists x [\text{car}(x, w_0) \wedge \exists s' [\text{was-bought}(x, s') \wedge \tau(s') < t_0 \wedge \text{in-} \\ \quad \text{80s}(s') \wedge \tau(s') \subseteq 80s] \wedge \exists R [\text{R}(x, s)]] \wedge \tau(s) \subseteq i_s] \\ \quad [\exists s'' [s \leq s'' \wedge \exists x [\text{car}(x, w_0) \wedge \exists s' [\text{was-bought}(x, s') \wedge \\ \quad \tau(s') < t_0 \wedge \text{in-80s}(s') \wedge \tau(s') \subseteq 80s] \wedge \exists R [\text{R}(x, s'')]] \wedge \tau(s'') \subseteq \\ \quad i_{s''} \wedge \text{is-roadworthy}(\sigma\{x: \text{car}(x, s'') \wedge \exists s' [\text{was-bought}(x, s') \\ \quad \tau(s') < t_0 \wedge \text{in-80s}(s')]\}, s'') \wedge t_0 \subseteq \tau(s'') \wedge \tau(s'') \subseteq t] \end{array}$$

It is now easy to see why (87a) is fine: First, as the interval t in the nucleus counts as direct, overt information, i_s and $i_{s'}$ can be resolved to t . Furthermore, as already mentioned, t has to

be located later than the respective relative clause situations, i. e. after *the eighties*. This has the consequence that the situations quantified over do not get located within the intervals where the respective relative clause situations are located, but at an interval that *follows* those intervals. And an interval that follows *the eighties* may well include the speech time. Therefore, no contradiction arises in the nuclear scope. This accounts for the felicity of (87a).

Finally, note that the addition of *still* does not lead to perfect acceptability in the case of our initial example, as is evidenced by the oddity of (93) below.

(93) ?A man who studied linguistics in the eighties is usually still blond.

I assume that this is due the following reason: The temporal adverbial is simply superfluous in this case, as it only adds a presupposition that is already guaranteed to be fulfilled because of the very meaning of the predicate. As *be blond* is an individual level predicate, it is clear that if this property holds of an individual at a given situation, it will hold of this individual for its whole lifetime. This has the consequence that at each moment during the lifetime of this individual, there are infinitely many past situations where she/he was also *blond*. There is thus no point in adding *still* in this case. This, however, is different in the case of (87a): The property of *being roadworthy* is not automatically guaranteed to hold of a given car for its whole time of existence.

2.6 Causally related situations

All the examples below are fine and get QV-readings easily, in spite of the fact that each of them exemplifies the constellation that lead to deviance in our initial set of examples: The relative clause verbs are all marked for past tense, while the matrix verbs are marked for present tense. Furthermore, no overt adverbs are present that might introduce intervals where the situations quantified over could be located.

- (94) a. A man who studied linguistics in the eighties is usually COMPETENT.
b. A man who was born in the eighties is usually BLOND.
c. A car that was built in the eighties is usually BLUE.
d. A man who was in jail during the eighties usually has a Bruce LEE tattoo.

Note that the sentences in (94a – d) intuitively all have one thing in common: The respective matrix situations can plausibly be assumed to have been brought about either by the respective relative clause situation itself or at least by something that happened during the respective relative clause situation. Thus, in the case of (94a) the states of the respective men being competent can plausibly be interpreted as the result of studying linguistics in the eighties, while in (90d) the states of the respective men having a Bruce Lee tattoo can plausibly be interpreted as a result of something that happened during their imprisonment. In (94b) and (94c) the indirect causal relation is rather trivial, because coming into existence (either via being born or via being built) is a necessary prerequisite for having any kind of property.

As will become clear in a minute, the important point in all the examples is the following: Under their most prominent (or only plausible) reading, there are no situations where the respective individuals have the property denoted by the respective matrix verb before the respective (minimal) relative clause situations have taken place. This has the consequence that if the respective matrix situations were located within the intervals where the respective relative clause situations took place, the sentences were no longer able to express the direct or indirect causal relations they are intuitively felt to express.

I assume that this is the reason why marking the matrix verbs for present tense in (94a – d) does not lead to deviance: In cases like these, following the interval resolution strategy in order to determine the interval where the situations quantified over are to be located would make it impossible to interpret the sentences in the intended way. As the interval resolution strategy is still a pragmatic strategy, after all, ignoring it should therefore be allowed if it would preclude an intended meaning from being expressed.

Consider in detail what happens if the matrix verb in one of the examples above is marked for past tense:

(95) A man who was in jail during the eighties usually had a Bruce LEE tattoo.

According to its most prominent reading, the men introduced by the indefinite in (95) are assumed to already have a Bruce Lee tattoo at the time when they get imprisoned. But also a second reading is available, according to which (at least most of) the men introduced by the indefinite either do not live any more at the speech time, or have their tattoos removed, while their having a Bruce Lee tattoo actually came about as a result of something that happened to them during their imprisonment.

The first reading is the one predicted by the interval resolution strategy. It results from resolving i_s to the intervals where the respective relative clause situations are located (as shown in (96) below): As the situations quantified over have the subinterval property (see above), locating them within the intervals where the matrix situations are located has the consequence that they (because of our revised definition of minimality in (55ii)) completely exhaust those intervals. The second reading, on the other hand, results from resolving i_s to t_{world} (as shown in (96b)): As (again due to (55ii)) the temporally maximal situations where the respective men have a Bruce Lee tattoo that lie within t_{world} are picked out, those situations can only end before the speech time if either those men are dead or their tattoos have been removed from their bodies.

- (96) a. Most s [$\exists x$ [$\text{man}(x, w_0) \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\wedge \exists R R(x, s)] \wedge \tau(s) \subseteq \tau(s')$
 $[\exists s'' [s \leq s'' \wedge \exists x [\text{man}(x, w_0) \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\wedge \exists R R(x, s'')] \wedge \tau(s'') \subseteq \tau(s') \wedge \text{have-a-Bruce-Lee-tattoo}(\sigma\{x:$
 $\text{man}(x, s'') \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]\}, s'') \wedge$
 $\tau(s'') < t_0]$
- b. Most s [$\exists x$ [$\text{man}(x, w_0) \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\wedge \exists R R(x, s)] \wedge \tau(s) \subseteq t_{world}]$
 $[\exists s'' [s \leq s'' \wedge \exists x [\text{man}(x, w_0) \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\wedge \exists R R(x, s'')] \wedge \tau(s'') \subseteq t_{world} \wedge \text{have-a-Bruce-Lee-tattoo}(\sigma\{x:$
 $\text{man}(x, s'') \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]\}, s'') \wedge \tau(s'') < t_0]$

Note that the existence of the reading given in (96b) can be taken as evidence that the interval resolution strategy can be overridden by the need to convey a meaning that could not be conveyed if i_s would be resolved in accordance with the interval resolution strategy. But this means that the hearer needs a clue that such a meaning is to be conveyed, i. e. there needs to be an obvious reason why the situations quantified over are not to be located within the intervals where the respective relative clause situations are located. Of course, a plausible (direct or indirect) causal relation between the respective situations is such an obvious reason.

Let us have a look at what happens if the matrix verb in (94c) is set to past tense (as given in (97a)): In this case, the reading that triggers a life time effect is the most prominent

one (or even the only one available). According to this reading (which is shown in (97c)), the (majority of the) cars introduced by the indefinite do not exist any longer, but their having been blue is interpreted as a result of their having been built. This is of course due to the fact that the relative clause verb is a verb of creation: As already mentioned, it simply makes no sense to ascribe properties to non-existing entities. Therefore, the reading shown in (97b), according to which the respective cars would already have had to be *blue* before they were *built*, is unavailable.

- (97) a. A car that was built in the eighties was usually BLUE.
- b. Most s [$\exists x$ [$\text{car}(x, w_0) \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\wedge \exists R R(x, s)] \wedge \tau(s) \subseteq \tau(s')$
 $[\exists s'' [s \leq s'' \wedge \exists x [\text{car}(x, w_0) \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\subseteq 80s] \wedge \exists R R(x, s'')] \wedge \tau(s'') \subseteq \tau(s') \wedge \text{is-blue}(\sigma\{x:$
 $\text{car}(x, s'') \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]\}, s'') \wedge$
 $\tau(s'') < t_0]$
- c. Most s [$\exists x$ [$\text{car}(x, w_0) \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\wedge \exists R R(x, s)] \wedge \tau(s) \subseteq t_{\text{world}}$
 $[\exists s'' [s \leq s'' \wedge \exists x [\text{car}(x, w_0) \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\subseteq 80s] \wedge \exists R R(x, s'')] \wedge \tau(s'') \subseteq t_{\text{world}} \wedge \text{is-blue}(\sigma\{x:$
 $\text{car}(x, s'') \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]\}, s'') \wedge$
 $\tau(s'') < t_0]$

With these assumptions in place, let us now return to the examples in (94a – d). They are acceptable for the same reason for which the sentence in (97a) can be interpreted as shown in (97c), and for which the one in (95) can be interpreted as shown in (96b): Due to the plausibility of a (direct or indirect) causal relation between the respective relative clause and matrix clause situations, the hearer is given a reason why the situations quantified over are not to be located within the intervals where the respective relative clause situations are located, i.e. why disregarding the interval resolution strategy is allowed. The only difference to the examples in (95) and (97a) is the absence of a lifetime effect, as the respective verbs are marked for present tense.

Thus, if on the one hand a (direct or indirect) causal relation between the relative clause and the matrix situations is to be conveyed, and if on the other hand the speaker does

not want to say that the (majority of the) respective entities do not exist anymore at the speech time, combining past tense marking of the relative clause verb and present tense marking of the matrix verb is the best option. Therefore, in all the examples in (93) resolving i_s to t_{world} in violation of the interval resolution strategy is allowed, and no contradiction arises in the nucleus, accordingly. This has the consequence that (94c) and (94d) (repeated below as (98a) and (99a)), for example, are interpreted as given in (98b) and (99b), respectively.

(98) a. A car that was built in the eighties is usually BLUE.

b. Most s [$\exists x$ [$\text{car}(x, w_0) \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\wedge \exists R R(x, s)] \wedge \tau(s) \subseteq t_{world}$
 $[\exists s'' [s \leq s'' \wedge \exists x [\text{car}(x, w_0) \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\subseteq 80s] \wedge \exists R R(x, s'')] \wedge \tau(s'') \subseteq t_{world}] \wedge \text{is-blue}(\sigma\{x:$
 $\text{car}(x, s') \wedge \exists s' [\text{is-built}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]\}, s') \wedge$
 $t_0 \subseteq \tau(s')$]

(99) a. A man who was in jail during the eighties usually has a Bruce LEE tattoo.

b. Most s [$\exists x$ [$\text{man}(x, w_0) \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\wedge \exists R R(x, s)] \wedge \tau(s) \subseteq t_{world}$
 $[\exists s'' [s \leq s'' \wedge \exists x [\text{man}(x, w_0) \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq 80s]$
 $\subseteq 80s] \wedge \exists R R(x, s'')] \wedge \tau(s'') \subseteq t_{world}] \wedge \text{have-a-Bruce-Lee-}$
 $\text{tattoo}(\sigma\{x: \text{man}(x, s') \wedge \exists s' [\text{be-in-jail}(x, s') \wedge \tau(s') < t_0 \wedge \tau(s') \subseteq$
 $80s]\}, s') \wedge t_0 \subseteq \tau(s')$]

The wellformedness of the examples in (94) thus shows that the interval resolution strategy may be violated if following it would keep the speaker from conveying a certain meaning (and if this is intelligible to the hearer): Namely, that there is a (direct or indirect) causal relation between the respective relative clause and matrix situations. Seen from this perspective, the oddity of our initial examples thus shows the absence of a plausible causal relation between the respective relative cause and matrix situations: There is simply no plausible reason why the interval resolution strategy should be violated.

This line of reasoning raises the obvious question why the fact that in our initial examples following the interval resolution results in an ill-formed semantic representation should not be regarded as a good reason to violate the interval resolution strategy, and resolve the respective interval i_s to t_{world} . I assume that this is due to the following reason: In a

sentence like (50a), there is no obvious reason why the speaker should not have chosen a minimal variant of this sentence that would result in a well-formed semantic representation that has been arrived at in accordance with the interval resolution strategy, i. e. why the matrix verb is not marked for past tense. Remember furthermore that a QV-reading, i. e. a reading according to which the respective indefinite is interpreted in the restrictor of the respective Q-adverb, is not the only possibility to interpret sentences that contain Q-adverbs and topical indefinites. In principle, it is also possible to interpret the indefinite specifically, i.e. to give it scope over the Q-adverb. Let us therefore assume that in the case of examples like (50a) the following happens: The hearer “realizes” (unconsciously) that a well-formed semantic representation that is in accordance with the interval-resolution strategy is not available and furthermore sees no reason why the speaker did not choose the minimal variant mentioned above. She therefore switches to the second option, and interprets the indefinite specifically. This of course also leads to deviance, and the sentence is therefore judged unacceptable.

In the case of the examples in (94), on the other hand, matters are different: Because of the highly plausible causal connection between the respective situations, there is an obvious reason why the speaker did not choose the minimal variant where the matrix verb is marked for past tense: Interpreting this variant according to the interval resolution strategy would result in a reading that would no longer express such a causal relation. Therefore, there is no need to switch to the second interpretative option in the first place.

2.7 Section summary

In section 2 I have shown that the availability of QV-readings in sentences with topical indefinites modified by relative clauses is sensitive to the tense marking of the respective verbs (i.e. relative clause verb and matrix verb): In the absence of intervening factors, QVEs only obtain if the tense markings agree. In order to explain this restriction, I have argued for the existence of a pragmatic strategy that locates the situations quantified over by the Q-adverb in an interval that is determined on the basis of available information. This pragmatic mechanism is sensitive to locality considerations: In the absence of direct, overt interval information (i. e. in the absence of temporal adverbials that modify the matrix verb), it locates the situations quantified over within the intervals where the respective relative clause verbs are located, as these count as indirect information originating from the same domain (i. e. in the restrictor). If this information about the temporal location of the respective situations contradicts the information contributed by the tense marking of the respective matrix verb

(which is interpreted in the nuclear scope), the respective nucleus set is necessarily empty. I assume that the oddity of the resulting reading (see above) leads to ill-formedness in sentences where the matrix verbs are individual level predicates, because a reading where the indefinite DP has scope over the Q-adverb is also deviant in those cases.

I have furthermore discussed a number of cases where different tense markings on relative clause and matrix verbs does not result in ill-formedness. In the first set of examples, this is due to the presence of an overt temporal adverb that introduces an interval where the situations quantified over can be located. This works as predicted by the interval resolution strategy. In the second set of examples, on the other hand, the interval resolution strategy is violated. I have assumed that this is allowed because the intended meaning of the respective sentences could not be conveyed otherwise: In all those cases the matrix situations can naturally be interpreted as having been at least indirectly caused by the respective relative clause situations. Locating the situations quantified over within the intervals where the respective matrix situations are located would thus destroy this causal connection. I assume that this is the reason why the interval resolution strategy – which, after all, is a pragmatic strategy – can be violated in these cases.

3 The Final Analysis of QVEs in Sentences that Contain FRs and Plural Definites

In section 2 we have seen that the “tense agreement constraint” that is in effect in adverbially quantified sentences containing indefinites finds a natural explanation under the assumption that the situations quantified over need to be located in an interval that is determined on the basis of contextual information. As the same effect shows up in adverbially quantified sentences that contain “temporally specific” FRs and plural definites (cf. section 2.3.4), any account of how those sentences get their QV-readings also has to be based on quantification over situations in order to capture the obvious parallelism.

In section 3.1 I will present an analysis that assumes QV in sentences with FRs and plural definites to be an indirect effect of quantification over the atomic parts of complex situations. This analysis is based on the analysis of the adverb “for the most part” by Nakanishi/Romero (2004), which will therefore be summarized and discussed in section 3.1.1. In section 3.2 I will show how this analysis can be augmented in order to account naturally for the “tense agreement effects” mentioned in section 1.3.2, and in section 3.3 I will offer an explanation for the second constraint mentioned in section 1.3.2. In section 3.4, I will offer a

rather tentative answer to the question why the lack of tense agreement does not lead to ill-formedness in the case of adverbially quantified sentences that contain bare plurals (modified by relative clauses) and "temporally non-specific" FRs.

3.1 Quantification over the atomic parts of complex situations

3.1.1 Nakanishi/Romero (2004) on 'for the most part'

Nakanishi/Romero (2004) offer an account of the fact that sentences like (100) below get QV-readings:

(100) For the most part, the students admire [Mary]_F. (ibd.: (31a)).

Based on differences regarding focus-sensitivity and – most importantly – the availability of distributive readings in sentences with activity- and accomplishment-verbs, Nakanishi/Romero (2004) argue that the quantificational determiner *most* operates on plural individuals, while the quantificational adverb *for the most part* operates on plural eventualities. They assume that a sentence of the form *For the most part NP VP* has the truth conditions given in (100) below, where **p** corresponds to the denotation of the non-focussed material, while **q** corresponds to the denotation of the focussed material. Furthermore, they assume a Neo-Davidsonian event-semantics (cf. Parsons (1990), Schein (1993), Herburger (2000) and Landman (2000) for discussion), according to which verbs introduce an additional event argument, while the individual arguments of verbs are introduced via thematic-role predicates like *Agent*, *Theme*, etc., and are combined with the predicate denoted by the verbal head via conjunction.

(101) $\exists e [\mathbf{p}(e) \wedge \exists e' [e' \leq e \wedge |e'| \geq \frac{1}{2}|e| \wedge \forall e'' [e'' \leq e' \rightarrow \mathbf{q}(e'')]]]$ (ibd.: (28)).

Nakanishi/Romero (2004) paraphrase the formula above as follows: "There is a general (possibly plural) event **e** for which **p**(**e**) holds and there is a (possibly plural) event **e'** that is a major part of **e** such that, for all subevents **e''** of **e'**, **q**(**e''**) holds" (ibd.: 8). They propose that a QV-reading "with respect to a given NP arises as a side effect of the following choices" (ibd.: 9):

- (102) “(i) The semantic content and thematic predicate on the NP are within the restrictor **p**.
(ii) The general event *e* is ‘measured’ by counting its atomic event units in $[[V^0]]$.
(iii) The NP is interpreted distributively in a one-to-one mapping” (ibd.: 9, (30)).

According to Nakanishi/Romero (ibd.), sentence (100) above then gets the semantic representation given in (103a) and paraphrased in (103b) below:

- (103) a. $\exists e [*admire(e) \wedge Agent(e, \text{the students}) \wedge \exists e' [e' \leq e \wedge |e'| \geq \frac{1}{2} |e| \wedge \forall e'' [e'' \leq e' \rightarrow Theme(e'', \text{Mary})]]]$ (ibd.: 9, (31b))
b. “There is a general (possibly plural) event *e* such that $*admire(e) \wedge Agent(e, \text{the students})$ and there is a (possibly plural) event *e'* that is a major part of *e* such that, for all subevents *e''* of *e'*, $Theme(e'', \text{Mary})$ ” (ibd.: 9, (31c)).

Note that this analysis only works under the following two assumptions:

- (a) The individual arguments of verbs are separated from the respective verbal predicate at the level of semantic interpretation.
(b) The denotation of the whole clause minus the Q-adverb is “cut” in two parts: One part that contains non-focal material, and one part that contains focal material.

As Nakanishi/Romero acknowledge themselves, these two assumptions are crucial for the following reason: If **q** in the formula above would be replaced by an eventuality predicate that contains the NP with respect to which the QV-reading arises, one would not get the desired reading, as the sum individual denoted by this NP would stand in the respective thematic relation to each atomic part of the smaller event *e''*. This of course would not result in a QV-reading.

Both assumptions are of course incompatible with the situations semantics framework assumed in this dissertation in general, and with the mapping algorithm I assume in particular. Therefore, the analysis of Nakanishi/Romero cannot be adopted straightforwardly to account for the examples under discussion in this section. Furthermore, at least the second assumption is problematic for independent reasons: Nakanishi/Romero (ibd.) do not offer a mapping algorithm that would give the desired result, and it is not obvious what such a mechanism would look like. One possibility would be the following: The whole clause (minus the Q-adverb) is adjoined to the vP-projection that dominates the Q-adverb, and then in the higher

copy the focus-marked constituents are deleted, while in the lower part the non-focus-marked constituents are deleted. This is similar to the algorithm proposed in Herburger (2000), the only difference being that in the latter nothing is deleted in the lower copy, i. e. also non-focal material is repeated there. What is of course highly problematic about this algorithm as well as about the one proposed by Herburger (2000) is the fact that it is hard to imagine how the parts of the original clause should be interpreted in a compositional manner. How, for example, should an object like “The students admire” be interpreted correctly (i. e. with *the students* as the Agent, not the Theme), and why should the (focus-marked) DP “Mary” be interpreted as “Theme (e, Mary)”? This problem could only be avoided if deletion would not apply to syntactic objects at LF, but to the denotations of these objects at the level of semantic representation, i. e. if the two copies would both be semantically interpreted before the objects corresponding to the focus-marked/non-focus-marked parts of the original sentence get deleted. This, however, is a dubious assumption, as deletion is normally conceived of as a syntactic operation.

Another point that at least casts doubt on the analysis of Nakanishi/Romero (*ibid.*), according to which *for the most part* quantifies over eventualities, is the following: Remember that I took the “tense agreement effect” as evidence for the assumption that Q-adverbs like *usually* exclusively quantify over situations. Furthermore, situation semantics analyses of adverbial quantification can rather easily be translated into event semantics analyses, as minimal situations correspond (roughly) to eventualities (see Elbourne (to appear) for discussion). But now note that the tense agreement effects discussed in the last section, which also obtain in sentences with “temporally specific” FRs and plural definites, systematically disappear if *usually* is replaced by *for the most part*, as is evidenced by the contrast between (104a) and (105a) below:

- (104) a. ^{??}The people who lectured on kangaroos at the conference last summer are usually OPEN-MINDED.
 b. The people who lectured on kangaroos at the conference last summer were usually OPEN-MINDED.
- (105) a. For the most part, the people who lectured on kangaroos at the conference last summer are OPEN-MINDED.
 b. For the most part, the people who lectured on kangaroos at the conference last summer were OPEN-MINDED.

The same contrast also shows up with respect to the other constraint mentioned in section 1.3.2 (which will be discussed in detail in section 3.3): While sentences with *usually* do not get QV-readings if the complex situation introduced by the relative clause modifying the definite DP consists of atomic parts that necessarily coincide temporally, no such constraint is in effect in sentences containing *for the most part*. This is evidenced by the contrast between (106) and (107) below:

(106) ??The people who listened to Peter’s talk on kangaroo tails at the conference last summer were usually OPEN-MINDED.

(107) For the most part, the people who listened to Peter’s talk on kangaroo tails at the conference last summer were OPEN-MINDED.

I will return to the question whether this is actually to be regarded as evidence against the claim that *for the most part* quantifies over abstract entities like eventualities or situations at the end of section 3.3, after I have offered an account of the unacceptability of sentences like (104a) and (106a).

In spite of the problems just mentioned, the idea that QVEs in sentences that contain expressions denoting plural individuals may come about as an indirect effect of quantification over the atomic parts of abstract entities like plural eventualities or complex situations is very attractive in view of the evidence discussed in this work. I will therefore in the next section develop a version of this idea that is consistent with the assumptions made in this work, and will apply it to the analysis of sentences that contain Q-adverbs like *usually*.

3.1.2 A slightly modified version of Nakanishi and Romero’s idea

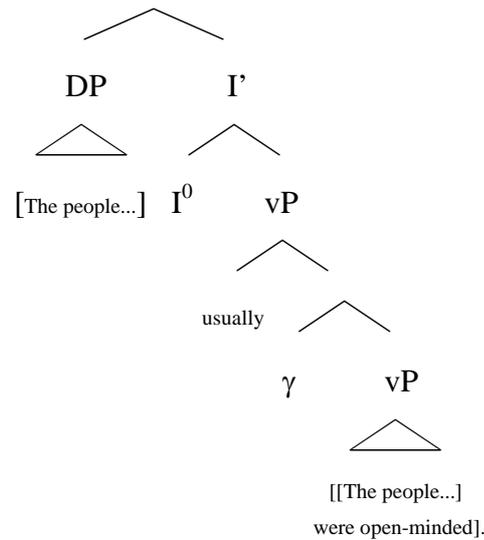
Let us assume that also the Q-adverb *usually* is able to quantify over the atomic parts of plural eventualities. This means that *usually* has to be ambiguous: In order to account for the QV-readings of sentences with singular indefinites and singular definites (and also co-varying plural definites, of course), one still needs to assume that there is version of *usually* that establishes a relation between two sets the elements of which are (minimal) situations. But in light of the fact that also sentences containing “temporally specific” FRs and plural definites the denotations of which presumably do not vary with the situations quantified over get QV-readings, a second, closely related meaning of *usually* needs to be available. This second meaning is modelled after the denotation Nakanishi/Romero (2004) assume for the Q-adverb

For the most part. It introduces two existential quantifiers over (possibly complex) situations, and establishes a relation between the atomic parts of those situations: The cardinality of the set of atoms constituting the second one at least has to be larger than the cardinality of the set of atoms constituting the first one.

But now the crucial question is: How are the two complex situations that are related this way determined, i. e. which part of the denotation of the respective clause is predicated of the first one, and which part is predicated of the second one? As already mentioned in section 3.1.1, Nakanishi/Romero (ibid.) in their analysis of *for the most part* assume – without specifying the technical details – that the denotation of the non-focussed part of the clause is predicated of the first (in their terminology:) eventuality, while the denotation of the focussed part is predicated of the second one. This, however, is in conflict with the mapping algorithm assumed in this work, as already mentioned.

Remember that this mapping algorithm works as follows: At LF, a (copy of the respective) topical DP has to c-command the respective Q-adverb, while focal DPs are preferably interpreted in their vP-internal base positions. Furthermore, the higher copy of the respective topical DP is interpreted as a situation predicate. If the respective DP is a generalized quantifier, this comes about via existential abstraction over its unsaturated argument (see section 4.3 in chapter 2). If, on the other hand, it is an object of type e , it needs to be shifted to the type of generalized quantifiers first. Then, in the next step, existential abstraction can be applied. Concerning the lower copy of the respective topical DP, it is turned into a definite description in the manner described in detail in section 4.3 of chapter 2: The original determiner is deleted and replaced by the definite determiner. Furthermore, the free situation variable contained within this definite description can be turned into a variable bound by the Q-adverb if (a situation variable) binding operator is inserted directly beneath the respective Q-adverb.

If we stick to these assumptions, a sentence like (104a) gets the (strongly simplified) LF-representation given in (108) below. Furthermore, the copy of the definite DP that c-commands the Q-adverb is turned into a situation predicate (as shown in (109a, b)), while the vP-segment c-commanded by the Q-adverb is interpreted as given in (110). Note that I assume that the (free) situation variable contained within the higher copy is resolved to w_0 by default, while the one contained within the lower copy is turned into a bound variable via the binding operator.



- (109) a. $\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-kangaroos}(x, s') \wedge \text{at}(\text{the conference last summer}, s') \wedge \tau(s') < t_0]\} \Rightarrow$
 $\lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda s. P(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-kangaroos}(x, s') \wedge \text{at}(\text{the conference last summer}, s') \wedge \tau(s') < t_0]\}, s)$
- b. $\lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda s. P(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-kangaroos}(x, s') \wedge \text{at}(\text{the conference last summer}, s') \wedge \tau(s') < t_0]\}, s) (\lambda y \lambda s''. \exists R [R(y, s'')]) =$
 $\lambda s. \exists R [R(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-kangaroos}(x, s') \wedge \text{at}(\text{the conference last summer}, s') \wedge \tau(s') < t_0]\}, s)$
- (110) $\lambda s. \text{open-minded}(\sigma\{x: \text{person}(x, s) \wedge \exists s' [\text{lecture-on-kangaroos}(x, s') \wedge \text{at}(\text{the conference last summer}, s') \wedge \tau(s') < t_0]\}, s) \wedge \tau(s') < t_0$

Let us now turn our attention to a point that I already mentioned in section 1.3.2, but which I abstracted away from in the formulas above: The matrix predicate *were open-minded* has to be interpreted distributively if it is applied to a sum individual, while in the case of the relative clause predicate *lectured-on-kangaroos* this is at least the preferred interpretation. Let us therefore assume that both predicates are shifted accordingly via a distributivity-operator¹⁵ that is applied to them, as shown in (111) below (cf. Lasersohn (1998), who builds on Link (1983, 1987)):

- (111) a. $DIST(\lambda x \lambda s. \text{lecture-on-kangaroos}(x, s) \wedge \tau(s) < t_0) =$

¹⁵ For concreteness, let us assume that the distributivity-operator is adjoined to the constituents (i. e. the VPs) that denote the respective objects.

$$\lambda x \lambda s. \forall y [y \in \text{Atom}(x) \rightarrow \exists s' [s' \leq s \wedge \text{lecture-on-kangaroos}(y, s') \wedge \tau(s') < t_0]]$$

$$\text{b. } \text{DIST}(\lambda x \lambda s. \text{open-minded}(x, s) \wedge \tau(s) < t_0) =$$

$$\lambda x \lambda s. \forall y [y \in \text{Atom}(x) \rightarrow \exists s' [s' \leq s \wedge \text{open-minded}(y, s') \wedge \tau(s') < t_0]]$$

This has the consequence that the situation predicate that *c*-commands the *Q*-adverb is actually spelled out as given in (112a), while the one that is *c*-commanded by the *Q*-adverb is actually spelled out as given in (112b):

$$(112) \text{ a. } \lambda s. \exists R [\text{R}(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\forall y [y \in \text{Atom}(x) \rightarrow \exists s'' [s'' \leq s' \wedge \text{lecture-on-kangaroos}(y, s'') \wedge \tau(s'') < t_0]] \wedge \text{at}(\text{the conference last summer, } s')\}], s), \text{ where } R \text{ means } \textit{Relation}.$$

$$\text{b. } \lambda s. \forall y [y \in \text{Atom}(\sigma\{x: \text{person}(x, s) \wedge \exists s' [\forall y [y \in \text{Atom}(x) \rightarrow \exists s'' [s'' \leq s' \wedge \text{lecture-on-kangaroos}(y, s'') \wedge \tau(s'') < t_0]] \wedge \text{at}(\text{the conference last summer, } s')\}]) \rightarrow \exists s''' [s''' \leq s \wedge \text{open-minded}(y, s''') \wedge \tau(s''') < t_0]]$$

Let us now define a denotation of *usually* that is based on Nakanishi and Romero's (2004) analysis of *for the most part* discussed in the last section and see what happens if this object is applied to the two situation predicates in (112). This new denotation is given in (113) below:

$$(113) \text{ } [[\text{usually}_3]]^g = \lambda Q_{\langle s, t \rangle} \lambda P_{\langle s, t \rangle} \lambda s. \exists s' [s' \leq s \wedge s' \in \min\{s'': P(s'') \wedge g(C)(s'')\} \wedge \exists s''' [s''' \leq s' \wedge |s'''| \geq \frac{1}{2} |s'| \wedge s''' \in \min\{s''': Q(s''')\}], \text{ where } |s| := |\{s': s' \in \text{Atom}(s)\}|$$

Now the question of course is what the atomic parts of a complex situation are. Let us assume that an atomic part of a complex situation *s* is the smallest situation *s'* contained within *s* that satisfies a certain predicate, where the choice of this predicate depends on the context. This has the consequence that if no suitable predicate is available, the result of applying the *Atom*-function to the respective situation *s* is not defined.

Concerning the situation predicates in (112a) and (112b), it is pretty obvious how the respective sets of atoms could be determined for the situations that satisfy the respective predicates: In the case of situations *s* that satisfy (112a), it would be the set of (minimal)

situations such that each of those situations contains an atomic part of the sum individual that s stands in some relation to. In other words, it would be the set of minimal situations such that each of those situations contains an atomic part of this sum individual.

In the case of situations that satisfy (112b), on the other hand, it would be the set of minimal situations such that each of those situations is a situation where an atomic part of the sum individual denoted by the definite DP is open-minded.

With these assumptions in place, let us now see what we get if the object in (114) is applied to the situation predicates in (112a, b). Consider (114) below, which gives the result of this operation:

$$(114) \quad \lambda s. \exists s' [s' \leq s \wedge s' \in \min\{s'' : \exists R [R(\sigma\{x: \text{person}(x, w_0) \wedge \exists s''' [\forall y [y \in \text{Atom}(x) \rightarrow \exists s'''' [s'''' \leq s''' \wedge \text{lecture-on-kangaroos}(y, s''''') \wedge \tau(s''''') < t_0]] \wedge \text{at}(\text{the conference last summer}, s''')], s'') \wedge C(s'') \} \wedge \exists s'''''' [s'''''' \leq s' \wedge |s''''''| \geq \frac{1}{2} |s'| \wedge s'''''' \in \min\{s''''''': \forall y [y \in \text{Atom}(\sigma\{x: \text{person}(x, s''''''') \wedge \exists s'''' [\forall y [y \in \text{Atom}(x) \rightarrow \exists s'''''' [s'''''' \leq s'''' \wedge \text{lecture-on-kangaroos}(y, s''''') \wedge \tau(s''''') < t_0]] \wedge \text{at}(\text{the conference last summer}, s''')]] \} \rightarrow \exists s'''''''' [s'''''''' \leq s'''''' \wedge \text{open-minded}(y, s''''''') \wedge \tau(s''''''') < t_0]]]]]]]$$

As it turns out on closer inspection, (114) is the right result, as it accounts for the QV-reading we wanted to account for. In order to see this more clearly, consider the simplified version of (114) given in (115) below (Note that in (115) I have suppressed the respective minimality conditions as well as the contribution of the respective distributivity-operators and the “outermost” situation argument of the Q-adverb).

$$(115) \quad \exists s [\exists R [R(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-k.}(x, s') \wedge \tau(s') < t_0 \wedge \text{at}(\text{the c. last summer}, s')], s)] \wedge C(s) \wedge \exists s'' [s'' \leq s \wedge |s''| \geq \frac{1}{2} |s| \wedge \text{open-minded}(\sigma\{x: \text{person}(x, s') \wedge \exists s' [\dots]], s') \wedge \tau(s') < t_0]]]$$

(115) can be paraphrased as follows: “There is a situation s such that s stands in some relation to the maximal sum of people who lectured on kangaroos at the conference last summer, and there is a situation s' such that s' is a part of s the cardinality of which is larger than or equal to half the cardinality of s , and s' is a situation such that the maximal sum of people who

lectured on kangaroos at the conference last summer *that is contained within s'* is open-minded in s' “.

If it is furthermore assumed that the cardinality of the respective situations is determined in the way described above, this is the correct result (see section 3.1.1). Fortunately, the mapping algorithm argued for in this dissertation circumvents the problem mentioned above in section 3.1.1. Remember that Nakanishi and Romero (2004) had to assume that the original eventuality predicate (i. e. the denotation of the clause minus the Q-adverb) is split up in the following way: The focal part is predicated of the “smaller” eventuality e' , while the non-focal part is predicated of the larger eventuality e . (This was necessary in order to keep the non-focal DP from being repeated in the eventuality predicate that is applied to the smaller eventuality e' – which would prevent the respective sentence from getting a QV-reading, as then also the smaller eventuality e' would contain the respective sum individual as a whole). It is, however, unclear how the required split can be achieved in a compositional manner (see section 3.1.1).

But now remember that the mapping algorithm repeated above makes it possible that the situation variable contained within the lower copy of the respective definite DP is turned into a variable bound by the existential quantifier that introduces the smaller situation s' . This has the consequence that only the larger situation s contains the maximal sum of individuals that satisfy the respective NP-predicate in the actual world, while the smaller situation s' only contains the maximal sum of individuals that satisfy this predicate in s' . Furthermore, as the cardinality of s' is required to be at least half the cardinality of s , and as the cardinality of the respective situations is determined in the way described above, it is clear that the cardinality of the maximal sum individual contained in s' is at least half the cardinality of the maximal sum individual contained in s . And that is exactly what we want.

Note furthermore that in this case the presupposition associated with the definite determiner does not give rise to the problem discussed extensively in chapter 2: If s contains the maximal sum individual that satisfies the respective predicate in w_0 , then it is automatically guaranteed that there is a part s' of s such that s' contains the maximal sum of individuals that satisfy the respective predicate in s' . In other words, it is thus guaranteed that the “second” σ -operator is not applied to the empty set.

In section 3.2 I will show that if the assumption that *usually* may also denote the object given in (113) above is combined with the results of section 2, we cannot only account for the fact that sentences with plural definites and “temporally specific” FRs get QV-readings, but

also for the fact that this is only possible if the tense markings of the respective relative clause and matrix verbs agree.

3.2 An explanation for the tense agreement effect

Remember my assumption from section 2 that the C-variable introduced in the restriction of Q-adverbs needs to be resolved to a (contextually salient) time interval, as situations need to be located in time. Furthermore, I assumed that there is a pragmatic principle (the *interval resolution strategy*) which – in the absence of intervening factors – forces situations quantified over to be resolved to intervals introduced in the restriction of the respective Q-adverb.

Now the analysis argued for in section 3.1.2 forces me to assume that Q-adverbs come in two, systematically related varieties: One that takes (the characteristic functions of) two sets of atomic situations as arguments, and relates the cardinalities of those two sets, and one that takes the characteristic functions of two complex situations as arguments, and relates the cardinalities of the atomic parts of those complex situations. It is therefore natural to assume that the same principles apply to those two varieties as far as the resolution of the respective C-variables are concerned. This has the consequence that also in the variety that takes the characteristic functions of complex situations as arguments, the C-variable introduced by the first existential quantifier needs to be resolved according to the *interval resolution strategy*. Let us return to sentence (104b) (repeated below as (116a)) and its (simplified) semantic representation in (115) (repeated below as (116b)):

(116) a. The people who lectured on kangaroos at the conference last summer were usually OPEN-MINDED.

b. $\exists s [\exists R [R(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-k.}(x, s') \wedge \tau(s') < t_0$
 $\wedge \text{at}(\text{the c. last summer, } s')\}], s)] \wedge C(s) \wedge \exists s'' [s'' \leq s \wedge |s'| \geq \frac{1}{2} |s|$
 $\wedge \text{open-minded}(\sigma\{x: \text{person}(x, s'') \wedge \exists s' [\dots]\}, s'') \wedge \tau(s'') < t_0]]$

Now, the next step consists in resolving *C* to the predicate $\lambda s. \pi(s) \subseteq i_s$, as shown in (117) below (cf. section (2.3.2)):

(117) $\exists s [\exists R [R(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-k.}(x, s') \wedge \tau(s') < t_0$
 $\wedge \text{at}(\text{the c. last summer, } s')\}], s)] \wedge \tau(s) \subseteq i_s \wedge \exists s'' [s'' \leq s \wedge |s'| \geq \frac{1}{2} |s|$

$$\wedge \text{open-minded } (\sigma\{x: \text{person}(x, s') \wedge \exists s' [\dots]\}, s') \wedge \tau(s') < t_0]$$

After this has been done, i_s needs to be resolved to a contextually salient time interval. This has to be done according to the *interval resolution strategy*, which is repeated below:

1. Make use of direct, overt information (where temporal adverbials that fulfil the following condition count as “direct, overt information”: They modify the verb that takes the variable ranging over the situations to be located as argument.)
2. If not available: Make use of locally available indirect information, i. e. take the most specific contextual information originating from the same domain (i. e. the restrictor of an adverbial or a determiner quantifier on the one hand, and the nucleus of the respective quantifier on the other hand). In the cases under discussion, this contextual information is given via the running times of other salient situations.
3. If not available: Take the most specific contextual information originating from the other domain or from preceding clauses, or take the default interval i_{world} , which denotes the whole time axis.

As in (116a) there is no temporal adverbial available within the matrix clause, step 2. has to be taken, i.e. i_s has to be resolved to the most specific interval that is available within the local context¹⁶. The most specific contextual information available within the local context is of course the interval where the situation introduced by the relative clause that modifies the definite DP is located, i. e. $\tau(s')$. Therefore, i_s has to be resolved to $\tau(s')$, as shown in (118) below¹⁷:

$$(118) \quad \exists s [\exists R [R(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-k.}(x, s') \wedge \tau(s') < t_0 \\ \wedge \text{at}(\text{the c. last summer}, s')\}], s)] \wedge \tau(s) \subseteq \tau(s') \wedge \exists s'' [s'' \leq s \wedge |s''| \geq \frac{1}{2} |s| \\ \wedge \text{open-minded } (\sigma\{x: \text{person}(x, s') \wedge \exists s' [\dots]\}, s') \wedge \tau(s') < t_0]$$

¹⁶ Note that while formulas like (117) do not have a restrictor in the usual sense, the predicate that applies to the first existentially quantified situation intuitively corresponds to the restrictor.

¹⁷ In order for formulas like (118) to be well-formed, I have to assume that the σ -operator is externally dynamic, i. e. that the existential quantifier binding the situation variable s' in the relative clause is allowed to bind the occurrence of this variable inside the conjunct $\tau(s) \subseteq \tau(s')$, which is outside the scope of the σ -operator.

In (118), there is no conflicting tense information: The “restrictor” situation s is specified to be located within the interval where s' is located, which in turn took place during the summer one year before the speech time. The “nucleus” situation s'' , on the other hand, which is a part of s , is specified to be located within an interval that ends before the speech time. As those two tense specifications do not contradict each other, the sentence is correctly predicted to be fine under a QV-reading.

Let us next turn to sentence (104a) (repeated below as (119a)), which initially gets the (simplified) semantic representation in (119b):

- (119) a. ^{??}The people who lectured on kangaroos at the conference last summer are usually OPEN-MINDED.

$$\begin{aligned} \text{b. } \exists s [\exists R [\mathbf{R}(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-k.}(x, s') \wedge \tau(s') < t_0 \\ \wedge \text{at}(\text{the c. last summer, } s')\}], s)] \wedge \tau(s) \subseteq i_s \wedge \exists s'' [s'' \leq s \wedge |s''| \geq \frac{1}{2}|s| \\ \wedge \text{open-minded}(\sigma\{x: \text{person}(x, s'') \wedge \exists s' [\dots]\}], s'') \wedge t_0 \subseteq \tau(s'')] \end{aligned}$$

Now, according to the *interval resolution strategy*, i_s also in this example has to be resolved to the running time of the relative clause eventuality s' , as this is as the most specific locally available temporal information. But in this case, this results in contradicting tense specifications, as can be seen in (120) below: On the one hand, the situation s has to be located during a conference that took place in the year before the speech time. On the other hand, there has to be an eventuality s'' , which is a part of s , such that the running time of s'' includes the speech time. But this, of course, necessarily results in a contradiction: (120) can never be true, as it is impossible to find a situation that as a whole took place before the speech time, but has a part that includes the speech time. (104a) is therefore predicted to be odd – for essentially the same reason as the structurally similar sentences with indefinites that were discussed in section 2.

$$\begin{aligned} (120) \exists s [\exists R [\mathbf{R}(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{lecture-on-k.}(x, s') \wedge \tau(s') < t_0 \\ \wedge \text{at}(\text{the c. last summer, } s')\}], s)] \wedge \tau(s) \subseteq \tau(s') \wedge \exists s'' [s'' \leq s \wedge |s''| \geq \frac{1}{2}|s| \\ \wedge \text{open-minded}(\sigma\{x: \text{person}(x, s'') \wedge \exists s' [\dots]\}], s'') \wedge t_0 \subseteq \tau(s'')] \end{aligned}$$

An obvious question that comes to mind at this point is whether the factors that obviate “the tense agreement constraint” in sentences with indefinites have the same effect in structurally

similar sentences with plural definites. Remember that in section 2 three such factors were discussed: (a) The presence of adverbs like *nowadays* or *today* in the matrix clause, which explicitly introduce intervals i_s can be resolved to (cf. section 2.4), (b) the presence of adverbs like *still*, which trigger presuppositions that cause interval resetting (cf. section 2.5), and (c) the indirect effect of highly plausible (indirect) causal relations between the respective relative clause and matrix situations (cf. section 2.6). Let us see whether it is possible to construct examples with plural definites that show parallel effects:

- (121) a. ??The people who lectured on kangaroos at the conference last summer usually work at MIT today.
 b. ??The people who lectured on kangaroos at the conference last summer are usually still interested in Australian animals.
 c. ??The people who lectured on kangaroos at the famous conference in the summer of 1985 are usually well known.

The examples in (121) do not get QV-readings (and are therefore unacceptable if the matrix verb is understood as an individual-level predicate), in spite of the fact that in each of them one of the above conditions is fulfilled: In (121a) the adverb *today* introduces an interval into the matrix clause overtly that is compatible with the tense marking of the matrix verb. In (121b) the presupposition triggered by the presence of *still* in the matrix clause should cause i_s to be resolved to an interval that is located *after* the interval where the respective relative clause situations are located (which should have the effect that there is no incompatibility with the tense marking of the matrix verb). Finally, in (121c) there is a plausible causal relation between the relative clause situations of lecturing on kangaroos at the famous conference in the summer of 1985 and the matrix state of being well known. This should have the effect that i_s cannot get resolved to the interval where the respective relative clause situations are located, but has to be resolved to a later interval, if this causal relation is not to be destroyed.

As it is not plausible to assume that interval resolution works fundamentally different in sentences with plural definites than it works in sentences with singular indefinites, there has to be another reason why the sentences in (121) are unacceptable. I assume that this is due to the fact that they violate an additional constraint that will be discussed in the next section.

3.3 The coincidence constraint

Consider sentence (106) again (repeated below as (122a)), which according to the interval resolution strategy gets the (simplified) semantic interpretation given in (122b). Note that *listen* is short for *listen to Peter's lecture on kangaroo tails*:

- (122) a. ^{??}The people who listened to Peter's talk on kangaroo tails at the conference last summer were usually OPEN-MINDED.
- b. $\exists s [\exists R [R(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{listen}(x, s') \wedge \tau(s') < t_0$
 $\wedge \text{at}(\text{the c. last summer, } s')\}], s)] \wedge \tau(s) \subseteq \tau(s') \wedge \exists s'' [s'' \leq s \wedge |s''| \geq$
 $\frac{1}{2}|s| \wedge \text{open-minded}(\sigma\{x: \text{person}(x, s') \wedge \exists s' [\dots]\}, s') \wedge \tau(s'') < t_0]]$

According to everything said so far, there is nothing wrong with (122b): There is no contradiction between the temporal location of the „restrictor“ situation s and the temporal location of the “nucleus” situation s'' . Nevertheless, sentence (122a) is odd, which means that it has to violate another constraint which has not been identified yet. Intuitively, the relevant factor that sets sentences like (122a) apart from sentences like (104b) seems to be the internal constitution of the respective complex relative clause situations: Note first that of course also the relative clause situation in (122b) has to be interpreted distributively. Therefore, the relative clauses in (122a) that the two σ -operators are applied to are actually spelled out as given in (123) below:

- (123) $\lambda x \lambda s. \text{person}(x, s) \wedge \exists s' [\forall y [y \in \text{Atom}(x) \rightarrow \exists s'' [s'' \leq s' \wedge \text{listen}(y, s'') \wedge$
 $\tau(s'') < t_0]]]$

Now note that in the case of (123), the temporal traces of all the (minimal) situations s'' that s' consists of have to coincide: Due to definiteness, there is only one talk by Peter on kangaroo tails, and if one listens to a lecture, one usually listens to it from start to finish. Therefore, the (minimal) situations such that each of those situations is a situation where an atomic part of the sum individual in (122a) listens to Peter's lecture on kangaroo tails all have to take place at the same time.

In the case of (104b), on the other hand, this is different: There, the temporal traces of the minimal situations s'' that the complex relative clause situation s' consists of do not have to coincide, as the lectures given at a conference are normally distributed over the whole

duration of this conference. In other words, the minimal situations such that each of those situations is a situation where an atomic part of the sum individual in (104b) lectures on kangaroos are presumably distributed over the whole duration of the conference mentioned in this sentence. We will see in a minute that this difference in the internal constitution of the respective relative clause situations also has a consequence on the internal constitution of the respective “restrictor” situations, as – due to the interval resolution strategy – those restrictor situations are temporally located within the intervals where the respective relative clause situations are located. But before going into the details, let us first check whether our speculation is on the right track that the internal constitution of the respective relative clause situations is the relevant factor.

Consider the contrast between (124a) and (124b) below: In the case of (124a) it is intuitively clear that the atomic situations contained within the complex relative clause situation take place at the same time, while in the case of (124b) it is natural to assume that the atomic situations contained within the complex relative clause situation are temporally distributed over the whole duration of Peter’s safari. Interestingly, (124a) is very odd, while (124b) is fine.

- (124) a. ^{??}The people who were killed in the car accident yesterday afternoon were usually less than 20 years old.
b. The lions Peter saw during his safari trip usually had a mane.

Consider furthermore example (125) below: It is only acceptable if it is interpreted in a specific way, namely if one is willing to assume that the atomic parts of the complex relative clause situation did not all coincide, i. e. under the assumption that Peter did not meet all of his colleagues at the same time, but during the course of the afternoon:

- (125) The people Peter met yesterday afternoon usually were colleagues of his.

Let us now assume that Q-adverbs like *usually* are not allowed to operate on complex situations of any kind, but only on complex situations that satisfy a certain condition concerning the temporal distribution of their atomic parts. The first option that might come to mind would be to only allow a Q-adverb to be applied to a complex situation if it consists of atomic parts such that there is no (temporal) overlap between those parts. This, however, would be too strong: It does not seem to be required that there is no overlap at all between the

temporal traces of the respective atoms. Intuitively, a sentence like (104b) does not become unacceptable if it is uttered in a situation where it is clear that some of the lectures mentioned took place at the same time. It seems to be sufficient that at least a substantial proportion of them took place at different times. Let us therefore assume that Q-adverbs like *usually* are only allowed to operate on complex situations that consist of atomic parts such that it is not the case that the temporal traces of all those atomic parts overlap.

But note that this assumption alone does not automatically account for the unacceptability of sentences like (122a) and (124a): After all, it is the respective relative clause situation that would violate the constraint informally sketched above, not the existentially quantified “restrictor” situation. But then, as already mentioned, the interval resolution strategy forces i_s to be resolved to the temporal trace of the respective relative clause situation (as shown in (122b) above). It is therefore not completely surprising that the internal constitution of the latter has an influence on the internal constitution of the former. But in order to see how this works in detail, it has to be clarified how the temporal trace of a (minimal) complex situation that is defined on the basis of its atomic parts is to be determined.

Let us assume that this is done in the most obvious way: The temporal trace of such a complex situation is the smallest discontinuous interval that includes the temporal traces of all of its atomic parts. This is given formally in (126) below:

$$(126) \quad \tau(s) \text{ if } s \text{ is a complex situation that is defined on the basis of its atomic parts: =} \\ \text{it s. t. } \forall s' [s' \in \text{Atom}(s) \rightarrow \tau(s') \subseteq t] \wedge \forall t' [\forall s' [s' \in \text{Atom}(s) \rightarrow \tau(s') \subseteq t'] \\ \rightarrow t \subseteq t'].$$

As will become clear in a minute, it is important that the interval in the formula above is understood to be discontinuous, i. e. it does not contain the stretches of time that lie in between the subintervals corresponding to the temporal traces of the respective atomic situations.

Now, the next question is what it means to say that the temporal trace of a complex situation is included in the temporal trace of another complex situation. The most straightforward answer is the following: The temporal trace of a complex situation s' is included in the temporal trace of another complex situation s if the smallest (discontinuous) interval that includes the running times of all the atomic parts of s' is a part of the smallest interval that includes the running times of all atomic parts of s . This is given formally in (127) below:

$$(127) \quad \text{If } s \text{ and } s' \text{ are both complex situations (in the above sense),}$$

$$\tau(s') \subseteq \tau(s) := \text{it s. t. } \forall s'' [s'' \in \text{Atom}(s) \rightarrow \tau(s'') \subseteq t] \wedge \forall t' [\forall s'' [s'' \in \text{Atom}(s) \rightarrow \tau(s'') \subseteq t'] \rightarrow t \subseteq t'] \subseteq \text{it}' \text{ s. t. } \forall s''' [s''' \in \text{Atom}(s') \rightarrow \tau(s''') \subseteq t'] \wedge \forall t'' [\forall s''' [s''' \in \text{Atom}(s') \rightarrow \tau(s''') \subseteq t''] \rightarrow t' \subseteq t'']$$

At this point, the fact that the interval denoting the temporal trace of a complex situation is understood to be discontinuous becomes relevant: This has the consequence that for each atomic part s'' of a complex situation s' the temporal trace of which is included in the temporal trace of another complex situation s , there is an atomic part s''' of s , such that the temporal trace of s'' is included in the temporal trace of s''' . This is given more formally in (128) below:

$$(128) \quad \text{If } s \text{ and } s' \text{ are both complex situations (in the above sense), and if } \tau(s) \subseteq \tau(s'),$$

$$\text{then } \forall s''' [s''' \in \text{Atom}(s) \rightarrow \exists s'' [s'' \in \text{Atom}(s') \wedge \tau(s''') \subseteq \tau(s'')]]$$

Let us now return to the question why the internal constitution of the relative clause situation in (122a) has an influence on the acceptability of the clause. Note that if we add the condition that not all the atomic parts of the existentially quantified “restrictor” situation may have overlapping running times to the truth conditions of Q-adverbs like *usually* (as shown in (129) below), the unacceptability of (122a) is an automatic consequence of (128): As the temporal trace of the restrictor situation s has to be included in the temporal trace of the relative clause situation s' , each atomic part s'' of s has to correspond to an atomic part s''' of s' such that the temporal trace of s'' is included in the temporal trace of s''' . But if the temporal traces of all atomic parts of s' coincide, it is also necessarily the case that all atomic parts of s coincide. This has the consequence that (122a) would be necessarily contradictory: It could only be true under the condition that the temporal traces of all atomic parts of the restrictor situation s coincide, while at the same time there are some atomic parts of the restrictor situation s such that the temporal traces of those atomic parts do not overlap. This is shown more formally in (130b) below, which gives the (simplified) truth conditions of (122a) (repeated below as (130a)) under the assumption that the denotation of *usually*₃ is modified as given in (129). Note that o means “overlaps”).

$$(129) \quad [[\text{usually}_3]]^g = \lambda Q_{\langle s, t \rangle} \lambda P_{\langle s, t \rangle} \lambda s. \exists s' [s' \leq s \wedge s' \in \min\{s'' : P(s'') \wedge g(C)(s'')\} \\ \wedge \neg \forall s''', s'''' \in \text{Atom}(s) [\tau(s''') o \tau(s''')]]$$

$$\wedge \exists s'''' [s'''' \leq s' \wedge |s''''| \geq \frac{1}{2} |s'| \wedge s'''' \in \min \{s''''': Q(s''''')\}].$$

- (130) a. ??The people who listened to Peter's talk on kangaroo tails at the conference last summer were usually OPEN-MINDED.
- b. $\exists s [\exists R [R(\sigma\{x: \text{person}(x, w_0) \wedge \exists s' [\text{listen}(x, s') \wedge \tau(s') < t_0 \wedge \text{at}(\text{the c. last s., s}')\}], s)] \wedge \tau(s) \subseteq \tau(s') \wedge \neg \forall s'', s''' \in \text{Atom}(s) [\tau(s'') \circ \tau(s''')]$
 $\exists s'''' [s'''' \leq s \wedge |s''''| \geq \frac{1}{2} |s| \wedge \text{open-minded}(\sigma\{x: \text{person}(x, s''''') \exists s' [\dots]\}, s''''') \wedge \tau(s''''') < t_0]$

The unacceptability of (122a) is thus explained under the assumption that the QV-reading is blocked because it results in a necessary contradiction.

Note that adding the condition that not all atomic parts of the respective existentially quantified complex situation may have overlapping temporal traces to the truth conditions of *usually*₃ also automatically accounts for the oddity of the sentences in (121) (which are repeated below as (131a – c)). (Remember that at the end of section 3.2 we did not yet have an explanation for the oddity of those sentences.)

- (131) a. ??The people who lectured on kangaroos at the conference last summer usually work at MIT today.
- b. ??The people who lectured on kangaroos at the conference last summer are usually still interested in Australian animals.
- c. ??The people who lectured on kangaroos at the famous conference in the summer of 1985 are usually well known.

As already pointed out, in each of the three sentences above there is a plausible reason to locate the respective “restrictor” situation *s* in an interval that is located *after* the interval where the respective relative clause situation *s'* is located. Therefore, the fact that the nucleus situation – because of the tense marking of the matrix verb – has to include the speech time should not result in a contradiction. While this is certainly true, it is now easy to see that there is another problem with those sentences: They violate the coincidence constraint, as in each of them the temporal traces of the atomic parts of the respective “restrictor” situation overlap. This is just a necessary consequence of the fact that the complex situation that is constituted by those atomic parts has a complex situation as part the temporal trace of which includes the

speech time: As each atomic part of the “restrictor” situation includes an atomic part of the “nucleus” situation, each of the former atomic situations has to include the speech time if each of the latter does. It is thus expected that the sentences in (131) do not get QV-readings and are therefore odd.

In sections 3.1, 3.2 and 3.3 I have offered an analysis that on the one hand accounts for the fact that adverbially quantified sentences containing plural definites (and “temporally specific” FRs) are in principle able to get QV-readings, and that at the same time offers an explanation for why such QV-readings are sometimes blocked. But note that this analysis makes it necessary to assume that Q-adverbs like *usually* have two different (albeit closely related) meanings: One according to which they take the characteristic functions of two sets of (minimal) situations as arguments, and relate the cardinalities of those two sets, and one according to which they introduce two complex situations and relate the cardinalities of the sets of atoms those complex situations consist of. In the second case, they also take two situation predicates as arguments, but they do not relate the cardinalities of the sets characterised by those predicates directly. Rather, the respective predicates are predicated of (the values of) two existentially quantified variables ranging over (complex) situations, and what gets related are the cardinalities of the sets of atoms constituting those complex situations. Thus, while the two meanings of *usually* have in common the relation they establish between the cardinalities of two sets of situations, the way in which the situation predicates *usually* is applied to determine those sets of situations is different: In the former case we have the direct relation between characteristic functions and the sets characterised by those functions, while in the latter case one element of the set characterised by the respective predicates is picked out (via existential quantification) and shifted (via the function *Atom*) to a set itself. Unfortunately, for the moment I see no other option than to bite the bullet, and simply accept the conclusion that Q-adverbs like *usually* are systematically ambiguous in the above sense.

In section 3.4 I will try to account for the fact already mentioned in section 1.3.1 that adverbially quantified sentences containing (topical) bare plurals and “temporally non-specific” FRs get QV-readings irrespective of the fact whether the tense markings of the respective relative clause and matrix verbs agree.

3.4 QV in sentences containing kind-denoting DPs

In the last two sections I offered an analysis that is able to explain the fact that sentences which contain plural definites and “temporally specific” FRs only get QV-readings if they fulfil two constraints: First, the tense markings of the respective relative clause and matrix verbs have to agree. Second, it is required that at least not all atomic parts of the complex situation introduced by the respective relative clause have overlapping temporal traces. Furthermore, as discussed in section 2, the first constraint can also be observed in adverbially quantified sentences that contain singular indefinites. Now, as already mentioned in section 1.3.1, sentences that contain bare plurals and “temporally-non-specific” FRs do not obey this constraint: They also get QV-readings if the tense marking of the relative clause verb does not agree with the tense marking of the matrix verb. This is evidenced by the contrast between (132a, b) on the one hand, and (132 c – e) on the other ((132f – h) are just included in order to show that the lack of tense agreement is the relevant factor in accounting for the oddity of (132 c – e)):

- (132) a. Cars that were bought in the eighties are usually BLUE.
b. What was bought in the eighties is usually BLUE.
c. ??A car that was bought in the eighties is usually BLUE.
d. ??The cars that were bought yesterday are usually BLUE.
e. ??What was bought yesterday is usually BLUE.
f. A car that was bought in the eighties was usually BLUE.
g. The cars that were bought yesterday were usually BLUE.
h. What was bought yesterday was usually BLUE.

Now remember from section 1.3.1 that I assume that “temporally non-specific” FRs like the ones above and bare plurals do not denote objects of type e , but objects of type $\langle s, e \rangle$. In other words, I assume (cf. Chierchia (1998) and Dayal (2004)) that the respective NP/CP-predicates are not shifted via an overt or covert version of the definite determiner, but via an (at least in English; see section 1.3.1) covert determiner D_{KIND} the denotation of which is repeated in (133) below:

$$(133) \quad [[D_{\text{KIND}}]] = \lambda P_{\langle e, \langle s, t \rangle \rangle} \lambda s. \sigma \{x: P(x, s)\}$$

Remember furthermore our assumption from section 1.3.1 that if a kind denoting expression is combined with an object-level predicate (i.e. a predicate, that does not take arguments of type $\langle s, e \rangle$, but arguments of type e), the kind denoting expression has to be shifted in the way repeated in (134) below (cf. Chierchia (1998)):

$$(134) \quad k \Rightarrow \lambda P \lambda s. \exists x [Real(x, k, s) \wedge P(x, s)],$$

where k stand for “kind denoting expression” and $Real(x, k, s)$ for “ x realizes k at s ”.

This has the consequence that in the case of adverbially quantified sentences containing topical bare plurals and “temporally non-specific” FRs, the respective Q-adverb quantifies over minimal situations such that each of those situations contains a realization of the kind denoted by the respective bare plural/FR. Thus, according to our assumptions a sentence like (132a) above thus gets the (simplified) semantic representation given in (135) below:

$$(135) \quad \text{Most } s [\exists x [Real(x, \lambda s'. \sigma\{x: \text{car}(x, s') \wedge \exists s'' [\text{was-bought}(x, s'') \wedge \tau(s'') \subseteq 80s]]], s) \wedge \exists R [R(x, s)] \wedge \tau(s) \subseteq i_s]$$

$$[\exists s''' [s \leq s''' \wedge \exists x [Real(x, \dots, s''') \wedge \exists R [R(x, s''')] \wedge \tau(s''') \subseteq i_{s'''} \wedge \text{is-blue}(\sigma\{x: \text{car}(x, s''') \wedge \exists s'' [\text{was-bought}(x, s'') \wedge \tau(s'') \subseteq 80s]]], s''') \wedge t_0 \subseteq \tau(s''')]]]$$

Note that in (135) there is only an indirect relation between the individuals introduced by the existential quantifier and the denotation of the bare plural: It is not the kind denoted by the bare plural itself that is interpreted in the restrictor of the Q-adverb. Rather, the situations quantified over are defined on the basis of their containing an individual that stands in a certain relation to the kind denoted by this DP – namely the relation of realizing it in the respective situation. This is different for adverbially quantified sentences that contain singular indefinites or plural definites and “temporally specific” FRs: In these cases, the respective DPs are interpreted directly in the restriction of the respective Q-adverb, and therefore their denotations *directly* define the situations quantified over.

I assume that this difference is the reason why the three types of sentences do not behave alike as far as tense agreement is concerned: In the case of singular indefinites as well as in the case of plural definites and “temporally specific FRs”, the direct relation between the denotations of the respective DPs and the situations quantified over forces the latter to be

located within intervals that are determined on the basis of temporal information originating within the respective DPs, if such information is available.

In the case of bare plurals and “temporally non-specific” FRs, on the other hand, there is no such direct relation. Let us therefore assume that the situations quantified over do not have to be located within the intervals where the respective relative clause situations are located. Rather, they can be located within t_{world} (as in point 3. of the *interval resolution strategy*). This has the consequence that the final semantic representation of (132a) is as given in (136) below:

$$(136) \text{ Most } s [\exists x [\text{Real}(x, \lambda s'. \sigma\{x: \text{car}(x, s') \wedge \exists s''[\text{was-bought}(x, s'') \wedge \tau(s'') \subseteq 80s]], s) \wedge \exists R [\text{R}(x, s)] \wedge \tau(s) \subseteq t_{world}] \\ [\exists s''' [s \leq s''' \wedge \exists x [\text{Real}(x, \dots, s''') \wedge \exists R [\text{R}(x, s''')] \wedge \tau(s''') \subseteq t_{world} \\ \wedge \text{is-blue}(\sigma\{x: \text{car}(x, s''') \wedge \exists s''[\text{was-bought}(x, s'') \wedge \tau(s'') \subseteq 80s]], s''') \wedge t_0 \subseteq \tau(s''')]]]$$

Note that in (136) there is no contradiction in the nucleus: The requirement that the (minimal extensions of the) situations quantified over are located within t_{world} is perfectly compatible with the requirement that they are located in an interval that includes the speech time.

In this section I have offered an account of the difference between bare plurals and “temporally non-specific” FRs, on the one hand, and plural definites and temporally specific FRs, on the other, as far as the tense agreement constraint is concerned. My explanation is based on the assumption that the former denote kinds, i. e. objects of type $\langle s, e \rangle$, and therefore have to be shifted to existential quantifiers over realizations of the respective kind if they are combined with object-level predicates. More concretely, I assume that the availability of this type-shift is the reason why adverbially quantified sentences containing bare plurals and “temporally non-specific FRs” have an interpretative option at their disposal that sentences with plural definites and temporally specific FRs do not have: Quantification over minimal situations that contain realizations of the object denoted by the respective DP. Furthermore, I assume that because in this case there is no direct relation between the denotations of the respective DPs and the situations quantified over, temporal information originating from those DPs does not have to be made use of in order to temporally locate the situations quantified over.

4 Conclusion

My main concern in this dissertation has been to show that it is not only *possible* to account for Quantificational Variability Effects under the assumption that Q-adverbs are only able to quantify over situations/eventualities (as argued for by de Swart (1993), von Stechow (1994) and Herburger (2000)), but rather that this is the only viable option. This conclusion was reached at on the basis of a detailed investigation of the conditions under which sentences containing various types of DPs get QV-readings, where my main focus has been on definite DPs and Free Relatives. I have concentrated on those two types of DPs because in the case of adverbially quantified sentences containing FRs or definite DPs it is less obvious how QV-readings could come about via unselective binding than in the case of adverbially quantified sentences containing singular indefinites or bare plurals: As there are good reasons to assume that both FRs and definite DPs denote the maximal (sum) individuals that satisfy the respective predicate (see chapter 1), even shifting them to the type of predicates in the obvious way (namely via Partee's (1987) type-shift *IDENT*) would not turn them into sensible restrictions for Q-adverbs that are conceived of as unselective binders. Nevertheless, we have seen that not only sentences containing FRs, but also ones containing singular or plural definites are in principle capable of getting QV-readings.

The conditions under which such readings are available, however, turned out to be rather non-uniform: In the case of singular definites, contextual (or clause-internal) information has to be available on the basis of which the hearer can accommodate a set of situations each of which can plausibly be assumed to contain exactly one individual that fulfils the respective predicate. Furthermore, the respective definite DP has to contain a focus-accent. In the case of FRs and plural definites, on the other hand, no corresponding contextual clues are required. Furthermore, both types of DPs insofar pattern with singular indefinites and bare plurals as they have to be de-accented in order for sentences containing them to get QV-readings.

I took this as evidence that the respective "QV-strategies" are different – although they both involve quantification over situations, but not over individuals: In the case of singular definites, QVEs come about as a consequence of the fact that the respective DPs contain a situation variable (cf. Heim (1990), Elbourne (2001, to appear), Büring (2004)) that gets bound by the respective Q-adverb. This, however, makes it necessary that the situations quantified over are already known to contain exactly one individual of the required kind when the denotation of the respective Q-adverb is computed, as otherwise the uniqueness condition

associated with the definite determiner would not be fulfilled. In other words, it is not the case that the situations quantified over by the respective Q-adverb are determined on the basis of the denotation of the respective DP (as in the case of adverbially quantified sentences containing singular indefinites), but rather the other way around: The denotation of those DPs is computed on the basis of the situations.

Furthermore, I have analysed the situation variables contained within the respective definite DPs as free variables that can only become bound by the respective Q-adverb if the former c-commands the latter at LF. This has the consequence that singular definites that c-command a clausemate Q-adverb overtly have to be reconstructed into their vP-internal base position at LF if the situation variable contained within them is to be bound by this Q-adverb. The availability of reconstruction, however, I have taken to depend on the respective DP's being focus marked, thus explaining the fact that singular definites have to contain a focus accent in order to receive a co-varying interpretation. Furthermore, I have assumed (following Chierchia (1995a), who takes Q-adverbs to be unselective binders, however) that Q-adverbs combine with their two arguments in a more compositional manner than is often assumed: Material that is c-commanded by them at LF is interpreted in the nuclear scope, while material that c-commands them at LF is interpreted in the restrictor.

This assumption, however, has necessitated an adjustment concerning the interpretation of traces/lower copies in order to account for the QV-readings of adverbially quantified sentences that contain topical indefinites: Assuming that a topical indefinite has to occupy a position where it c-commands a Q-adverb at LF in order to be interpreted in the restrictor of this Q-adverb, I had to specify how the copies left behind by those indefinites are interpreted. Following Fox (2002), Sauerland (2004) and Elbourne (to appear), I have proposed that all copies left behind by moved DPs are turned into definite descriptions. But in contrast to these researchers, I have proposed that the insertion of a lambda-operator directly beneath the respective higher copy in combination with the insertion of a variable co-indexed with this operator within the lower copy is only optional. If this option is chosen, the material c-commanded by the higher copy is interpreted as a predicate that can either be applied to the denotation of the respective DP (in case the latter denotes an object of type e), or become an argument of this DP (if the latter denotes a generalized quantifier). If, on the other hand, no lambda-operator and no corresponding individual variable are inserted, we get a QV-reading in case the DP is an indefinite: While the higher copy can be turned into a situation predicate in a rather simple way (namely into the characteristic function of the set of situations that contain (at least) one individual that satisfies the respective predicate), the lower copy can be

interpreted in the same way as the singular definites discussed above if the situation variable contained within it gets bound by the respective Q-adverb.

Returning to FRs and plural definites, the above mentioned fact that they show QVEs under the same conditions as singular indefinites (namely when they are de-accented with respect to the matrix predicate, and in the absence of contextual clues) has led me to the conclusion that they are also interpreted in the restrictor of Q-adverbs, not in the nuclear scope. This has the consequence that in this case QVEs cannot be assumed to come about in virtue of the respective DPs containing a bound situation variable.

On the other hand, there are data that strongly argue for an analysis in terms of quantification over situations/eventualities also in this case: QVEs are only possible if the tense marking of the relative clause verb contained within the respective FR/definite DP agrees with the tense marking of the respective matrix verb. Furthermore, this effect is entirely absent in determiner quantification, but also constrains the availability of QV-readings in sentences containing singular indefinites – which I took to be a strong argument that in the latter case QVEs come about as an indirect effect of quantification over situations, not over individuals. Furthermore, there is a rather subtle effect concerning the internal constitution of the respective relative clause situations: QV-readings are only available if those situations can plausibly be assumed to consist of minimal situations that are temporally distributed.

In light of these facts, I have proposed (based on Endriss and Hinterwimmer (2005)) that Q-adverbs are not only able to quantify over the elements of a set of situations, but are also able to quantify over the atomic parts of a complex situation (cf. Nakanishi/Romero (2004) on *for the most part*). QVEs in this case then come about as a by-product of this quantification if there is a one-to-one relation between the atomic parts of the respective complex situation to the atomic parts of the sum individual that is interpreted in the restrictor of the respective Q-adverb, i. e. if the atomic parts of the respective complex situation are individuated on the basis of their containing an atomic part of the sum individual that is interpreted in the restrictor.

Concerning the above mentioned restrictions, I have proposed that they can be explained in the following way: Situations need to be located in a time interval that is determined via a pragmatic strategy called *Interval Resolution Strategy* (Endriss and Hinterwimmer (to appear)). According to this strategy, local contextual information has to be made use of in order to determine the respective interval. This has the consequence that the situations quantified over are located within the temporal traces of the respective relative

clause situations if the DPs containing those relative clauses are interpreted in the restrictor of the respective Q-adverb – which leads to a contradiction if the tense marking of the respective matrix verb requires the situations quantified over to be located within a disjoint interval.

Furthermore, the *Interval Resolution Strategy* in combination with a principle that allows Q-adverbs only to quantify over temporally distributed situations can also explain why the internal constitution of the respective relative clause situations is relevant: Under the assumption that the temporal trace of a complex situation is the sum of the temporal traces of the atomic situations it is constituted by, the internal constitution of the respective relative clause situation determines the internal constitution of the complex situation that contains the atomic situations quantified over by the Q-adverb.

Finally, I have shown that adverbially quantified sentences containing bare plurals and “temporally non-specific” FRs are not sensitive to the tense agreement constraint mentioned above. I have explained this in the following way: As both types of DPs denote kinds – i. e. objects of type $\langle s, e \rangle$ (cf. Chierchia (1998)) – , a covertly inserted existential quantifier over instances of the respective kind has to be applied to them when they are combined with object-level predicates. Therefore, in the sentences under discussion the Q-adverb quantifies over situations each of which contains an instance of the respective kind. This has the consequence that in these cases the relation between the denotation of the respective DP and the situations quantified over is more indirect than in the case of singular indefinites or “temporally-specific” FRs/plural definites: It is not the object denoted by the bare plural/“temporally non-specific” FR itself that is interpreted in the restrictor of the respective Q-adverb, but only an existential quantifier over instances of the respective object. I have assumed that for this reason the *Interval Resolution Strategy* in these cases is not forced to locate the situations quantified over within the temporal traces of the respective relative clause situations. This has the consequence that contradictory tense information does not cause any harm.

I have thus shown in this dissertation that QVEs, while coming about in different ways with different types of DPs, nevertheless must always be analysed as by-products of quantification over situations if the restrictions discussed in this dissertation are to be accounted for: In each case, there is no direct quantification over individuals, but rather co-variation of individuals with the situations quantified over. This co-variation can either come about in virtue of the meaning of the respective determiner (as in the case of singular indefinites), or because the situation variable contained within the respective NP is interpreted as a bound variable (as in the case of singular definites), or because a complex situation is

turned into a set of atoms (in order for the Q-adverb to have something to operate on) on the basis of the internal constitution of the sum individual denoted by the respective DP (as in the case of FRs and plural definites).

As already mentioned in the introduction, this result is especially noteworthy in light of the following fact: As pointed out by Bach et al. (1995), it seems to be the case that while all (known) languages that have determiner-quantifiers also have adverbial quantifiers, not all (known) languages that have adverbial quantifiers also have determiner-quantifiers. It would thus be very interesting to check whether also in the case of languages that do not have determiner-quantifiers the available adverbial quantifiers are only able to quantify over situations. I. e. one would have to check whether QVEs in these languages exclusively come about in the ways that are available in German and English and whether they are also subject to the same constraints. If this were the case, it would be a very interesting result insofar as it could be seen as an argument for the following (rather counterintuitive) claim: Quantification over situations is cognitively more basic than quantification over individuals.

Furthermore, I have the hope that the restrictions that seem to be involved in quantification over situations can be made to follow from more basic principles that govern the way in which human beings perceive and make sense of the world surrounding them. If this can be done, and if it furthermore actually turns out that also in languages without determiner quantifiers the available adverbial quantifiers only quantify over situations, the above claim might seem less absurd than it does right now.

References

- Bach, E. and R. Cooper (1978): The NP-S Analysis of Relative Clauses and Compositional Semantics. *Linguistics and Philosophy* 2, 145- 150.
- Bach, E. (1986): The Algebra of Events. *Linguistics and Philosophy* 9, 5-16.
- Bach, E., Jelinek, E., Kratzer, A. and B. Partee (eds.) (1995): *Quantification in Natural Languages*. Dordrecht: Kluwer
- Barker, C. (2000): Definite Possessives and Discourse Novelty. *Linguistics and Philosophy* 25, 1-36.
- Bar-Hillel, Y. (1953): A Quasi-Arithmetical Notation for Syntactic Description. *Language* 29, 47-58.
- Barwise, J. and R. Cooper (1981): Generalized Quantifiers and Natural Language. *Linguistics and Philosophy* 4, 159-219.
- Beaver, D. and B. Clark (2003): *Always and Only*: Why not all Focus-Sensitive Operators are Alike. *Natural Language Semantics* 11, 323-362.
- Beck, S. and H. Rullmann (1999): A Flexible Approach to Exhaustivity in Questions. *Natural Language Semantics* 7, 249-298.
- Beghelli, F. and T. Stowell (1997): Distributivity and Negation: The Syntax of *Each* and *Every*. In: A. Szabolsci (ed.), *Ways of Scope Taking*, 71-107. Dordrecht: Kluwer.
- Bennett, M. and B. Partee (1972): *Toward the Logic of Tense and Aspect in English*. System Development Corporation, Santa Monica, California.
- Berman, S. (1987): Situation-Based Semantics for Adverbs of Quantification. In: J. Blevins and A. Vainikka (eds.), *University of Massachusetts Occasional Papers* 12, GLSA, University of Massachusetts, Amherst.
- Berman, S. (1991): *The semantics of Open Sentences*. PhD thesis, University of Massachusetts, Amherst.
- Berman, S. (1994): *On the Semantics of WH-Clauses*. New York and London: Garland.
- Bhatt, R. (2003): Locality in Correlatives. *Natural Language and Linguistic Theory* 21, 485-541.

- Bonomi, A. and P. Casalegno (1993): *Only*: Association with Focus in Event Semantics. *Natural Language Semantics* 2, 1-45.
- Bosch, P. (1988): Representing and Accessing Focussed Referents. *Language and Cognitive Processes* 3, 207-231.
- Bresnan, J. and J. Grimshaw (1978): The Syntax of Free Relatives in English. *Linguistic Inquiry* 9, 331-391.
- Büring, D. (1997): *The Meaning of Topic and Focus: The 59th Bridge Street Accent*. London: Routledge.
- Büring, D. (2001a): Let's Phrase It! Focus, Word Order, and Prosodic Phrasing in German Double Object Constructions. In: G. Müller and W. Sternefeld (eds.), *Competition in Syntax*, 69–105. Berlin/New York: de Gruyter.
- Büring, D. (2001b): What do Definites Do that Indefinites Definitely Don't? In: C. Féry and W. Sternefeld (eds.), *Audiatur Vox Sapientiae: A Festschrift for Arnim von Stechow*, 70–100. Berlin: Akademie-Verlag.
- Büring, D. (2003): On D-trees, Beans and B-accents. *Linguistics and Philosophy* 26, 511–545.
- Büring, D. (2004): Crossover Situations. *Natural Language Semantics* 12, 23-62.
- Caponigro, I. (to appear): The Semantic Contribution of WH-Words and Type Shifts: Evidence from Free Relatives Crosslinguistically. In: *Proceedings of Semantics and Linguistic Theory (SALT) XIV*. Ithaca, NY: CLC Publications.
- Caponigro, I. (2002a): On the Source of Maximality in WH-Constructions Crosslinguistically. In: M. Andronis, E. Debenport, A. Pycha and K. Yoshimura (eds.), *Proceedings of the 38th Meeting of the Chicago Linguistics Society (CLS 38)*, Chicago Linguistics Society, Chicago.
- Caponigro, I. (2002b): Free Relatives as DPs with a Silent D and a CP Complement. In: V. Samiian (ed.), *Proceedings of the Western Conference on Linguistics 2000 (WECOL 2000)*, Fresno, CA: California State University.
- Carlson, G. (1977): Reference to Kinds in English. PhD thesis, University of Massachusetts, Amherst.
- Chierchia, G. (1992): Anaphora and Dynamic Binding. *Linguistics and Philosophy* 15, 111–183.
- Chierchia, G. (1995a): *Dynamics of Meaning*. University of Chicago Press, Chicago.
- Chierchia, G. (1995b): Individual Level Predicates as Inherent Generics. In: G. Carlson and F. J. Pelletier (eds): *The Generic Book*, 176-223. Chicago: University of Chicago Press.
- Chierchia, G. (1998): Reference to Kinds Across Languages. *Natural Language Semantics* 6, 339-405.

Chomsky, N. (1993): A Minimalist Program for Linguistic Theory. In: K. Hale and S. J. Keyser (eds.), *The View from Building 20: Essays in linguistics in honor of Sylvain Bromberger*, 1-52. Cambridge, Mass.: MIT Press.

Chomsky, N. (1995): *The Minimalist Program*. Cambridge, Mass.: MIT Press.

Chomsky, N. (1998): Minimalist Inquiries: The Framework. In: R. Martin, D. Michaels and J. Uriagereka (eds.), *Step by Step*, 89-155. Cambridge, Mass.: MIT Press.

Christophersen, P. (1939): *The Articles: A Study of Their Theory and Use in English*. London: Oxford University Press.

Cinque, G. (1999): *Adverbs and Functional Heads: A Cross-Linguistic Perspective*. Oxford: Oxford University Press.

Cohen, A. (2001): On the Generic Use of Indefinite Singulars. *Journal of Semantics* 18, 183-209.

Cohen, A. and N. Erteschik-Shir (2002): Topic, Focus, and the Interpretation of Bare Plurals. *Natural Language Semantics* 10, 125-165.

Cohen, A. (in preparation): Fronted Quantificational Adverbs. Unpublished Manuscript, Ben-Gurion University of the Negev.

Cooper, R. (1979): The Interpretation of Pronouns. In: F. Heny. and H. Schnelle (eds.), *Syntax and Semantics 10*. New York: Academic Press.

Cresti, D. (1995): Indefinite Topics. PhD thesis, MIT

Dahl, Ö. (1975): On Generics. In: E. Keenan (ed.), *Formal Semantics of Natural Language*, 99-111. Cambridge: Cambridge University Press.

Dahl, Ö. (1985): *Tense and Aspect Systems*. Oxford: Blackwell.

Dahl, Ö. (1995): The Marking of the Episodic/Generic Distinction in Tense-Aspect Systems. In: G. N. Carlson and F. J. Pelletier (eds.), *The Generic Book*. Chicago and London: The University of Chicago Press.

Davidson, D. (1967): The Logical Form of Action Sentences. In: N. Rescher (ed.), *The Logic of Decision and Action*. Pittsburgh: University of Pittsburgh Press

Dayal, V. (1995): Quantification in Correlatives. In: E. Bach, E. Jelinek, A. Kratzer and B. Partee (eds.), *Quantification in Natural Language*, 179-205. Dordrecht: Kluwer.

Dayal, V. (1996): *Locality in WH-Quantification*. Dordrecht: Kluwer.

Dayal, V. (1997): Free Relatives and *-ever*: Identity and Free Choice Readings. In: A. Lawson and A. Cho (eds.), *Proceedings of Semantics and Linguistic Theory VII*, 99-116. Cornell University, Ithaca: CLC publications.

- Dayal, V. (2004): Number Marking and (In)Definiteness in Kind Terms. *Linguistics and Philosophy* 27, 393-450.
- Dekker, P. (1993): Existential Disclosure. *Linguistics and Philosophy* 16, 561-587.
- Diesing, M. (1992): *Indefinites*. Cambridge, Mass.: MIT Press.
- Ebert, C. and C. Endriss (2004): Topic Interpretation and Wide Scope Indefinites. In: K. Moulton and M. Wolf (eds.), *Proceedings of NELS 34*. Umass, Amherst: GLSA.
- Ebert, K. (1970): Referenz, Sprechsituation und die bestimmten Artikel in einem nordfriesischen Dialekt (Fering). Dissertation, Christian-Albrechts-Universität zu Kiel.
- Elbourne, P. (2001): E-Type Anaphora as NP-Deletion. *Natural Language Semantics* 9: 241–288.
- Elbourne, P. (to appear): *Situations and Individuals*. Cambridge, Massachusetts: MIT Press.
- Endriss, C. (in preparation): Quantificational Topics. PhD thesis, Universität Potsdam.
- Endriss, C. and S. Hinterwimmer (to appear): Tense and Adverbial Quantification. In: J. Doelling and T. Heyde-Zybatow (eds.), *Event Structures in Linguistic Form and Interpretation*. Berlin: Mouton de Gruyter.
- Endriss, C. and S. Hinterwimmer (2005): Quantificational Variability Effects with Plural Definites. In: E. Maier, C. Bary und J. Huitink (eds.), *Proceedings of the Sinn und Bedeutung* 9, 87-101.
- Endriss, C. and S. Hinterwimmer: The Quantificational Variability of Bare Plurals, Plural Definites and Singular Indefinites. Manuscript, University of Potsdam, Humboldt University Berlin.
- Enc, M. (1981): Tense without Scope: An Analysis of Nouns as Indexicals. PhD thesis, University of Wisconsin, Madison.
- Evans, G. (1977): Pronouns, Quantifiers and Relative Clauses. *Canadian Journal of Philosophy* 7, 467–536.
- Fanselow, G. (2001): Features, θ -roles, and Free Constituent Order. *Linguistic Inquiry* 32, 450-437.
- Fanselow, G. (2004): Cyclic Phonology-Syntax-Interaction: Movement to First Position in German. In: S. Ishihara, M. Schmitz and A. Schwarz (eds.), *Interdisciplinary Studies on Information Structure I*, 1-42.
- von Fintel, K. (1994): Restrictions on Quantifier Domains. PhD thesis, University of Massachusetts, Amherst.
- von Fintel, K. (1995): A Minimal Theory of Adverbial Quantification. Unpublished manuscript, MIT.

- von Fintel, K. (2000): Whatever. In: B. Jackson and T. Matthews (eds.), *Proceedings of Semantics and Linguistic Theory X*, 27-40. Ithaca, NY: CLC Publications.
- Fox, D. (2000): *Economy and Semantic Interpretation*, Cambridge, MA: MIT Press.
- Fox, D. (2002): Antecedent Contained Deletion and the Copy Theory of Movement. *Linguistic Inquiry* 33, 63-96.
- Frege, G. (1892): Über Sinn und Bedeutung. *Zeitschrift für Philosophie und philosophische Kritik*, NF 100, 25-50.
- Frey, W. (1993): *Syntaktische Bedingungen für die semantische Interpretation. Über Bindung, implizite Argumente und Skopus*. Berlin: Akademie-Verlag.
- Frey, W. (2000): Über die syntaktische Position der Satztopiks im Deutschen. *ZAS Papers in Linguistics* 20:137-172.
- Frey, W. (2001): About the Whereabouts of Indefinites. *Theoretical Linguistics* 27, 137-161.
- Frey, W. (2004): A Medial Topic Position for German. *Linguistische Berichte* 198, 1553-190.
- Gerstner-Link, C. and M. Krifka (1993): Genericity. In J. Jacobs, A. von Stechow, W. Sternefeld and T. Vennemann (eds.), *Handbuch der Syntax*, 966-978. Berlin: Walter de Gruyter.
- Gerstner-Link, C. (1995): Über Generizität. Generische Nominalausdrücke in singulären und generellen Aussagen. München: Wilhelm Fink Verlag.
- Graff, D. (2001): Descriptions as Predicates. *Philosophical Studies* 102, 1-42.
- Greenberg, Y. (2002): Two Kinds of Quantificational Modalized Genericity, and the Interpretation of Bare Plural and Indefinite Singular NPs. In: B. Jackson (ed.): *Proceedings of SALT XII*. Cornell University: Cornell Linguistics Circle.
- Greenberg, Y. (2003): *Manifestations of Genericity*. Outstanding Dissertations in Linguistics. New York and London: Routledge.
- Groenendijk, J. and M. Stokhof (1990): Dynamic Predicate Logic. *Linguistics and Philosophy* 14, 39-100.
- Groos, A. and H. van Riemsdijk. (1979): Matching Effects in Free Relatives: A Parameter of Core Grammar. In: A. Belletti, L. Brandi, L. Rizzi (eds.), *Theory of Markedness in Generative Grammar: Proceedings of the IV GLOW Conference*. Pisa, 171-216.
- Grosu, A. (1994): *Three studies in Locality and Case*. London-New York: Routledge.
- Grosu, A. and F. Landmann (1998): Strange Relatives of the Third Kind. *Natural Language Semantics* 6, 125-170.
- Grosz, B., A. Joshi, and S. Weinstein (1995): Centering: A Framework for Modeling the Local Coherence of Discourse. *Computational Linguistics* 21, 203-226.

- Gundel, J. (1998): Centering Theory and the Givenness Hierarchy: Towards a Synthesis. In: M. Walker, A. Joshi, and E. Prince (eds.): *Centering Theory in Discourse*, 359-400. Oxford: Clarendon Press.
- Haider, H. and I. Rosengren (1998): Scrambling. In: *Sprache und Pragmatik* 49: 1-104.
- Hamblin, C.L. (1973): Questions in Montague English. *Foundations of Language* 10, 41-53.
- Harbert, W. (1983): On the Nature of the Matching Parameter. *The Linguistic Review* 2, 237-284.
- Hawkins, J. (1978): *Definiteness and Indefiniteness: A Study in Reference and Grammaticality Prediction*. London: Croom Helm.
- Heim, I. (1982): The Semantics of Definite and Indefinite Noun Phrases. PhD thesis, University of Massachusetts, Amherst.
- Heim, I. (1990): E-type Pronouns and Donkey Anaphora. *Linguistics and Philosophy* 13, 137-177.
- Heim, I. (1992), Presupposition Projection and the Semantics of Attitude Verbs, *Journal of Semantics*, 9, 183-222.
- Heim, I. and A. Kratzer (1998): *Semantics in Generative Grammar*. Oxford: Blackwell.
- Herburger, E. (2000): *What Counts. Focus and Quantification*. Cambridge, Mass.: MIT Press.
- Hirschbühler, P. (1978): The Syntax and Semantics of WH-Constructions. PhD thesis, University of Massachusetts, Amherst, Mass.
- Hirschbühler, P. and M. Rivero (1983): Remarks on Free Relatives and Matching Phenomena. *Linguistic Inquiry* 14, 505-520.
- Holmberg, A. (2000): Scandinavian Stylistic Fronting: How any Category can Become an Expletive. *Linguistic Inquiry* 31, 445-484.
- Hornstein, N. (1995): *Logical Form*. Oxford: Blackwell
- Iatridou, S. and S. Varlakosta (1998): Pseudoclefts Crosslinguistically. *Natural Language Semantics* 6, 3-28.
- Ingria, R. (1990): The Limits of Unification. In: *Proceedings of the 28th Annual Meeting of the Association of Computational Linguistics*, 194-204.
- Jackendoff, R. (1972): *Semantic Interpretation in Generative Grammar*, Cambridge, Massachusetts: MIT Press.
- Jacobs, J. (1982): *Syntax und Semantik der Negation im Deutschen*. München: Fink.
- Jacobs, J. (1983): *Fokus und Skalen*. Tübingen: Niemeyer.

- Jacobs, J. (1984): Funktionale Satzperspektive und Illokutionssemantik. *Linguistische Berichte* 91: 25–58.
- Jacobs, J. (2001): The Dimensions of Topic-Comment. *Linguistics* 39, 641-681.
- Jacobson, P. (1995): On the Quantificational Force of English Free Relatives. In: E. Bach, E. Jelinek, A. Kratzer, B. H. Partee (eds.), *Quantification in Natural Language*, 451-486. Dordrecht: Kluwer.
- Jäger, G. (1995): Topics in Dynamic Semantics. PhD thesis, Humboldt University, Berlin.
- Kadmon, N. (1987): On Unique and Non-Unique Reference and Asymmetric Quantification. PhD thesis, University of Massachusetts, Amherst.
- Kamp, H. (1981): A Theory of Truth and Semantic Representation. In: J. Groenendijk, T. Janssen and M. Stokhof (eds.), *Formal Methods in the Study of Language*, 277-322. Mathematisch Centrum, University of Amsterdam, Amsterdam.
- Kayne, R. (1994): *The Antisymmetry of Syntax*. Cambridge, MA: MIT Press
- Kayne, R. (1998): Overt vs. Covert Movement. *Syntax* 1, 128–191.
- König, E. (1977): Temporal and Non-Temporal Uses of *schon* and *noch* in German. *Linguistics and Philosophy* 11, 173–198.
- Koopmann, H. and D. Sportiche (1985): Theta Theory and Extraction. Abstract of a talk given at the 1985 GLOW colloquium in Brussels, *GLOW Newsletter*, February 1985. Dordrecht: Foris Publications.
- Koopmann, H. and D. Sportiche (1991): The Position of Subjects. *Lingua* 85, 211-258.
- Kratzer, A. (1989): An Investigation of the Lumps of Thought. *Linguistics and Philosophy* 12, 607-653.
- Kratzer, A. (1995): Stage-Level Predicates and Individual-Level Predicates. In: G. Carlson and F. J. Pelletier (eds), *The Generic Book*, 125-175. Chicago: University of Chicago Press.
- Kratzer, A. (2004): Covert Quantifier Restrictions in Natural Languages. Handout of a talk given at the Milan Meeting ‘Covert Variables at LF’ (Palazzo Feltrinelli, Gargnano).
- Krifka, M. (1989): *Nominalreferenz und Zeitkonstitution. Zur Semantik von Massentermen, Pluraltermen und Aspektklassen*. München: Fink.
- Krifka, M. (1990): Four Thousand Ships Passed Through the Lock: Object-Induced Measure Functions on Events, *Linguistics and Philosophy* 13, 487-520.
- Krifka, M. (1992): Thematic Relations as Links between Nominal Reference and Temporal Constitution. In: I. Sag and A. Szabolcsi (eds.), *Lexical Matters*, 29-53. Chicago: University of Chicago Press.

Krifka, M. (1995): Focus and the Interpretation of Generic Sentences. In: G. Carlson and F.J. Pelletier (eds.), *The Generic Book*, 238-264. Chicago: University of Chicago Press.

Krifka, M. (1998): Scope Inversion under the Rise-Fall Contour in German. *Linguistic Inquiry* 29, 75-112.

Krifka, M., F.J. Pelletier, G. Carlson, A. ter Meulen, G. Chierchia, and G. Link (1995): Genericity: An Introduction. In: G. Carlson and F. J. Pelletier (eds), *The Generic Book*, 1-124. Chicago: University of Chicago Press.

Krifka, M. (2001): Non-Novel Indefinites in Adverbial Quantification. In: C. Condoravdi and G. Renardel de Lavelette (eds.), *Logical Perspectives on Language and Information*. Stanford: CSLI Publications.

Krifka, M. (2004): Bare-NPs: Kind-Referring, Indefinites, Both or Neither?. In: R. B. Young and Y. Zhou (eds.), *Proceedings of Semantics and Linguistic Theory (SALT) XIII*. Cornell: CLC Publications.

Kripke, S. (1977): Speaker Reference and Semantic Reference. In: P. French, T. Uehling, Jr. and H. Wettstein (eds.), *Contemporary Perspectives in the Philosophy of Language*, 6-27. Minneapolis: University of Minnesota Press.

Kuroda, S.-Y. (1988): Whether We Agree or Not: A Comparative Syntax of Japanese and English. *Linguistica Investigationes* 12, 1-47.

Lahiri, U. (2002): *Questions and Answers in Embedded Contexts*. Oxford: Oxford University Press.

Landman, F. (2000): *Events and Plurality*. Dordrecht: Kluwer.

Landman, F. (2004): *Indefinites and the Type of Sets*. Malden: Blackwell.

Lappin, S. and T. Reinhart (1988): Presuppositional Effects of Strong Determiners. *Linguistics* 26:1021-1037.

Larson, R. (1987): 'Missing Prepositions' and the Analysis of English Free Relatives. *Linguistic Inquiry* 18, 239-266.

Larson, R. (1998): Events and Modification in Nominals. In: D. Strolovitch and A. Lawson (eds.), *Proceedings from Semantics and Linguistic Theory (SALT) VIII*. Cornell University, Ithaca, NY.

Lasnik, P. (1995): *Plurality, Conjunction and Events*. Dordrecht: Kluwer.

Lasnik, P. (1998): Generalized Distributivity Operators. *Linguistics and Philosophy* 21, 83-93.

Lasnik, H. (1999): Chains of Arguments. In: S. D. Epstein and N. Hornstein (eds.), *Working Minimalism*, 189-215. Cambridge, Massachusetts: MIT Press.

- Lebeaux, D. (1988): Language Acquisition and the Form of the Grammar. PhD thesis, University of Massachusetts, Amherst.
- Lebeaux, D. (1995): Where does the Binding Theory Apply? In: *Maryland Working Papers in Linguistics*, Vol. 3, 63-88. College Park, MD: University of Maryland.
- Lenci, A. and P. M. Bertinetto (1999): Aspect, Adverbs, and Events: Habituality vs. Perfectivity. In: F. Pianesi, J. Higginbotham and A. C. Varzi (eds), *Speaking of Events*, 245-287. Oxford: Oxford University Press.
- Lewis, D. (1975): Adverbs of Quantification. In: E. L. Keenan (ed.), *Formal Semantics of Natural Language*, 3-15. Cambridge: Cambridge University Press.
- Link, G. (1983): The Logical Analysis of Plurals and Mass Terms: A Lattice-Theoretical Approach. In: R. Bäuerle, C. Schwarze and A. von Stechow (eds.), *Meaning, Use and Interpretation of Language*, 302-323. Berlin: de Gruyter.
- Link, G. (1987): Generalized Quantifiers and Plurals. In: P. Gärdenfors (ed.), *Generalized Quantifiers. Linguistic and Logical Approaches*. Dordrecht: Reidel.
- Löbner, S. (1987): Definites. *Journal of Semantics* 4, 279-326.
- Löbner, S. (1989): German *schon*, *erst*, *noch*: An Integrated Analysis. *Linguistics and Philosophy* 12, 167-212.
- Löbner, S. (1990): *Wahr neben Falsch. Duale Operatoren als die Quantoren natürlicher Sprache*. Tübingen: Niemeyer.
- Löbner, S. (1999): Why German *schon* and *noch* are still Duals: A Reply to van der Auwera. *Linguistics and Philosophy* 22, 45-107.
- Longobardi, G. (2001): How Comparative is Semantics? A Unified Parametric Theory of Bare Nouns and Proper Names. *Natural Language Semantics* 9, 335-369.
- Ludlow, P. (1993): Conditionals, Events, and Unbound Pronouns. *Lingua e Stile* 29, 165-183.
- Lyons, C. (1999): *Definiteness*. Cambridge: Cambridge University Press.
- Marti, L. (2003): Contextual Variables. PhD thesis, University of Connecticut, Connecticut.
- Matthewson, L. (2001): Quantification and the Nature of Crosslinguistic Variation. *Natural Language Semantics* 9, 145-189.
- May, R. (1977): The Grammar of Quantification. PhD thesis, MIT.
- May, R. (1985): *Logical Form: Its Structure and Derivation*. Cambridge, Massachusetts: MIT Press.
- Meinunger, A. (2000): *Syntactic Aspects of Topic and Comment*. Amsterdam/Philadelphia: John Benjamins.

- Montague, R. (1970): English as a Formal Language. In: B. Visentini et al. (eds.), *Linguaggi nella Società e nella Tecnica*, 189–224. Milan: Edizioni di Comunità.
- Montague, R. (1974): *Formal Philosophy: Selected Papers of Richard Montague*, edited by Richmond Thomason. New Haven: Yale University Press.
- Müller, G. and W. Sternefeld (1993): Improper Movement and Unambiguous Binding. *Linguistic Inquiry* 24, 461-507.
- Müller, S. (1999): An HPSG-Analysis for Free Relative Clauses in German. *Grammars* 2, 53-105.
- Musan, R. (1997): Tense, Predicates and Life-Time Effects. *Natural Language Semantics* 5, 271-301.
- Nakanishi, K. and M. Romero (2004): Two Constructions with *Most* and their Semantic Properties. In: K. Moulton and M. Wolf (eds.), *Proceedings of NELS 34*. Umass, Amherst: GLSA.
- Ogihara, T. (1998): Adverbial Quantifiers, Maximal Situations, and Weak E-type Pronouns. In: *Proceedings of the Western Conference on Linguistics*, (WECOL 96) Volume 9, 200-213. Department of Linguistics, California State University, Fresno.
- Parsons, T. (1990): *Events in the Semantics of English*. Cambridge Massachusetts: MIT Press.
- Partee, B. (1973): Some Structural Analogies Between Tenses and Pronouns in English. *The Journal of Philosophy* 70, no. 18, 601-609.
- Partee, B. (1975): Some Transformational Extensions of Montague Grammar. In: D.J. Hockney, W.L. Harper, and B. Freed, *Contemporary Research in Philosophical Logic and Linguistic Semantics*, 195–220. Dordrecht: Reidel.
- Partee, B. (1984): Nominal and Temporal Anaphora. *Linguistics and Philosophy* 7, 243-286.
- Partee, B. (1987): Noun Phrase Interpretation and Type-Shifting Principles. In: J. Groenendijk, D. de Jongh, and M. Stokhof (eds.), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, 115-143. Dordrecht: Foris.
- Partee, B. (1995): Quantificational Structures and Compositionality. In: A. Kratzer, E. Bach, E. Jelinek and B. Partee (eds), *Quantification in Natural Languages*, 541-602. Dordrecht: Kluwer.
- Partee, B. and M. Rooth (1983): Generalized Conjunction and Type Ambiguity. In: R. Bäuerle, C. Schwarze, and A. von Stechow (eds.), *Meaning, Use and Interpretation of Language*, 361-383. Berlin: de Gruyter.
- Percus, O. (2000): Constraints on Some Other Variables in Syntax. *Natural Language Semantics* 8, 173–229.
- Pierrehumbert, J. (1980): The Phonology and Phonetics of English Intonation. PhD thesis, MIT.

- Pittner, K. (1991): Freie Relativsätze und die Kasus-hierarchie. In: E. Feldbusch, R. Pogarell, C. Weiß (eds.), *Neue Fragen der Linguistik. Akten des 25. Linguistischen Kolloquiums, Paderborn 1990. Band 1*, 341-347. Tübingen: Niemeyer.
- Pittner, K. (1995): The Case of German Relatives. *The Linguistic Review* 12, 197-231.
- Quine, W. V. (1960): *Word and Object*. Cambridge, Massachusetts: MIT Press.
- Recanati, F. (2004): Descriptions and Situations. In: A. Bezuidenhout and M. Reimer (eds.), *Descriptions and Beyond*. Oxford: Oxford University Press
- Reinhart, T. (1981): Pragmatics and Linguistics: An Analysis of Sentence Topics. *Philosophica*. 27, 53-93.
- Reinhart, T. (1983): *Anaphora and Semantic Interpretation*. Chicago: University of Chicago Press.
- Rizzi, L. (1986): Null Objects in Italian and the Theory of *pro*. *Linguistic Inquiry* 17, 501-557.
- Roberts, C. (1996): Information Structure in Discourse: Towards an Integrated Formal Theory of Pragmatics. In: J.H. Yoon and Andreas Kathol (eds.), *OSU Working Papers in Linguistics 49: Papers in Semantics*, 91–136.
- Roberts, C. (2003): Uniqueness in Definite Noun Phrases. *Linguistics and Philosophy* 26, 287-350.
- Romero, M. (1998): Problems for a Semantic Account of Scope Reconstruction. In: G. Katz, S.-S. Kim and H. Reinhart (eds.), *Reconstruction: Proceedings of the 1997 Tübingen Workshop*. Arbeitspapiere des SFB 340, Volume 127, 127-153.
- Rooth, M. (1985): Association with Focus. PhD thesis, University of Massachusetts, Amherst.
- Rooth, M. (1992): A Theory of Focus Interpretation. *Natural Language Semantics* 1, 75-116.
- Rooth, M. (1995): Indefinites, Adverbs of Quantification and Focus Semantics. In: G. Carlson and F. J. Pelletier (eds.), *The Generic Book*, 265-299. Chicago: University of Chicago Press.
- Ross, J. R. (1967): Constraints on Variables in Syntax. PhD thesis, MIT.
- Rothstein, S. (2003): *Structuring Events. A Study in the Semantics of Aspect*. Malden: Blackwell.
- Sag, I. (1976): Deletion and Logical Form. Ph.D. thesis, MIT.
- van der Sandt, R. (1992): Presupposition Projection as Anaphora Resolution. *Journal of Semantics* 9, 333-377.
- Sauerland, U. (1998): *The Meaning of Chains*. PhD thesis, MIT.
- Sauerland, U. (2004): The Interpretation of Traces. *Natural Language Semantics* 12, 63–127.

- Schein, B. (1993): *Plurals and Events*. Cambridge Massachusetts: MIT Press.
- Schubert, L. K. and F. J. Pelletier (1987): Problems in the Representation of the Logical Form of Generics, Plurals, and Mass Nouns. In: E. LePore (ed.), *New Directions in Semantics*, 381-451. London: Academic Press.
- Schwarzschild, R. (1996): *Pluralities*. Dordrecht: Kluwer.
- Selkirk, E. (1995): Sentence Prosody: Intonation, Stress, and Phrasing. In: J. A. Goldsmith (ed.), *The Handbook of Phonological Theory*, 550-569. London: Blackwell.
- Sharvy, R. (1980): A More General Theory of Definite Descriptions. *The Philosophical Review* 89, 607-624.
- Smessaert, H. and A. ter Meulen (2004): Temporal Reasoning with Aspectual Adverbs. *Linguistics and Philosophy* 27, 209-261.
- Stalnaker, R. (1974): Pragmatic Presuppositions. In: M. K. Munitz and P. Unger (eds.), *Semantics and Philosophy*, 197-213. New York: New York University Press.
- Stalnaker, R. (1979): Assertion. In: P. Cole (ed.): *Syntax and Semantics 9: Pragmatics*, 315-322. New York: Academic Press.
- Stalnaker, R. (1984): *Inquiry*. Cambridge, Massachusetts: MIT Press.
- Stanley, J. (2000): Context and Logical Form. *Linguistics and Philosophy* 23, 391-434.
- Stanley, J. (2002): Nominal Restriction. In: G. Peters and G. Preyer (eds.), *Logical Form and Language*, 365-368. Oxford: Oxford University Press.
- Stanley, J. and Z. Szabó (2000): On Quantifier Domain Restriction. *Mind & Language*, 15, 219-261.
- Staudacher, P. (1987): Zur Semantik indefiniter Nominalphrasen. In: B. Asbach-Schnitker and J. Roggenhofer (eds.), *Neuere Forschungen zur Wortbildung und Historiographie in der Linguistik*, 239-258. Tübingen: Narr Verlag.
- Steedman, M. (1996): *Surface Structure and Interpretation*. Cambridge, Massachusetts: MIT Press.
- Strawson, P. (1950): Referring. *Mind* 59, 320-344.
- Suñer, M. (1984): Free Relatives and the Matching Parameter. *The Linguistic Review* 3: 363-387.
- de Swart, H. (1993): *Adverbs of Quantification: A Generalized Quantifier Approach*. New York: Garland.
- Szabolsci, A. (to appear): Strong and Weak Islands. In: M. Everaert, M. and H. van Riemsdijk (eds.), *The Syntax Companion*. Malden: Blackwell

- Umbach, C. (2001): (De)accenting Definite Descriptions. *Theoretical Linguistics* 27, 251-280.
- Vallduvi, E. (1990): The Informational Component . PhD thesis, University of Pennsylvania.
- Vallduvi, E. (1993): Information Packaging: A Survey. Technical Report, Edinburgh.
- Vendler, Z. (1957): Verbs and Times. *The Philosophical Review* LXVI, 143-160.
- Vendler, Z. (1967): *Linguistics in Philosophy*. Ithaca, NY: Cornell University Press.
- Vogel, R. (2001): Case Conflict in German Free Relative Constructions. An Optimality Theoretic Treatment. In: G. Müller and W. Sternefeld (eds.), *Competition in Syntax*, 341-375. Berlin: de Gruyter.
- Vogel, R. (2002): Free Relative Constructions in OT Syntax. In: G. Fanselow and C. Féry (eds.), *Resolving Conflicts in Grammars: Optimality Theory in Syntax, Morphology, and Phonology*, volume 11 of *Linguistische Berichte Sonderheft*, 119-162. Hamburg: Helmut Buske Verlag.
- Vogel, R. (2003): Surface Matters. Case Conflict in Free Relative Constructions and Case Theory. In: E. Brandner and H. Zinsmeister (eds.), *New Perspectives on Case Theory*, 269-299. Stanford: CSLI Publications.
- Westerstahl, D. (1984): Determiners and Context Sets. In: J. van Benthem and A. ter Meulen (eds.), *Generalized Quantifiers in Natural Language*, 45-71. Dordrecht: Foris.
- Wettstein, H. (1981): Demonstrative Reference and Definite Descriptions. *Philosophical Studies* 40, 241-57.
- Wilkinson, K. (1991): Studies in the Semantics of Generic Noun Phrases. PhD thesis, University of Massachusetts, Amherst.
- Williams, E. (1981): Argument Structure and Morphology. *The Linguistic Review* 1, 81-114.
- Wiltschko, M. (1999): Free Relatives as Indefinites. In: K. Shahin, S. Blake and E.-S. Kim (eds.), *Proceedings of WCCFL 17*, 700-712. Stanford: CSLI Publications.
- Winter, Y. (2001): *Flexibility Principles in Boolean Semantics*. Cambridge, Massachusetts: MIT Press.
- Zimmermann, M. (2003): Pluractionality and Complex Quantifier Formation. *Natural Language Semantics* 11, 249-287.
- Zybatow, T. and M. Malink (2003): Verbklassen und Phasenpartikeln. In: M. Weisgerber (ed.), *Proceedings of the Conference „SuB 7 – Sinn und Bedeutung“*, 327-351. Arbeitspapier 114, Fachbereich Sprachwissenschaft, Universität Konstanz.