Interdisciplinary Studies on Information Structure Vol. 8

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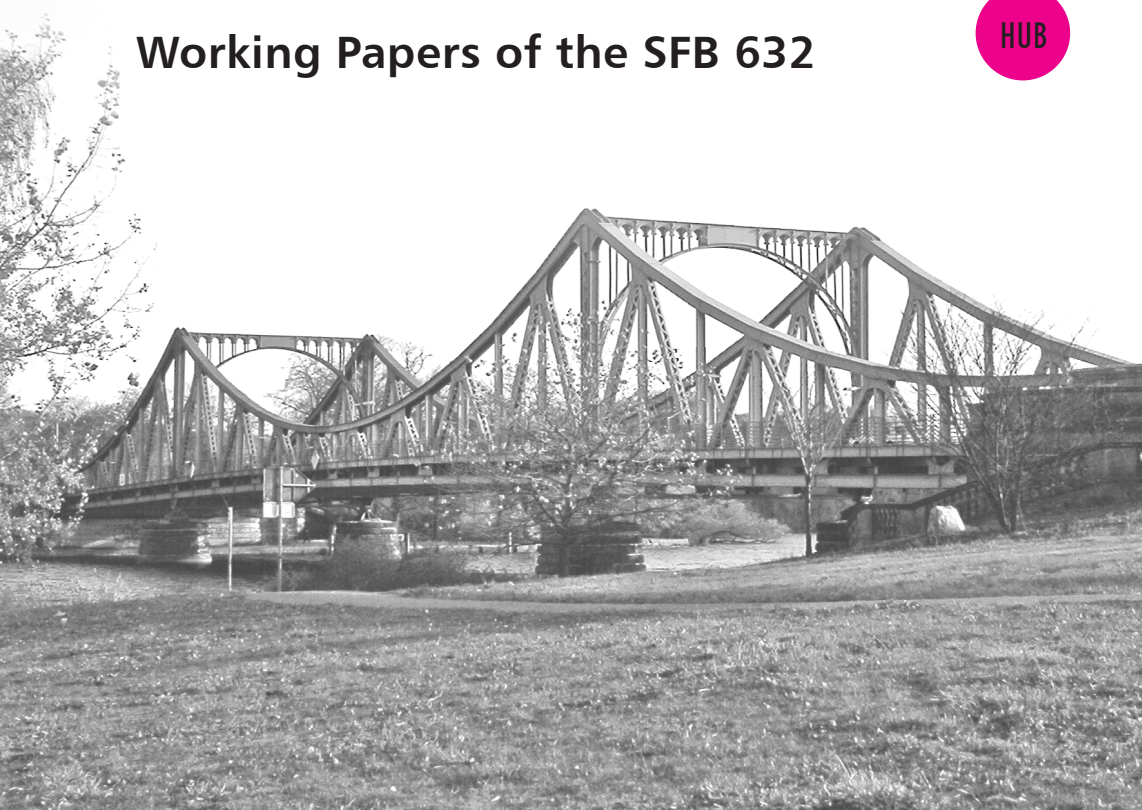

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Preface

The 8th volume of the working paper series *Interdisciplinary Studies on Information Structure* (ISIS) of the SFB 632 contains a collection of eight papers contributed by guest authors and SFB-members.

The first paper on "Biased Questions" is an invited contribution by **Nicholas Asher (CNRS, Laboratoire IRIT) & Brian Reese (University of Texas at Austin)**. Surveying English tag questions, negative polar questions, and what they term "focus" questions, they investigate the effects of prosody on discourse function and discourse structure and analyze the interaction between prosody and discourse in *SDRT* (Segmented Discourse Representation Theory).

Stefan Hinterwimmer (A2) explores the interpretation of singular definites and universally quantified DPs in adverbially quantified English sentences. He suggests that the availability of a co-varying interpretation is more constrained in the case of universally quantified DPs than in the case of singular definites, because different from universally quantified DPs, co-varying definites are inherently focus-marked.

The existence of striking similarities between topic/comment structure and bimanual coordination is pointed out and investigated by **Manfred Krifka (A2).** Showing how principles of bimanual coordination influence the expression of topic/comment structure beyond spoken language, he suggests that bimanual coordination might have been a preadaptation of the development of Information Structure in human communication.

Among the different ways of expressing focus in Foodo, an underdescribed African Guang language of the Kwa family, the marked focus constructions are the central topic of the paper by **Ines Fiedler (B1 & D2).** Exploring the morpho-syntactic facilities that Foodo has for focalization, she suggests that the two focus markers *N* and *nɪ* have developed out of a homophone conjunction.

Focus marking in another scarcely documented African tone language, the Gur language Konkomba, is treated by **Anne Schwarz (B1 & D2).** Comparing the two alleged focus markers *lé* and *lá* of the language, she argues that *lé* is better interpreted as a syntactic device rather than as a focus marker and shows that this analysis is corroborated by parallels in related languages.

The reflexes of Information Structure in four different European languages (French, German, Greek and Hungarian) are compared and validated by **Sam Hellmuth & Stavros Skopeteas (D2)**. The production data was collected with selected materials of the *Questionnaire on Information Structure* (QUIS) developed at the SFB. The results not only allow for an evaluation of the current elicitation paradigms, but also help to identify potentially fruitful venues of future research.

Frank Kügler, Stavros Skopeteas (D2) & Elisabeth Verhoeven (University of Bremen) give an account of the encoding of Information Structure in Yucatec Maya, a Mayan tone language spoken on the Yucatecan peninsula in Mexico. The results of a production experiment lead them to the conclusion that focus is mainly expressed by syntax in this language.

Stefanie Jannedy (D3) undertakes an instrumental investigation on the expressions and interpretation of focus in Vietnamese, a language of the Mon-Khmer family contrasting six lexical tones. The data strongly suggests that focus in Vietnamese is exclusively marked by prosody (intonational emphasis expressed via duration, f0 and amplitude) and that different focus conditions can reliably be recovered.

This volume offers insights into current work conducted at the SFB 632, comprising empirical and theoretical aspects of Information Structure in a multitude of languages. Several of the papers mine field work data collected during the first phase of the SFB and explore the expression of Information Structure in tone and non-tone languages from various regions of the world.

Shin Ishihara
Stefanie Jannedy
Anne Schwarz

Contents

Intonation and Discourse: Biased Questions*

Nicholas Asher and Brian Reese

University of Texas at Austin & CNRS, Laboratoire IRIT

This paper surveys a range of constructions in which prosody affects discourse function and discourse structure. We discuss English tag questions, negative polar questions, and what we call "focus" questions. We postulate that these question types are complex speech acts and outline an analysis in Segmented Discourse Representation Theory (SDRT) to account for the interactions between prosody and discourse.

Keywords: Bias, Intonation, Prosody, Complex Speech Acts, Negative Polar Questions, Tag Questions, SDRT

1 Introduction

As semanticists have repeatedly demonstrated over the past twenty years, intonation often conveys information important for determining the content of a discourse. Intonation is important for marking focus, which in turn is important for interpreting sentences with focus sensitive adverbs like *even* and *only*. Intonation is also important in marking the discourse function of utterances in discourse and dialogue. For example, intonation is an essential clue in determining whether an assertion can function as an answer to a question given in prior discourse. The canonical way of presenting an answer to a question such as (1-a) is to place the nuclear pitch accent on the constituent that replaces the *wh*-particle, as in (1-b). Alternative realizations of the same sentence are anomalous, as shown in (1-c).

* We would like to thank the audiences at *Sinn und Bedeutung 9* (Nijmegen), LENLS 2005 and 2006 (Kitakyushuu, Tokyo), CSSP 2005, the 42nd meeting of the *Chicago Linguistic Society*, and *Sinn und Bedeutung 11* (Barcelona) for commenting on various aspects of the work presented in this paper.

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Ishihara, S., S. Jannedy, and A. Schwarz (eds.):

(1) a. A: Who loves Mary?
b. B: [Jackie]$_F$ loves Mary
c. B: #Jackie loves [Mary]$_F$

Asher (1995) and Txurruka (1997) investigate similar intonational cues to discourse relations in detail within the formal theory of discourse interpretation known as Segmented Discourse Representation Theory or SDRT, and many others have investigated the topic in other frameworks (Ward and Hirschberg 1985, Pierrehumbert and Hirschberg 1990, Büring 2003, a.o.).

The present paper explores another way in which intonation contributes to conveyed content. Sometimes in a discourse or dialogue a single locutionary act corresponds to two (or more) illocutionary acts. Furthermore, these illocutionary acts are ordinarily conveyed by utterances with incompatible semantic types (Asher and Lascarides 2001). We refer to such locutions as *complex speech acts*. Indirect requests, as in (2-a), are a prime example (Searle 1975).

(2) a. Could you *please* pass the salt?
b. Do you (#*please*) speak Arabic?

(2-a) is syntactically an interrogative, and therefore – by the conventional association of clause type and discourse function – asks a question. We also have independent evidence that (2-a) asks a question, since one can reply *yes* to (2-a) and to (2-b), but not to direct requests like (3):

(3) Pass the salt

Nevertheless, (2-a) also functions as a request; the adverb *please* in (2-a), which marks polite *requests,* does not normally occur in neutral questions, as shown by (2-b).

Indirect requests are not the only kind of complex speech act. In this paper, we discuss a range of interrogative sentences which we argue function as both *questions* and *assertions*, and in which prosody – intonational phrasing, intonation, stress – often has important interpretive effects. We refer to these constructions as *biased questions*, as they convey an expectation, or bias, on the part of the speaker toward a specific answer to the question. We show in §3 that biased questions convey an assertion.

Examples of the types of interrogatives that we investigate are provided in (4) – (6). Tag questions, as in (4), provide a natural starting point, as they wear their illocutionary force(s) on their sleeves, so to speak.

(4) a. Jane isn't coming, is she?
b. Jane is coming, isn't she?

As a matter of clausal syntax, tag questions possess both declarative and interrogative components. It is not unexpected, then, that they have properties of both assertions and questions. However, a number of more nuanced issues arise regarding their interpretation. First, tag questions are not always biased. Second, the discourse function of the interrogative component is influenced by the final pitch movement over the tag.

Negative polar questions as in (5) are also biased toward a specific answer (Ladd 1981, van Rooy and Šafářová 2003, Romero and Han 2004, Reese 2006a).

(5) a. Isn't Jane coming *too*?
b. Isn't Jane coming *either*?

We argue below that on the so-called "outside-negation" reading in (5-a) (cf. Ladd 1981) negative polar questions do consist, at least in part, of an assertion. We link the biased reading of negative polar questions to the neutral reading

of tag questions and discuss the weaker form of bias present on the so-called "inside-negation" reading, (5-b).

Finally, the examples in (6) each convey a bias toward a negative answer. Since Borkin (1971), negative bias has been linked to the presence of a strong negative polarity item (NPI) (cf. Ladusaw 1979, Krifka 1995, van Rooy 2003, Guerzoni 2004, also).

(6) a. Did John *lift a finger* to help Mary?
b. Is John EVER going to help Mary?
c. Did I TELL you writing a dissertation would be easy?

But it also occurs when a weak NPI like *any* or *ever* is pronounced with emphatic stress, as in (6-b), and in certain examples of narrow focus, as in (6-c) from Sadock (1971). As far as we know, the examples in (6) have not received a unified account (see Asher and Reese (2005) for a recent attempt). It seems to us that such an account is desirable and we attempt to provide one here.

In broad terms, our account of bias is couched in a theory of the alignment of linguistic form and illouctionary force. That is, our account of biased questions is framed within a linguistic theory of speech acts, as supplied by SDRT. Many aspects of linguistic form contribute to the determination of discourse function, including:

- clausal syntax and semantics,
- specific lexical choices,
- phonology

We are interested, in particular, in how phonology interacts with lexical and compositional semantics to influence the rhetorical role an utterance plays in a discourse or dialogue. Aspects of phonology relevant to interpretation include

final tune and nuclear pitch accent (or focus). The former is normally taken to signal some relation between the speaker, the underlying propositional content of an utterance and the common ground or the public commitments of various discourse participants (Gussenhoven 1984, Steedman 2000, Gunlogson 2003, Marandin et al. 2005). The latter contributes information structural information, for example by marking information as given or new, in addition to introducing a set of alternative propositions.

We provide a formal model of complex speech acts using an extension of type theory proposed in Asher and Pustejovsky (2004) and a theory of discourse interpretation, viz. SDRT. SDRT distinguishes many relational types of speech act (like answers) and provides a good framework for analyzing complex speech acts. In particular, it distinguishes a number of types of questions that will prove useful here. For example, while many people have recognized that there are speech acts like acknowledgements that are a subspecies of assertions, SDRT postulates that for each such type of speech act, there is a corresponding question form—a question whose goal is to elicit an acknowledgement from the other discourse participants. We provide an analysis of the constructions in (4) – (6), focusing on the interaction of intonation, prosody and syntax, in the promotion of bias and the computation of the rhetorical role of complex speech acts.

2 Kinds of Biased Questions

The present section offers more detail on the constructions introduced in §1.

2.1 Tag Questions

Although English tag questions have received a lot of attention in descriptive grammars of English (Quirk et al. 1985, Huddleston and Pullum 2002) and from syntacticians (Culicover 1992), there has been relatively little *formal* semantic

and pragmatic work, and certainly little or no *recent* work.[1] Nevertheless, tag questions provide an interesting case in which intonation contributes to what is said.

Syntactically, tag questions consist of a declarative clause paratactically related to a reduced interrogative clause, or *tag*, as in (4) from §1. While these surface syntactic features certainly contribute to the presence of both an assertion and a question in discourse logical form, (i) they do not *guarantee* it, and (ii) they do not provide any information about the specific rhetorical contribution of the tag.[2] We maintain that certain lexical and phonological cues provide information for the computation of more fine-grained discourse functions.

We assume the model of intonational tunes assumed by the To(nes) and B(reak) I(ndices) labelling conventions (Beckman and Elam 1997). In ToBI, intonational tunes consist of strings of tones constructed on the basis of a simple generative grammar. An intonational phrase consists of one or more intermediate phrases followed by a boundary tone, L% or H%, and an intermediate phrase consists of one or more pitch accents followed by a phrase accent L- or H-. ToBI assumes five pitch accents: L*, H*, L+H*, L*+H, H*+!H. Pitch accents are tones aligned with stressed syllables. Given this background, there are two phonological distinctions relevant to the understanding the meaning and use of tag questions.

First, the sequence of phrase accent and boundary tone, i.e. final falling vs. final rising intonation, on the tag has been claimed to have important interpretive effects (cf. Rando 1980, Quirk et al. 1985, Huddleston and Pullum 2002, a.o.).[3] Most, if not all, descriptions of tag questions note this fact and associate

[1] Older treatments of the semantics and pragmatics of tag questions include Sadock (1974), Millar and Brown (1979), Rando (1980), Ladd (1981).

[2] The most one could claim is that the presence of the assertion blocks the default communicative goal associated with questions, viz. to know an answer.

[3] It is an empirical question about how best to characterize the final vs. rise distinction. For example, Gunlogson (2003) distinguishes between falling vs. non-falling. As a result, she includes final plateaus, i.e. H-L% sequences, with rises. We ignore these issues here and

some interpretation with the fall vs. rise distinction. Descriptions of these interpretations are remarkably consistent between researchers and we have no reason to dispute them here. Tag questions with falling intonation ask for acknowledgment from the addressee that the communicative goal of the anchor has been achieved, cf. Huddleston and Pullum (2002) for example. In SDRT, this communicative goal is called a *speech-act related goal*, or SARG and is an important element in computing which discourse relations hold between discourse constituents of a dialogue. The SARG of a declarative anchor is simply belief transfer, i.e. that the addressee come to believe the truth of the anchor.

The simple constructed dialogue in (1) provides an illustration. Imagine that A and B are trying to complete some task at which neither is proficient, but at which Julie is known to be. We adopt the orthographic convention of indicating a final fall with a period, and a final rise with a question mark—hence the particular orthography of ((1-b)).

(1) a. A: [Julie]$_{CF}$ wouldn't do it that way.
b. B: Well, Julie isn't here, / is she.

B's utterance (1-b) does not express any doubt regarding the truth of the anchor, but rather is used to get A to acknowledge that Julie is not present (and therefore that how Julie would accomplish the task is irrelevant to the present situation). As described above, this use of a tag question stands in a close correspondence to the SDRT relation $Acknowledgment$, which defines a type of relational speech act. $Acknowledgment$ holds when an utterance entails that the SARG of the utterance to which it is attached has been achieved. In SDRT, for any discourse relation R, R_q relates α and β just in case any answer γ to β entails that $R(\alpha, \gamma)$. Thus, when a question is used to elicit an acknowledgement as in the case of the tag in ((1-b), we use the relation $Acknowledgment_q$ to specify its contribution

follow Gunlogson in drawing the line between falling and non-falling tunes.

as a speech act.

Tag questions with final rising intonation are still biased toward an answer that confirms the content of the anchor, yet express some uncertainty or doubt on the part of the speaker. The dialogue in (2) illustrates this phenomenon.

(2) a. A: Can Julie do it for us?
b. B: Julie isn't here, / is she?

B's turn in (2-b) conveys a belief that Julie is not present (and thus answers A's question). The tag itself, however, expresses doubt or uncertainty, i.e. the speaker is open to the possibility that he is wrong. On this use the tag acts as a request for confirmation of the anchor. If the addressee has evidence to the contrary, he should provide it; if not, then he should acknowledge the truth of the anchor. We capture this reading via the SDRT relation $Confirmation_q$.

Both of these interpretations are biased, in that the anchor is asserted (see the forthcoming discussion in §3). This fact blocks the default intention associated with the interrogative component of the utterance, viz. to know an answer. But tag questions *can* function as neutral requests for information, as shown in (3).

(3) a. A: We need to find somebody who has done this before.
b. B: Julie isn't here = is she?

Several aspects of linguistic form appear to be necessary for a neutral reading to arise. First, they only appear to be possible when the anchor contains a negation and when there is little or no rhythmic break between the anchor and the tag (Ladd 1981, McCawley 1988, Huddleston and Pullum 2002). Moreover, the anchor of a neutral tag question is more likely to contain a H- phrase accent.

Ladd (1981) refers to the tag questions in (1-b) and (2-b) as *nuclear* tag questions, indicated by placing a slash between the anchor and the tag, and to the neutral reading in (3) as a *postnuclear* tag question, indicated with an equals

sign. Ladd's description of postnuclear tag questions corresponds in the ToBI scheme to an utterance consisting of a single intonational phrase, which itself consists of a single intermediate phrase (and a boundary tone). The nuclear pitch accent, i.e. the last pitch accent in the intermediate phrase occurs somewhere in the anchor. On this view, there is no pitch accent on any element of the tag itself. Nuclear tag questions then *might* consist of either two complete intonational phrases, or one, which itself contains two intermediate phrases. We find this description of postnuclear tags dubious. It is difficult in our experience not to hear a pitch accent on the auxillary verb in the tag. Of course, one could posit the existence of postnuclear pitch accents (which is what Ladd appears to have in mind), but this is a controversial claim. We do, however, agree with Ladd and other authors, notably McCawley (1988) and Huddleston and Pullum (2002), that neutral readings of tag questions contain a weaker boundary between the anchor and tag than nuclear tag questions. For these reasons, we prefer to recast the nuclear/postnuclear distinction in terms of intonational phrasing as follows: nuclear tag questions consist of two complete intonational phrases, one for the anchor and one for the tag. Postnuclear tag questions consist of one intonational phrase that is constructed from two intermediate phrases for the anchor and tag. We sketch an analysis below in which these prosodic differences conspire with syntax and semantics to yield two speech acts or one. In either case, the computation of the discourse function of the tag relative to the anchor procedes in much the same fashion. However, postnuclear prosody allows a neutral interpretation that nuclear prosody does not.

2.2 Negative Polar Questions

Standard semantic treatments of interrogative sentences predict that positive and negative polar questions such (4-a) and (5-a) are equivalent. On these approaches questions partition the space of logical possibilities, each element of

the partition being a proposition expressing a direct answer to the question (cf. Groenendijk and Stokhof 1997). At first glance, the prediction appears to be correct; the same propositions count as direct answers to both types of interrogative, as shown by the simple *yes* and *no* answers to (4-a) and (5-a) below.

(4) a. A: Is Jane coming?
b. B: Yes, she is. (= Jane is coming.)
c. B: No, she isn't. (= Jane is not coming.)

(5) a. A: Isn't Jane coming?
b. B: Yes, (of course) she is. (= Jane is coming.)
c. B: No, she isn't. (= Jane is not coming.)

However, negative polar questions differ from positive polar questions in two important respects. First, all negative questions convey a backgrounded attitude on the part of the speaker toward the proposition expressed by a positive answer (Ladd 1981, Büring and Gunlogson 2000, Han 2002, van Rooy and Šafářová 2003, Romero and Han 2004, Reese 2006a). (6-b), for example, is a felicitous continuation of (6-a), which conveys a stance of epistemic neutrality by the speaker toward the issue raised by the question. (6-c) is infelicitous in the same context, as it conveys a prior belief toward the issue raised by the question that conflicts with the neutrality required by the context, namely that the president read (or ought to have read) the briefing.

(6) a. I have no beliefs on the matter. I just want to know…
b. Did the President read the August 6 PDB?
c. #Didn't the President read the August 6 PDB?

The second respect in which positive and negative polar questions diverge is that negative questions are ambiguous in a way that positive questions are not (Ladd 1981, Büring and Gunlogson 2000, Huddleston and Pullum 2002,

Romero and Han 2004). The two interpretations available to negative polar questions are disambiguated by including either a positive or negative polarity item. Negative questions that contain a PPI, as in (7), are biased toward positive answers. Ladd (1981) dubs this interpretation the *outside-negation* reading. Negative questions that contain an NPI, as in (8), on the other hand, are biased toward negative answers, Ladd's *inside-negation* reading.

(7) a. Didn't Kim read the report *too*?
b. Aren't there *some* vegetarian restaurants around here?

(8) a. Didn't Kim read the report *either*?
b. Aren't there *any* vegetarian restaurants around here?

We argue in §3 that outside- and inside-negation polar questions are not "biased" in the same sense. In the latter case, it might be more approriate to claim that inside-negation polar questions are only felicitous in a *context* that is biased toward a negative answer (Büring and Gunlogson 2000), rather than to claim that the question itself is biased. Outside-negation polar questions like those in (7), we shown, involve an assertion, i.e., they are complex speech acts, whereas inside-negation negative questions as in (8) do not. We argue that outside-negation, like negation in the anchor of a neutral tag question, is metalinguistic.

2.3 Emphatic Focus Questions

Questions that contain a strong NPI, like those in (9), convey a bias toward a negative answer. Of the sentence types we consider in this paper, these have received the most attention from formal semanticists (cf. Abels 2003, Asher and Reese 2005, Borkin 1971, Guerzoni 2004, Krifka 1995, Ladusaw 1979, van Rooy 2003).

(9) a. Did Fred contribute *a red cent* to the campaign?
b. Did John *lift a finger* to help Mary?
c. Does Fred do *a damn thing* at the office?
d. Did Mary *bat an eye* when you threatened her?

Most of these analyses center around the semantic properties of polarity items, i.e. their lexical semantics, in combination with certain well-attested pragmatic principles. Krifka (1995) is the ur-paper in this respect. (van Rooy (2003) and Guerzoni (2004), for example, follow Krifka, at least in broad outline, in their analyses.)

But there is an underlying respect in which these accounts are *intonational*. Krifka (1995) is explicit about this, noting that since NPIs introduce alternatives over the denotation of the NPI, they resemble "items in focus". Krifka also notes that strong NPIs necessarily require "emphatic focus", which he associates with an emphatic assertion operator that mirrors the semantic effects of the focus sensitive lexical item *even*, whose meaning others, notably van Rooy (2003) and Guerzoni (2004) (following Heim 1984), assume is shared (at least in part) by NPIs. This raises the question of whether it is the semantics of strong NPIs which is responsible for bias, or whether certain the phonetic properties of the nucelar pitch accent are primarily responsible. The examples in (9), which we used to introduce the phenomena of negative bias, all contain strong NPIs. Consequently, the presence of such lexical items appears to be a sufficient condition for bias to exist.

But, we argue, it is not a necessary condition. Questions with domain wideners such as *any* and *ever* are neutral, unless read with the same emphatic stress as the minimizers in (9), as demonstrated by the minimal pair in (10-a) and (10-b) and the similar pair in (11). The existence of minimal pairs like those in (10-a)/(10-b) suggests that intonation plays some role in the derivation of bias.

(10) a. Did Fred contribute anything to the campaign?
b. Did Fred contribute ANYthing to the campaign?

(11) a. Has John ever voted for a democrat?
b. Has John EVER voted for a democrat?

More interestingly, "emphatic" intonation *alone* produces negative bias, as in (12-b) and (13) (from Sadock 1971). Both of these examples have narrow focus, intuitively a L* or L*+H nuclear pitch accent, on the matrix verb.[4]

(12) a. Do you need that porkchop?
b. Do you NEED that porkchop?

(13) Did I TELL you that writing a dissertation was going to be easy?

(12) and (13) show that the presence of a strong NPI (or even an emphatically stressed domain widener) is not necessary for a question to be negatively biased. Rather, the foregoing discussion, we believe, establishes that intonation is the prime mover in deriving the bias in (9) – (13). And while it is tempting to adopt Krifka's analysis in terms of emphatic assertion, we note that it is insufficient, as it does not establish the existence of an assertion, which we argue is necessary given the evidence presented in §3.

[4] The location of the nuclear pitch accent need not fall on the matrix verb, nor be "narrow" in the usual sense. Take the example in (i) in which the nuclear pitch accent falls on *writing*, or (ii) in which the nuclear pitch accent occurs in an unmarked position.

(i) Did I tell you that WRITING a dissertation was going to be easy?

(ii) Did I tell you that writing a dissertation was going to be EASY?

Both (i) and (ii) expect a negative answer. (i) might be plausibly followed up by an utterance by the same speaker such as *No, I told you that* defending *it would be easy.* Likewise (ii) could be followed by *No, I told you that it's not as hard as most people think*.

3 Evidence for Multiple Speech Acts

Sadock (1971, 1974) provides several diagnostic tests for illocutionary force that appeal to the selectional constraints of specific discourse markers. The sentence initial parentheticals *after all* and *yet* take assertions as arguments, for example, but not neutral questions. *After all* collocates with assertions, for instance, but not neutral questions, as shown in (1-a) and (1-b) respectively.

(1) It's fine if you don't finish the article today.

a. After all, your adviser is out of the country.

b. #After all, is your adviser out of the country?

Likewise, utterances prefixed with *yet* can *follow* assertions, cf. (2-b), but not neutral questions, as in (3-b).

(2) a. John is always late for work.

b. Yet, he continues to be promoted.

(3) a. Is John always late for work?

b. #Yet, he continues to be promoted.

There are parallel tests for questions. Sadock (1971, 1974) notes that sentence-initial *tell me* and the expression *by any chance* occur with questions, but not assertions, as established in (4) and (5).

(4) a. #John, by any chance, owns a car.

b. Does John, by any chance, own a car?

(5) a. #Tell me, John owns a car.

b. Tell me, does John own a car?

Furthermore, *tell me* and *by any chance* also distinguish between distinct subtypes of question. *Tell me* – as a simple request for a response from the addressee – selects for any type of question. *By any chance*, on the other hand, as an expression of epistemic uncertainty, only selects neutral questions. As such, it does not appear with biased questions, which we believe convey a commitment by the speaker.

In the following subsection, we apply these tests to the constructions discussed in the previous section, establishing that they instantiate complex speech acts with constituent types *question* and *assertion*.

3.1 Tag questions

3.1.1 Nuclear tag questions

Unsurprisingly, nuclear tag questions involve both an assertion and a question according to Sadock's diagnostics. (6) and (7) show that nuclear tag questions assert the anchor, according to the *after all* test. (6-b) and (7-b) can be pronounced either with a final rise or final fall, something we note as './?'

(6) a. A: The conference should be exceptional this year.
b. A: After all, Julie is coming / isn't she ./?

(7) a. A: The conference might be sub-par this year.
b. A: After all, Julie isn't coming / is she ./?

The examples in (8-a) and (8-b), on the other hand, show that nuclear tag questions are not *neutral* questions, as they do not pass the *by any chance* test, but that they are questions, since they *do* pass the *tell me* test.

(8) a. Tell me, Jane {is/isn't} coming / {isn't/is} she ./?
b. #Jane {is/isn't} coming, by any chance / {isn't/is} she ./?

3.1.2 Postnuclear tag questions

Postnuclear tag questions exhibit more variation in use than nuclear tag questions.

Postnuclear tag questions with a positive anchor share the discourse functions of nuclear tag questions: they are assertions, as shown by (9) and (10), and (*tell me*) questions, (11). They are not neutral questions, however, as demonstrated by (12).

(9) a. A: Why is Nicholas so sure the conference will be dull?
b. A: After all, Julie is coming=isn't she ./?

(10) a. A: Pascal's not coming, so why is Nicholas so sure the conference will be a success?
b. A: After all, Julie isn't coming {#too/either}=is she ./?

(11) Tell me, Jane {is/isn't} coming={isn't/is} she ./?

The inclusion of a positive polarity item in a postnuclear tag question with a negative anchor coerces a neutral question reading for examples like (13). The anchor is no longer asserted under these circumstances, as established by the neutral question test in (10-b).[5]

(12) #Jane is coming, by any chance=isn't she?

(13) Jane isn't coming {too/#either}, by any chance=is she?

The disambiguating role of the PPI is an important clue to understanding how this neutral reading arises. We believe that the negation in these examples scopes over the speech act itself, i.e., that it is a sort of metalinguistic operator. Metalinguistic negation, as has been noted by Horn (1989), neither licenses NPIs, nor anti-licenses PPIs.

[5] Neutral readings of postnuclear tag questions normally contain final rising intonation.

3.2 Negative polar questions

According to Sadock's diagnostics, outside-negation negative questions are assertions, while inside-negation NIs are not. Note that (14-b) can be preceded by *after all* when it contains the PPI *too*, but not when it contains the NPI *either*. Either version of (14-b) is felicitous in the discourse context established in (14) if *after all* is left off.

(14) a. A: Sue can't attend, so there'll be no syntacticians there.
b. B: What do you mean? After all, isn't Jane coming {too/#either}?

Similarly, (15-b) can follow (15-a) when it contains *too*, but not when it contains *either*.

(15) a. A: Isn't Jane coming {too/*either}?
b. A: Yet, Mary claims there will be no syntacticians there.

Again, if *yet* is left off of (15-b), then either the outside- or inside-negation reading of (15-a) is available. Because outside-negation negative questions pass the *after all* and *yet* tests, we maintain that they characteristically make assertions. This is not true of inside-negation questions.

Outside- and inside- negation negative questions, however, are still questions: they can be answered with *yes* or *no* and they co-occur with the discourse marker *tell me*.

(16) Tell me, isn't Jane coming {too/either}?

Outside-negation negative questions, consequently, are *both* questions and assertions, as demonstrated by the discourse in (17). The *tell me* prefixed to the utterance in (17-a) requires it to be a question.

(17) a. A: Tell me, isn't Jane coming too?
b. A: Yet, Mary claims there will be no syntacticians there.

At the same time, the *yet* prefixed to (17-b) requires (17-a) to be an assertion. As a result, in order for the the typing constraints of *tell me* and *yet* to be satisfied in (17), the negative interrogative in (17-a) must be simultaneously typed as an *assertion* and *question*. In other words, the type associated with (17-a) is complex in just the same way as indirect speech acts like (2-a) are; they combine two speech acts in one.

3.3 Emphatic focus questions

Finally, applying the tests to the type of interrogative sentences exemplified in (6) shows that they too are complex speech acts, as shown in (18) – (22) from Asher and Reese (2005).

(18) a. After all, does John lift a finger to help around the house?
b. Does John lift a finger to help around the house? Yet you continue to reward him.
c. Does John, by any chance, lift a finger to help around the house?
d. Tell me, does John lift a finger to help around the house?

(19) I don't understand why you think that John is a liberal.
a. After all, has he EVER voted for a democrat?
b. #After all, has he ever voted for a democrat?

(20) a. Has John EVER voted for a democrat? Yet you still claim that he is a liberal.
b. #Has John ever voted for a democrat? Yet you still claim that he is a liberal.

(21) a. Has John, by any chance, EVER voted for a democrat?

b. Tell me, has John EVER voted for a democrat?

(22) [Nicholas is reaching for the last porkchop, after already having had three.]

a. You should have some fruit instead. After all, do you NEED that porkchop?

b. Tell me Nicholas, do you NEED that porkchop?

Again, it is not the case that the illocutionary force of these questions is ambiguous or underdertermined. Rather, it is *overdetermined*. Biased questions are *simultaneously* assertions and questions as shown by (23).

(23) *After all*, has John *by any chance* EVER voted for a democrat?

Assuming that the arguments to *after all* and *by any chance* must be restricted to assertions and questions respectively, then both types must be available in the discourse context, otherwise a type clash should arise in (23), resulting in a kind of zeugmatic effect.

4 Toward an Analysis of Bias

The present section provides an outline of an analysis of bias within Segmented Discourse Representation Theory (SDRT: Asher and Lascarides 2003).[6] SDRT is a dynamic semantic theory of the interpretation of discourse and dialogue that takes the rhetorical connections between utterances seriously. A segmented discourse representation structure, or SDRS, is a triple $\langle A, \mathcal{F}, LAST \rangle$, where:

- A is a set of labels.
- $LAST$ is a label in A (intuitively, this is the label of the content of the last clause that was added to the logical form); and

[6] More details can be found in Reese (in preparation).

- $\mathcal{F}$ is a function which assigns each member of A a formula of the SDRS language, which includes formulas of some version of dynamic semantics (DRT, DPL, Update Semantics, Martin Löf Type Theory, among others.)

This notion of discourse structure is very abstract and so very general.

To give a feel for the structures posited by SDRT and for its semantic implications about conveyed content, let's look to the temporal consequences of a text. the temporal structure of a discourse is more elaborate than what is suggested by the formal semantic analysis of tenses. There are clearly temporal shifts that show that the treatment of tenses cannot simply rely on the superficial order of the sentences in the text.

(1) a. (π_1) John had a great evening last night.
b. (π_2) He had a great meal.
c. (π_3) He ate salmon.
d. (π_4) He devoured lots of cheese.
e. (π_5) He then won a dancing competition.

(1-c) – (1-d) provide 'more detail' about the event in (1-b), which itself elaborates on (1-a). (1-e) continues the elaboration of John's evening that (1-b) started, forming a *narrative* with it (temporal progression). Clearly, the ordering of events does not follow the order of presentation, but rather obeys constraints imposed by discourse structure. Thus the eventualities that are understood as elaborating on others are temporally subordinate to them, and those events that represent narrative continuity are understood as following each other.

SDRT (Asher 1993, Asher and Lascarides 2003) provides the following discourse structure for (1) and permits a proper treatment of the temporal progression of the text. Here π_6 and π_7 are discourse constituents created by the process of inferring the discourse structure. See Asher and Lascarides (2003) for details. The discourse structure $\langle A, \mathcal{F}, LAST \rangle$ for (1) is as follows:

- $A = \{\pi_0, \pi_1, \pi_2, \pi_3, \pi_4, \pi_5, \pi_6, \pi_7\}$
- $\mathcal{F}(\pi_1) = K_{\pi_1}$, $\mathcal{F}(\pi_2) = K_{\pi_2}$, $\mathcal{F}(\pi_3) = K_{\pi_3}$, $\mathcal{F}(\pi_4) = K_{\pi_4}$, $\mathcal{F}(\pi_5) = K_{\pi_5}$,
  $\mathcal{F}(\pi_0) = \textit{Elaboration}(\pi_1, \pi_6)$
  $\mathcal{F}(\pi_6) = \textit{Narration}(\pi_2, \pi_5) \wedge \textit{Elaboration}(\pi_2, \pi_7)$
  $\mathcal{F}(\pi_7) = \textit{Narration}(\pi_3, \pi_4)$
- last $= \pi_5$

SDRT contains a logical system for computing discourse structure on the basis of information available from syntax and compositional and lexical semantics. Our work over the past several years has been to see how intonation and prosody can be added as information sources to this system. There are two parts to this logical system—the first is a glue logic that contains axioms for inferring discourse relations between discourse constituents. In view of the fact that each discourse constituent has a unique label, the axioms exploit information about labels that is given by a description of the SDRS $\top$ assembled in the discourse thus far and of the new discourse constituent β to be linked to some available discourse constituent α in the SDRS. These descriptions specify discourse structures by saying which constituents are related to which other constituents and by saying in which constituent that information is to be found. Thus, a binary discourse relation like $Acknowledgement$ that holds between two discourse constituents in an SDRS will be expressed in the description language as a three place predicate symbol $Acknowledgement(\alpha, \beta, \lambda)$, which means that the constituent labelled by β serves as an acknowledgement to β and that this information is contained within the formula associated with label λ.

The axioms and rules of the glue logic exploit standard propositional logic connectives and a weak conditional operator $>$, which serves to represent defeasible rules about discourse structure. The general form of a defeasible rule about discourse structure is provided below.

- $(?(\alpha, \beta, \lambda) \wedge \text{Info}(\alpha, \beta, \top)) > R(\alpha, \beta, \lambda)$

In words this rule says that if β is to be attached somehow to α in λ and certain information about α, β and the whole discourse structure $\top$ is available, then normally β is to be attached with R to α in λ. Such normality conditionals support modus ponens defeasibly. Thus, when the left hand side formula holds, we can defeasibly infer $R(\alpha, \beta, \lambda)$. Asher and Lascarides (2003) give a complete specification of the glue logic, in particular the defeasible consequence relation $\mid\!\sim$. In addition, to compute relations in dialogue SDRT makes use of an extension of the glue logic to reason about discourse participants' cognitive states. This logic is called the logic of cognitive modelling. This extension contains not only predicates relevant to computing discourse structure, propositional connectives and the weak conditional operator $>$, but also modal operators for belief and intention. We will express the contributions of prosody to computing discourse relations in the various types of biased questions we've described above using both the glue logic and the logic of cognitive modelling.

4.1 Complex speech acts

In §3, we showed that tag questions, outside-negation polar questions, and emphatic focus questions involve not only a question, but an assertive component as well. What we argue in the present section is that biased questions are, in fact, assigned a complex speech act type by the grammar. Following Asher and Lascarides (2001), we model complex types using the notion of a dot type in the sense of (Asher and Pustejovsky 2004). An utterance is a conventionalized complex speech act (CSA) if,

> (a) the grammar assigns it a complex speech act type of the form $s_1 \bullet s_2$, such that s_1 and s_2 are distinct (incompatible) types of semantic objects; and (b) Gricean-style principles of rationality and

> cooperativity link the constituent type s_1 to the type s_2 (Asher and Lascarides 2003, p. 310).

§3 provided the linguistic evidence that biased questions are assigned a complex speech act type, with a question component and an assertion component. Moreover, these component types are associated with distinct, incompatible semantic objects. The selectional constraints of the discourse markers mentioned above provide evidence of this. In addition, most compositional semantic theories assign the content of assertions and questions distinct, incompatible types of model-theoretic objects (or context-change potentials in a dynamic setting). Assertions, for example, are associated with propositions, or sets of possible worlds, whereas questions are associated with sets of propositions (Hamblin 1973) or propositional concepts (Groenendijk and Stokhof 1984). According to clause (a) in the above quotation, then, biased questions are conventionally assigned a complex speech act type $assertion \bullet question$.[7]

The grammar is able to exploit both of the constituent types of a complex type in computing the rhetorical contribution of an utterance in a given discourse context through a rule of *Dot Exploitation*. If an utterance β attaches to an utterance α (with some undetermined rhetorical relation) in the discourse context λ – written $?(\alpha, \beta, \lambda)$ – and β is assigned a complex type $t_1 \bullet t_2$ by the grammar, then new speech act discourse referents γ_1 and γ_2 of type t_1 and t_2 respectively are introduced. These new discourse referents are related to the original speech act referent β by a relation $O\text{-}Elab$, or "dot elaboration".

Clause (b) of the definition of conventionalized complex speech acts requires that Gricean-style reasoning about rationality and cooperativity link the constituent types of the complex type. We provide an informal discussion of this

[7] According to the quotation from Asher and Lascarides (2003) complex types are asymmetric based on the flow of information between the constituent types. As we argue below, the flow of information in biased questions, perhaps counter-intuitively, appears to be from the assertion to the question. Intuitively, this is because the assertion blocks the default goal associated with the question, i.e., to know an answer.

reasoning in the subsections below. The requirement is formalized in the coherence constraint on complex types given below (Asher and Lascarides 2001). $\mathcal{C}$ encodes the linguistic competence of the discourse participants. As such, it contains conventionalized information about the mapping of linguistic form to compositional and lexical semantics, in addition to the SDRT rules for inferring rhetorical connections between utterances. $\mathcal{R}$ contains axioms for reasoning about the cognitive states, i.e. the beliefs, intentions and goals, of the discourse participants, and information from world knowledge.

- *Coherence Constraint on Complex Speech Act Types*:
  Suppose that:
  - $?(\alpha, \beta, \lambda)$
  - $\beta : t_1 \bullet t_2$
  - $O\text{-}Elab(\beta, \gamma_1) \wedge O\text{-}Elab(\beta, \gamma_2)$
  - $\gamma_1 : t_1 \wedge \gamma_2 : t_2$

  Then:

  $$\mathcal{R}, \mathcal{C}, ?(\alpha, \gamma_1, \lambda), ?(\gamma_1, \gamma_2, \lambda'), Info(\gamma_1, \gamma_2) \mid\!\sim R(\gamma_1, \gamma_2, \lambda'),$$

  where λ' labels an SDRS that results from attaching γ_1 to α in the SDRS labeled by λ.

The coherence constraint ensures that the constituent types of a complex speech act are related by a discourse relation R, inferred on the basis of conventionalized linguistic knowledge and Gricean-style reasoning about rationality and cooperativity formalized in $\mathcal{R}$.

Before addressing how the constituent types of the biased question that form the topic of this paper are rhetorically linked, a few more words need to be

said about the content of $\mathcal{C}$, $\mathcal{R}$, and what it means for an utterance α to have the type $assertion$ in SDRT. To reiterate what was said above, $\mathcal{C}$ represents the linguistic competence of the discourse participants; it therefore provides information about syntax, phonology, and lexical and compositional semantics, in addition to information about the semantic contribution of rhetorical relations and SDRT's axioms for inferring rhetorical connections between utterances. As such, $\mathcal{C}$ includes the information that the negation in neutral tag questions and outside-negation polar questions is metalinguistic (however the notion of "metalinguistic" is cashed out formally). It also contains information about the intonational tune of an utterance and its interpretation. The direction of the $f0$ trend at the end of intonational phrases, for example, is often assumed to convey information about the speaker's relation to a proposition and its relation to the common ground (Gussenhoven 1984). Along similar lines, the placement and choice of nuclear pitch accent provides similar information, for example by marking information as new or backgrounded (Steedman 2000), and by introducing a (partially ordered) set of alternative propositions. Intonation thus provides the interpreter with a rich source of information for reasoning about the cognitive state of the speaker, or at least information about the speaker's "take" on the contents and structure of the discourse context.

This leads naturally into a discussion of the content of $\mathcal{R}$, a set of axioms for reasoning about the cognitive states of discourse participants based on what has been said in the course of a discourse or dialogue and on who said it. There are, for example, axioms that model Gricean-style reasoning about the rationality and cooperativity of discourse participants, in addition to axioms that associate, by default, certain goals with utterances based on their linguistic form. We refer to these goals as speech act related goals, or SARGs. *QRG*, for example, states that the default SARG of a question is that the speaker believe an answer to it. *Known Answers* blocks this default inference when the speaker already believes an answer.

- *QRG*: $Sanswer(\alpha, p) > \text{SARG}(\alpha, \mathcal{B}_{S(\alpha)}p)$
- *Known Answers*: $(Sanswer(\alpha, p) \wedge \mathcal{B}_{S(\alpha)}p) > \neg\text{SARG}(\alpha, \mathcal{B}_{S(\alpha)}p)$

Finally, we provide a few remarks on what it means in SDRT for an utterance to be an assertion. Our characterization of assertions is not controversial, but is captured in a very specific way in a discourse-based frameworks like SDRT. Searle and Vanderveken (1985) provide the following description of assertions: "the speaker presents a proposition as representing an actual state of affairs in the world of utterance (p. 37)." In other words, the proposition conveyed by an assertion should be true. Based on these observations, we provide the definition of assertions in (2).

(2) $$((R(\alpha, \beta, \lambda) \wedge \textit{right-veridical}(R)) \vee (R'(\beta, \gamma, \lambda') \wedge \textit{left-veridical}(R))) \leftrightarrow \beta\colon \textit{assertion}$$

A right-veridical rhetorical relation is one that entails the content of its right argument:

$$R(\alpha, \beta) \rightarrow K_\beta$$

A similar definition holds for left-veridical rhetorical relations. Rhetorical relations like $Narration$, $Explanation$, and $Correction$ are examples of right-veridical and left-veridical relations, and so on our definition are all kinds of assertions; relations such as $Q\text{-}Elab$ or $Narration_q$, on the other hand are not right-veridical. These and similar relations require their right-argument to be a question.

In the follow sections we discuss how the complex speech act types assigned to tag questions, outside-negation polar questions and emphatic focus questions satisfy the coherence constraint on complex types.

4.2 Tag Questions

Tag questions may or may not instantiate a complex speech act type. In the case of nuclear tag questions, we believe, clausal syntax and semantics, intonational phrasing, and the alignment rules of SDRT suggest the presence of two illocutionary acts: an assertion (based on the declarative anchor) and a question (derived from the tag). In the case of postnuclear tag questions, it is plausible to assume a complex type $assertion \bullet question$. Recall that the discourse functions available to postnuclear tag questions are a super-set of those available to nuclear tag questions. Whereas, both types of tag question function as requests for acknowledgment or confirmation, postnuclear tag questions can also function as neutral questions. The neutral use of postnuclear tag questions, however, has peculiar lexical semantic properties, viz. the presence of a metalinguistic negation operator.

The reasoning that links the anchor and tag of a nuclear tag question mirrors exactly that which links the constituent types of a postnuclear tag question. We therefore focus on the latter below, since we are interested for the most part in the analysis of biased questions as complex speech act types. As an illustration, we focus on the interpretation of tag questions as requests for acknowledgement. This interpretation, recall, is associated with falling intonation over the tag, a phonological feature that we assume provides no essential semantic information (cf. Reese and Asher 2006 for more discussion).

The axiom schema in (3) provides (indirectly) the semantic content of the relation used to model acknowledgement questions. $Acknowledgement_q$ links α to β just in case the answer to β entails that the SARG of α has been accepted or achieved. This semantic information, we assume, is sufficient to infer that $Acknowledgement_q$ links an utterance to the prior discourse context. This axiom, as part of SDRT's glue logic, is included in the set of conventional linguistic information $\mathcal{C}$.

(3) *Axiom on Acknowledgement Questions*:
$(?(\alpha, \beta, \lambda) \wedge \text{SARG}(\alpha, \phi) \wedge \mathit{Sanswer}(\beta, p) \wedge (\mathcal{B}_{H(\alpha)}(p) > \mathcal{B}_{H(\alpha)}\phi)) >$
$\mathit{Acknowledgement}_q(\alpha, \beta, \lambda)$

We sketch below how the coherence constraint on complex types is satisfied for postnuclear tag questions with falling intonation. Importantly, the rhetorical link between the constituent types follows from compositional semantics and cognitive modeling alone. Let β be a postnuclear tag question. Assume that $R(\alpha, \beta, \lambda)$ and that the grammar assigns β a complex type $\mathit{assertion} \bullet \mathit{question}$.[8] Because $?(\alpha, \beta, \gamma)$ assumes that β has a simple type, the rule *Dot Exploitation* is called, yielding:

$$\mathit{O\text{-}Elab}(\beta, \gamma_a) \wedge \mathit{O\text{-}Elab}(\beta, \gamma_t),$$

where $\gamma_a : \mathit{assertion}$ gives the semantic contribution of the anchor and $\gamma_t : \mathit{question}$ gives the contribution of the tag. The coherence constraint on complex types, then, requires a rhetorical link between γ_a and γ_t. As we argued above, the requisite link is one of two relations: $\mathit{Acknowledgement}_q$ or $\mathit{Confirmation}_q$.

Because γ_a is typed $\mathit{assertion}$, it must attach within λ with a right-veridical relation – see (2). Given this constraint, the SARG of γ_a is that the addressee believe its propositional content. This means that in the schema in (3), ϕ is instantiated with $\mathcal{B}_{H(\gamma_a)}(p_{\gamma_a})$. It also follows from certain axioms of cognitive modeling that $\mathcal{B}_{S(\gamma_a)}(p_{\gamma_a})$[9] and from the compositional semantics of questions and answers that $\mathit{Sanswer}(\gamma_t, p_{\gamma_a})$. Finally, it is a theorem of the logic of cognitive modeling that $\mathcal{B}_{H(\gamma_a)}(p_{\gamma_a}) > \mathcal{B}_{H(\gamma_a)}\mathcal{B}_{H(\gamma_a)}(p_{\gamma_a})$, as belief is a K45 modality. As a result, in the absence of conflicting information the addressee infers that $\mathit{Acknowledgement}_q(\gamma_a, \gamma_t, \lambda')$.

[8] The argumentation that follows holds for nuclear tag questions, as well, except that there is no need in the case of nuclear tag questions to employ *Dot Exploitation*.

[9] For tag questions, $S(\gamma_a) = S(\gamma_t)$.

We do not go into the details of the derivation of confirmation questions here, except to note that we assume that final rises do make a semantic contribution through either a modal expression of uncertainty (Šafářová 2005), or by expressing "ownership" in some sense of the underlying proposition expressed by the utterance (Steedman 2000, Gunlogson 2003). Reese and Asher (2006) and Reese (in preparation) provide proofs that this information blocks the default inference to $Acknowledgement_q$. The reason is that the final rise commits the speaker to inconsistent intentions (or, equivalently, SARGs), which we assume is ruled out by principles of rational action (see for example Cohen and Levesque 1990).

Neutral readings of postnuclear tag questions, as already stated, have a peculiar lexical feature, viz. a metalinguistic negation operator in the anchor. As such, the computation of their discourse function is a separate matter from that of the postnuclear tag questions described above. We adopt the analysis of metalinguistic negation common to multi-valued logics (see for example Bochvar 1981 as discussed by Beaver and Krahmer 2001) in which $\sim K_\pi$ is equivalent to $\neg(\pi : assertion)$, at least with respect to declarative sentences. Given our characterization of assertion, this means that it is not the case that π attaches to the discourse context with a right-veridical relation. If π does not attach with a right-veridical relation, then must attach with a rhetorical relation pertinent to a neutral question. Note that in the cases discussed above, the association of the anchor with an assertion blocks the default SARG of a question: if the speaker (of a tag question) believes the content of the anchor – which follows from cognitive modeling and the fact that it is asserted – then *Known Answer* will fire with respect to the tag's SARG. However, if the anchor contains a metalinguistic negation operator, the interpreter can no longer infer that the speaker believes the content of the anchor and there is nothing blocking *QRG*.

A remaining issue involves the relationship between "postnuclear" intonational phrasing and neutral interpretations: why can't nuclear tag questions have

a neutral interpretation? The answer, we maintain, lies in our assumption that nuclear phrasing forces two speech act discourse referents, one for the anchor and one for the tag. Postnuclear phrasing, on the other hand, assigns the tag question a dot type and *Dot Exploitation* will fire only if there is a type clash. This is normally the case, but metalinguistic negation – which forms part of the linguistic form of all neutral interpretations – cancels the assertion as described above.

4.3 Outside-Negation Polar Questions

Outside-negation polar questions, unlike their inside-negation counterparts, are also assigned a complex type $assertion \bullet question$ by the grammar. The connection between the constituent types varies according to the use to which the utterance is put. Outside-negation polar questions are felicitous in two types of situation, what Romero and Han (2004) call "contradiction" and "suggestion" scenarios. In the former situation, outside-negation polar questions are often prosodically marked in the same way as corrections, in which one finds some combination of higher mean pitch, greater pitch range, higher mean intensity and increased duration on the nuclear pitch accent (Swerts and Krahmer to appear). (4) provides an example of the contradiction use. A's turn in (4-a) biases the context against the proposition that John is in Hawaii.

(4) a. A: John is coming to the party tonight.
b. B: Isn't John still in Hawaii?

Reese (2006b) provides a number of examples which show that the discourse function of outside-negation negative polar interrogatives often patterns with the use of positive assertions as denials. This is to be expected on our analysis, since we maintain that outside-negation polar questions involve a positive assertion. In these cases, it is natural to assume that the assertion obtained through

Dot Exploitation attaches the the preceding discourse context with a divergent rhetorical relation like $Correction$ or $Counterevidence$. The presence of this the assertion requires, on pragmatic grounds, a reinterpretation of what question is being asked. A number of possibilities exist for attaching the question to the assertion. For example, the constituent speech acts may be related via $Acknowledgement_q$ or $Confirmation_q$, as with tag questions. Another possibility is that a stronger relation like $Counterevidence_q$ holds, in which case the question functions as a challenge to the addressee to back up a previous commitment by supplying counterevidence to the speakers assertion (see Reese 2006a).

Outside-negation polar questions also occur in neutral contexts, in which case they function as polite suggestions. (5), where (5-b) serves as an answer to the question in (5-a), illustrates this use.

(5) a. A: Who wrote *Gravity's Rainbow*?
b. B: Wasn't it Thomas Pynchon?

In this and similar cases, the component assertion, viz. that Thomas Pynchon wrote *Gravity's Rainbow*, attaches to the speech act discourse referent introduced by (5-a) with QAP (Question-Answer Pair), a right-veridical relation. The question component of the complex speech act type again attaches to the answer with $Acknowledgement_q$ or $Confirmation_q$ depending on the certainty conveyed by B.

4.4 Emphatic Focus Questions

Our treatment of emphatic focus questions is similar to the treatment of outside-negation polar questions given above. One difference, however, is that emphatic focus questions involve a negative assertion instead of a positive one. As with the use of outside-negation questions in contradiction scenarios, the assertoric

component of the complex type assigned to emaphtic focus questions attaches to the prior discourse context with a divergent rhetorical relation, i.e. $Correction$ or $Counterevidence$. With respect to the dialogue in (6) from Asher and Reese (2005), note that B's utterance in (6-f) calls into question A's assertion in (6-a).

(6) a. A: John is a pretty decent husband.
b. B: Does he do the dishes?
c. A: No.
d. B: Does he do the laundary?
e. A: Well... no.
f. B: Does he do a damn thing around the house?

The question intuitively challenges A to either provide counterevidence to B's negative assertion (indirectly providing evidence for her original claim in (6-a)) or to explain why they said it in the first place. These discourse functions are captured in SDRT with the relations $Counterevidence_q$ and $Explanation^*_q$ respectively.

Finally, we note in passing that the intonational properties of emphatic focus questions provide support for the characterization of their discourse function given above. Emphatic focus, to our ears, is marked with an L*+H nuclear pitch accent followed by a low-rising final tune, a L*+H L-H% contour in the ToBI framework. Liberman and Sag (1974) refer to this tune as the "contradiction contour" and Ward and Hirschberg (1985) that this contour – when occurring with marked spectral features – conveys speaker incredulity. In addition, Steedman (2000, 2003) maintains that L*+H marks contested thematic constituents. This intonational information, in addition to the lexical semantic properties of strong negative polarity items, most likely played the central role in the grammaticization of emphatic focus questions as complex speech acts.

Bibliography

Abels, K.: 2003, Who gives a damn about minimizers in questions?, *in* R. B. Young and Y. Zhou (eds), *Proceedings of SALT XIII*, CLC Publications, Ithaca, NY.

Asher, N.: 1993, *Reference to Abstract Objects in Discourse*, number 50 in *Studies in Linguistics and Philosophy*, Kluwer, Dordrecht.

Asher, N.: 1995, From discourse micro-structure to macro-structure and back again: The interpretation of focus, *in* H. Kamp and B. Partee (eds), *Proceedings of the Conference on Semantics and Context*, SFB340 Report, Universität Stuttgart.

Asher, N. and Lascarides, A.: 2001, Indirect speech acts, *Synthese* **129**(1–2), 183–228.

Asher, N. and Lascarides, A.: 2003, *Logics of Conversation*, Cambridge University Press.

Asher, N. and Pustejovsky, J.: 2004, Word meaning and commonsense metaphysics, Available from `nasher@la.utexas.edu`.

Asher, N. and Reese, B.: 2005, Negative bias in polar questions, *in* E. Maier, C. Bary and J. Huitink (eds), *Proceedings of SuB9*, pp. 30–43. `www.ru.nl/ncs/sub9`.

Beaver, D. and Krahmer, E.: 2001, A partial account of presupposition projection, *Journal of Logic, Language and Information* **10**, 147–182.

Beckman, M. E. and Elam, G. A.: 1997, *Guidelines for ToBI Labelling. Version 3*, Ohio State University.

Bochvar, D.: 1981, On a three-valued logical calculus and its application to the analysis of the paradoxes of the classical extended functional calculus, *History and Philosophy of Logic* **2**, 87–112.

Borkin, A.: 1971, Polarity items in questions, *Papers from the 7th Regional Meeting of the Chicago Linguistic Society*, University of Chicago, pp. 53–63.

Büring, D.: 2003, On D-trees, beans, and B-accents, *Linguistics and Philosophy* **26**, 511–545.

Büring, D. and Gunlogson, C.: 2000, Aren't positive and negative polar questions the same?, UCSC/UCLA.

Cohen, P. R. and Levesque, H. J.: 1990, Rational interaction as the basis for communication, *in* Cohen et al. (1990), pp. 221–255.

Cohen, P. R., Morgan, J. and Pollack, M. E. (eds): 1990, *Intentions in Communication*, MIT Press, Cambridge,MA.

Culicover, P. W.: 1992, English tag questions in universal grammar, *Lingua* **88**, 193–226.

Groenendijk, J. and Stokhof, M.: 1984, *Studies on the Semantics of Questions and the Pragmatics of Answers*, PhD thesis, University of Amsterdam, Amsterdam, The Netherlands.

Groenendijk, J. and Stokhof, M.: 1997, Questions, *in* J. v. Benthem and A. ter Meulen (eds), *Handbook of Logic and Language*, Elsevier, Amsterdam, pp. 1055–1124.

Guerzoni, E.: 2004, *Even*-NPIs in yes/no questions, *Natural Language Semantics* **12**, 319–343.

Gunlogson, C.: 2003, *True to Form: Rising and Falling Declaratives as Questions in English*, Outstanding Dissertations in Linguistics, Routledge, New York.

Gussenhoven, C.: 1984, *On the Grammar and Semantics of Sentence Accents*, Foris, Dordrecht.

Hamblin, C. L.: 1973, Questions in Montague English, *Foundations of Language* **10**, 41–53.

Han, C.: 2002, Interpreting interrogatives as rhetorical questions, *Lingua* **112**, 201–229.

Heim, I.: 1984, A note on negative polarity and DE-ness, *in* C. Jones and P. Sells (eds), NELS *14 Proceedings*, UMASS Amherst: GLSA, pp. 98–107.

Horn, L. R.: 1989, *A Natural History of Negation*, University of Chicago Press, Chicago.

Huddleston, R. and Pullum, G. K.: 2002, *The Cambridge Grammar of the English Language*, Cambridge University Press.

Krifka, M.: 1995, The semantics and pragmatics of polarity items, *Linguistic Analysis* **25**, 209–257.

Ladd, D. R.: 1981, A first look at the semantics and pragmatics of negative questions and tag questions, *Papers from the 17th Regional Meeting of the Chicago Linguistic Society*, University of Chicago, pp. 164–171.

Ladusaw, W. A.: 1979, *Polarity Sensitivity as inherent scope relations*, PhD thesis, University of Texas at Austin, Austin, Texas.

Liberman, M. and Sag, I.: 1974, Prosodic form and discourse function, *Papers from the* 10^{th} *Regional Meeting of the Chicago Linguistic Society*, University of Chicago, pp. 416–427.

Marandin, J.-M., Beyssade, C., Delais-Roussarie, E., Rialland, A. and de Fornel, M.: 2005, The meaning of final contours in French, Submitted for publication.

McCawley, J. D.: 1988, *The Syntactic Phenomena of English*, Vol. 2, University of Chicago Press, Chicago.

Millar, M. and Brown, K.: 1979, Tag questions in Edinburgh speech, *Linguistische Berichte* **60**, 24–45.

Pierrehumbert, J. and Hirschberg, J.: 1990, The meaning of intonational contours in the interpretation of discourse, *in* Cohen et al. (1990), pp. 271–311.

Quirk, R., Greenbaum, S., Leech, G. and Svartvik, J.: 1985, *A Comprehensive Grammar of the English Language*, Longman Publishers, London.

Rando, E.: 1980, Intonation in discourse, *in* Waugh and van Schooneveld (eds), *The Melody of Language*, University Park Press, Baltimore, pp. 243–278.

Reese, B.: 2006a, Negative polar interrogatives and bias, *in* T. Washio, A. Sakurai, K. Nakajima, H. Takeda, S. Tojo and M. Yokoo (eds), *New Frontiers in Artificial Intelligence: Joint JSAI 2005 Workshop Post-Proceedings*, Lecture Notes in Computer Science, Springer-Verlag, Berlin, pp. 85–92.

Reese, B.: in preparation, *Bias in Questions*, PhD thesis, University of Texas at Austin.

Reese, B. and Asher, N.: 2006, The nuclear option: The interpretation of tag questions, *Proceedings of SuB11*.

Reese, B. J.: 2006b, The meaning and use of negative polar interrogatives, *in* O. Bonami and P. Cabredo Hofherr (eds), *Empirical Issues in Syntax and Semantics 6*, pp. 331–354.

Romero, M. and Han, C.: 2004, On negative *yes/no* questions, *Linguistics and Philosophy* **27**, 609–658.

Sadock, J. M.: 1971, Queclaratives, *Papers from the 7th Regional Meeting of the Chicago Linguistic Society*, University of Chicago, pp. 223–231.

Sadock, J. M.: 1974, *Towards a Linguistic Theory of Speech Acts*, Academic Press, New York, NY.

Šafářová, M.: 2005, The semantics of rising intonation in interrogatives and declaratives, *in* E. Maier, C. Bary and J. Huitink (eds), *Proceedings of SuB9*, pp. 355–369. `www.ru.nl/ncs/sub9`.

Searle, J. R.: 1975, Indirect speech acts, *in* P. Cole and J. Morgan (eds), *Syntax and Semantics Vol. 3*, Academic Press, New York, pp. 59–82.

Searle, J. R. and Vanderveken, D.: 1985, *Foundations of Illocutionary Logic*, Cambridge University Press.

Steedman, M.: 2000, Information structure and the syntax-phonology interface, *Linguistic Inquiry* **31**(4), 649–689.

Steedman, M.: 2003, Information-structural semantics for English intonation, Paper to LSA Summer Institute Workshop on Topic and Focus, Santa Barbara.

Swerts, M. and Krahmer, E.: to appear, Meaning, intonation and negation, *in* H. Bunt and R. Muskens (eds), *Computing Meaning*, Vol. 3, Kluwer Academic Publishers.

Txurruka, I.: 1997, *Partición Informacional en el Discurso*, PhD thesis, Universidad del País Vasco.

van Rooy, R.: 2003, Negative polarity items in questions: Strength as relevance, *Journal of Semantics* **20**, 239–273.

van Rooy, R. and Šafářová, M.: 2003, On polar questions, *in* R. Young and Y. Zhou (eds), *Proceedings of SALT XIII*, CLC Publications, Ithaca, NY.

Ward, G. and Hirschberg, J.: 1985, Implicating uncertainty: The pragmatics of fall–rise intonation, *Language* **61**(4), 747–776.

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The Interpretation of Universally Quantified DPs and Singular Definites in Adverbially Quantified Sentences

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This paper deals with the conditions under which singular definites, on the one hand, and universally quantified DPs, on the other hand, receive interpretations according to which the sets denoted by the NP-complements of the respective determiner vary with the situations quantified over by a Q-adverb. I show that in both cases such interpretations depend on the availability of situation predicates that are compatible with the presuppositions associated with the respective determiner, as co-variation in both cases comes about via the binding of a covert situation variable that is contained within the NP-complement of the respective determiner. Secondly, I offer an account for the observation that the availability of a co-varying interpretation is more constrained in the case of universally quantified DPs than in the case of singular definites, as far as word order is concerned. This is shown to follow from the fact that co-varying definites in contrast to universally quantified DPs are inherently focus-marked.

Keywords: adverbial quantification, definites, universal quantifiers, situation variables, reconstruction.

1 Introduction

It is well known that adverbially quantified sentences with singular indefinites as well as ones with bare plurals get readings according to which the quantificational force of the respective DP seems to depend on the quantificational force of the respective Q-adverb. This phenomenon is generally

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referred to as *Quantificational Variability Effect* (QVE). Consider the sentences in (1) and (2) below[1]:

(1) a. A piano-player is always SMART.

b. Piano-players are always SMART.
≈ All piano-players are smart.

(2) a. A piano-player is usually SMART.

b. Piano-players are usually SMART.
≈ Most piano-players are SMART.

In principle, this phenomenon can be accounted for in two different ways. According to the first one, Q-adverbs are analysed as *unselective binders*, i. e. as operators capable of binding free variables of any type that they have scope over. Furthermore, singular indefinites as well as bare plurals are not treated as existentially quantified DPs, but rather as open expressions that introduce free variables restricted by the respective NP-predicate (cf. Kamp 1981, Heim 1982). Sentences such as (1a, b) would thus get the (simplified) semantic representation given in (3) below:

(3) $\forall x$ [piano-player(x) $\rightarrow$ is_smart(x)]

According to the second line of analysis, QVEs come about as by-products of quantification over minimal situations/eventualities each of which contains exactly one individual that satisfies the respective NP-predicate (cf. Berman 1987, de Swart 1993, von Fintel 1994, Herburger 2000). In other words, Q-adverbs are assumed to quantify over situations exclusively, and singular indefinites as well as bare plurals are analysed as existentially quantified DPs

[1] Note that capital letters indicate the main accent within the respective clause, while brackets with subscript *F* indicate focus domains. Focus domains are only marked explicitly, however, if they extend beyond the word that contains the main accent – which is not the case in sentences like (1) and (2), where the predicate *smart* is focus marked.

that in the cases under discussion are interpreted in the restrictor as well as in the nuclear scope of the respective Q-adverb. Furthermore, it is assumed that the value assigned to the variable bound by the existential quantifier varies with the value assigned to the situation variable bound by the Q-adverb. This (in combination with a minimality condition that requires the situations quantified over to contain nothing else but what is strictly required to satisfy the respective situation predicate; cf. von Fintel 1994 for discussion) guarantees the co-variation that is necessary in order to get results that are truth-conditionally equivalent to a direct quantification over individuals. The relevant reading of the sentences in (1) can thus be represented as given in (4) below:

(4) $\forall s\,[s \in \min\{s' : \exists x[\text{piano-player}(x) \wedge \text{in}(x, s')]\}$
$\rightarrow \exists s'' \geq s.\ s'' \in \min\{s''' : \exists x[\text{piano-player}(x) \wedge \text{is\_smart}(x, s''')]\}]$

"All minimal situations that contain a piano-player can be extended to minimal situations of a piano-player being smart".

Adverbially quantified sentences that contain singular definites[2] or universally quantified DPs, in contrast, do not get readings according to which the denotations of the respective DPs vary with the situations quantified over by the Q-adverb when they are presented without context. The sentences in (5) are therefore only acceptable if *be smart* is reinterpreted as a stage-level predicate:

(5) a. ?? The piano-player is usually SMART.

b. ?? Every student is usually SMART.

However, if (5a) is embedded in a context like the one given in (6a) below, and if there is furthermore an additional accent on the noun *piano*, the sentence

[2] In the case of plural definites, a second option is in principle available: under certain conditions, the Q-adverb quantifies over atomic situations which are defined on the basis of the denotation of the definite DP (see Hinterwimmer 2005 and Endriss and Hinterwimmer 2005 for details).

becomes acceptable and gets a reading according to which the piano-players vary with the situations quantified over:

(6) a. I love going to jazz-concerts:

b. The piAno-player is usually SMART
(and it's nice to talk to him about quantum mechanics after the show).

In the case of (5b), on the other hand, contextual licensing does not suffice: It is additionally required that the Q-adverb c-commands the quantificational DP overtly (while no additional accent on the noun is required; more on this below):

(7) a. I love teaching classes on formal semantics at this university:

b. ?? Every STUdent is usually SMART.

c. Usually, every student is SMART.

These facts raise three questions: first, how does co-variation with the situations quantified over come about in the case of singular definites and universally quantified DPs? Second, why is contextual licensing required in these cases, but not in the case of singular indefinites and bare plurals? Third, how can the difference between singular definites and universally quantified DPs with respect to word order be explained?

2 Co-variation in the Case of Singular Definites and Universally Quantified DPs

Note that in the case of existentially quantified DPs, the determiner does not "exhaust" the set denoted by its NP-complement. Rather, it simply requires the intersection of this set with the set denoted by the material that is c-commanded by the respective indefinite DP to be non-empty. This has the consequence that in the case of adverbially quantified sentences with indefinite DPs, the indefinite

article may "pick out" a different individual in each of the situations quantified over even if the set itself that these individuals are picked from remains constant.

The definite article and the determiner *every*, on the other hand, have in common that they both exhaust the sets they are applied to. The definite article requires the set it is applied to to be a singleton and turns this set into the unique individual contained within it (cf. Heim and Kratzer (1998); see also Sharvy (1980)). The determiner *every* requires the set denoted by its NP-complement to be non-empty, non-singleton (s. Lappin and Reinhart (1988)), and yields the value *true* if this set is a subset of the set denoted by the respective VP.

This has the consequence that in the case of adverbially quantified sentences containing singular definites or universally quantified DPs, co-variation with the situations quantified over is only possible if the denotation of the respective NP is relativized to those situations. In other words, with respect to each of the situations quantified over there has to be a different set that the respective determiner can be applied to. These NPs thus need to contain situation variables that are bound by the respective Q-adverb.

3 Contextual Licensing

As already mentioned, both the definite article and the determiner *every* presuppose that the sets they are applied to are non-empty. Furthermore, the definite article presupposes this set to be a singleton, while the determiner *every* presupposes that it contains at least two elements. This, however, has the following consequence: as soon as the denotations of the respective NPs are relativized with respect to the situations quantified over, something needs to be known about these situations in order to decide whether the respective presupposition is fulfilled. Namely, whether each of them can plausibly be

assumed to contain exactly one/at least two individuals that satisfy the respective NP-predicate.

(5a, b) are odd because it cannot be decided whether the respective presupposition is satisfied, i. e. whether each of the situations quantified over contains exactly one piano-player/at least two students. If, however, the context makes available a situation predicate that characterizes a set of situations such that each of these situations can at least plausibly be assumed to contain exactly one piano-player/a plurality of students, the sentences become acceptable, as shown in (6) and (7) above: in the case of (6a), a set of jazz-concerts is introduced, and in the case of (7a) a set of classes on formal semantics is introduced. Let us therefore assume that in both cases the respective situation predicate is interpreted in the restrictor of the Q-adverb. This gives us the (simplified) representations in (8a, b) below:

(8) a. Most s [jazz-concert(s)] [is_smart(ιx. piano-player(x, s), s)]
b. Most s [class_on_formal_semantics(s)] [∀x[student(x, s) → is_smart(x, s)]]

4 An Explanation for the Difference between Singular Definites and Universally Quantified DPs

4.1 The first possibility: Overt scope relations

Remember that in the case of universally quantified DPs, an additional condition must be met in order for co-variation to be possible: the DP must be c-commanded by the Q-adverb overtly. In the case of singular definites, on the other hand, this is not necessary.

At first sight, the following explanation for this difference sounds rather plausible: both Q-adverbs and universally quantified DPs are scope-bearing elements that need to indicate their scope relations overtly. Therefore, if a

universally quantified DP c-commands a Q-adverb overtly, it is automatically interpreted as having scope over this Q-adverb. If it is c-commanded by the Q-adverb, on the other hand, it is automatically interpreted in the scope of this Q-adverb. As only the latter possibility gives us the reading we are after, we have an explanation for the fact that only universally quantified DPs that are c-commanded by a Q-adverb overtly can be interpreted as co-varying with the situations quantified over by this Q-adverb. Singular definites, on the other hand, denote objects of type *e* and therefore do not take scope. There is thus no point in indicating any scope relations, and singular definites can be interpreted in the nuclear scope of a Q-adverb that they c-command overtly.

Unfortunately, this explanation does not work, as it runs into the following two problems: first, scope relations between quantificational DPs are not (necessarily) indicated overtly in English. So, why should this be different in cases where a Q-adverb is combined with a quantificational DP? Second, a singular indefinite that c-commands a Q-adverb overtly is not necessarily interpreted as having scope over this Q-adverb. This is simply an (often dispreferred) option. Alternatively, it can either be interpreted in the restrictor of this Q-adverb (if it is de-accented), or in the nuclear-scope (if it is focussed). As it is not plausible to assume that universally quantified DPs and existentially quantified DPs behave differently in this respect, we have to look for another solution.

4.2 The second possibility: Reconstruction differences

4.2.1 The basic idea

As already mentioned in section 2, in the case of singular definites and universally quantified DPs co-variation with the situations quantified over by a Q-adverb is only possible if the NP-complement of the respective determiner contains a situation variable that is bound by the Q-adverb. Let us now assume

that these situation variables are free variables that can only be bound by a Q-adverb under c-command at LF.

Let us furthermore assume that Q-adverbs can be base-generated in either vP- or TP-adjoined position (cf. Chierchia 1995). It is thus plausible to assume that the following derivation is prohibited because it is uneconomical: a Q-adverb is base-generated in vP-adjoined position and is then moved from there to a TP-adjoined position at LF. After all, there is an alternative derivation that requires one step less – namely, base-generating the Q-adverb in TP-adjoined position (cf. Chomsky (1995)' s claim that *Merge* is preferred over *Move*).

This has the consequence that in configurations where a DP that contains a free situation variable c-commands a Q-adverb overtly, this variable can only be interpreted as bound by the Q-adverb if the DP reconstructs into its vP-internal base position at LF.

Let us now assume that, for a reason to be discussed below, reconstruction is permitted if the DP to be reconstructed is a definite DP, but prohibited if the DP is headed by a strong quantifier. This means that definite DPs c-commanding a Q-adverb overtly can in principle be interpreted as co-varying with the situations quantified over by this Q-adverb, while universally quantified DPs have to be c-commanded by a Q-adverb overtly in order to receive a co-varying interpretation (but see below for some predicted exceptions). We would thus have an explanation for the observed differences between adverbially quantified sentences that contain singular definites and ones that contain universally quantified DPs.

4.2.2 The technical details

I follow Kratzer (1989, 2004), Percus (2000), Büring (2004) and Elbourne (2005) in assuming that all predicates, i. e. nouns and adjectives as well as verbs

take an additional situation argument. Furthermore, I assume that determiners turn the situation argument of the NP they apply to into a free variable, while (in the case of quantificational determiners) the situation argument of the VP they apply to remains bound by a lambda-operator. Evidence for this claim comes from the well-known observation that there are cases like the ones in (9) below where the nominal and the verbal predicate do not apply to an individual at the same time (cf. Enc 1981, Musan 1995, Percus 2000 and Kusumoto 2005):

(9) a. Every fugitive is in jail. (Enc 1981)

b. The dean was a nice boy.

The denotations of the definite article and the determiner *every* are thus as given in (10) below. Note that s_1 is meant to be a free variable.

(10) a. $[[\text{the}]] = \lambda P_{<e, <s, t>>}: \exists!x[P(x, s_1)]. \iota x. P(x, s_1)$

b. $[[\text{every}]] = \lambda P_{<e, <s, t>>}: \exists x \exists y[P(x, s_1) \wedge P(y, s_1) \wedge x \neq y]. \lambda Q_{<e, <s, t>>}. \lambda s. \forall x[P(x, s_1) \rightarrow Q(x, s)]$

In (11), the result of applying the respective determiners to an NP-predicate is given:

(11) a. $[[\text{the piano-player}]] = [\lambda P_{<e, <s, t>>}: \exists!x[P(x, s_1)]. \iota x. P(x, s_1)] (\lambda z \lambda s. \text{piano-player}(z, s)) = \iota x. \text{piano-player}(x, s_1)$

b. $[[\text{every student}]] = [\lambda P_{<e, <s, t>>}: \exists x \exists y[P(x, s_1) \wedge P(y, s_1) \wedge x \neq y]. \lambda Q_{<e, <s, t>>}. \lambda s. \forall x[P(x, s_1) \rightarrow Q(x, s)]\ ] (\lambda z \lambda s. \text{student}(z, s)) = \lambda Q_{<e, <s, t>>}. \lambda s. \forall x[\text{student}(x, s_1) \rightarrow Q(x, s)]$

Let us now assume that the free situation variables within the respective DPs can either be resolved to w_0 by default, to a contextually salient situation (if one is available), or be turned into bound variables via the insertion of a (situation-)

variable binding operator (cf. Büring 2004) that is defined as given in (12) below.

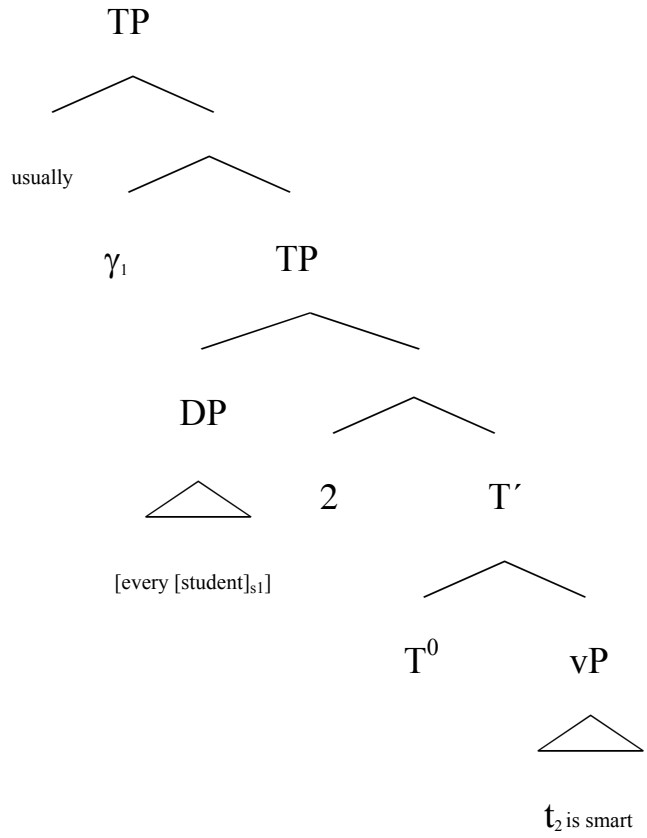
(12) $[[\gamma_n \text{ XP}]]^g = \lambda s.\ [\ [[\text{XP}]]^{g[n \rightarrow s]}(s)\ ]$

where γ_n is the situation variable binding operator and $g[n \rightarrow s]$ is the assignment function that (possibly) differs from the assignment function g insofar as it assigns the value s to all situation variables bearing the numerical index n.

The insertion of this operator has the effect of turning every free situation variable in its scope that bears the same index into a lambda-bound variable. Importantly, the operator can only be inserted directly beneath a Q-adverb. The respective variables thus become bound by this Q-adverb when it is combined with its sister via functional application. A sentence like (7c) from above (which is repeated below as (13a)) can thus be represented at LF as given in (13b), which results in the (simplified) interpretation given in (13c) below.

(13) a. (I love teaching classes on formal semantics at this university):
Usually, every student is SMART.

b.



c. Most s [class_on_formal_semantics(s)]
[∀x[student(x, s) → is_smart(x, s)]

Let us turn to the cases where the DP c-commands the respective Q-adverb overtly. The relevant data are repeated in (14) below:

(14) a. (I love going to jazz-concerts:) The piAno-player is usually SMART (and it's nice to talk to him about quantum mechanics after the show).

b. ?? (I love teaching classes on formal semantics at this university:) Every STUdent is usually SMART.

It follows from our assumptions that in these cases a co-varying interpretation is only possible if the DP reconstructs into its vP-internal base position at LF: otherwise, the situation variable contained within the DP cannot be interpreted as bound by the Q-adverb.

At this point, the following observation becomes relevant: consider the sentence given in (15) below. Chomsky (1995) claims that this sentence is

ambiguous, but note that it can be disambiguated by prosody: if it is read with the accent pattern given in (16a), the preferred interpretation is the one paraphrased in (16b). If it is read with the accent pattern given in (17a), on the other hand, it can only be interpreted as paraphrased in (17b).

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

(16) a. [Someone from New YORK]$_F$ is likely to win the lottery.

b. It is likely that someone from New York (whoever s/he may be) wins the lottery.

(17) a. Someone from New York is likely [to win the LOttery]$_F$.

b. There is a particular person who is from New York such that it is likely that this person wins the lottery.

I take this as evidence that only focal DPs can be reconstructed into their vP-internal base positions at LF. With this in mind, remember the fact already mentioned in section 1 that singular definites only receive co-varying interpretations if there is a strong (focus-)accent on the NP-complement of the definite determiner. This is evidenced by the contrast between (6b) (repeated below as (18b)) and (18c): in (18c), where there is no such accent, the singular definite cannot be interpreted as co-varying with the situations quantified over and the sentence is odd.

(18) a. I love going to jazz-concerts:

b. [The piAno-player]$_F$ is usually SMART (and it's nice to talk to him about quantum mechanics after the show).

c. ??The piano-player is usually SMART (and it's nice to talk to him about quantum mechanics after the show).

As shown by the subscript, I take the strong accent in (18b) as an indication that the definite DP is focal (cf. Selkirk 1984 for details concerning the mechanism

of *focus projection*). The fact that the singular definite in (18b) (in contrast to the one in (18c)) receives a co-varying interpretation is thus due to the fact that it can be reconstructed to a position where the free situation variable contained within it can be turned into a variable bound by the Q-adverb. This, however, raises the following question: what licenses focus-marking in the cases under consideration?

At this point, the following observation (cf. Umbach 2001) becomes relevant: in (19b) below, the definite DP *the shed* can only be interpreted as an epithet, i. e. as referring to the cottage mentioned in the previous clause (19a), while in (19c) it can only be interpreted as referring to the shed that belongs to the cottage mentioned in the previous clause.

(19) a. John owns an old cottage.

b. Last summer, he reconSTRUCted the shed.

c. Last summer, he reconstructed the SHED.

(from Umbach 2001)

Building on Umbach (2001), this contrast can be explained in the following way: denoting unique, but not necessarily familiar individuals, definite DPs can in principle either introduce new discourse referents or take up ones that have already been introduced. Now, if they do *not* take up discourse referents that have already been introduced, this must be indicated via focus marking, i.e. definites that introduce new discourse referents (*novel definites*; cf. Umbach 2001) must be focal[3].

[3] Of course, the definite DP in (19c) does not introduce a discourse referent that is new in the strongest sense, as it is related to the cottage introduced in (19a) via bridging. I follow Umbach (2001), however, in assuming that discourse referents that are related to familiar discourse referents via bridging do not count as familiar themselves, as it is not plausible to assume that whenever a discourse referent is introduced, all entities that stand in some

Concerning co-varying definite DPs in sentences like (18b) above, it is plausible to assume that they introduce new discourse referents with respect to the situations quantified over by the Q-adverb (albeit ones that are related to these situations via bridging; cf. footnote 3). It is thus expected that they have to be focus-marked.

Universally quantified DPs, in contrast, are of type *<<e, <s, t>>, <s, t>>*. Consequently, they neither introduce new discourse referents, nor do they take up ones that have already been introduced before. I therefore assume that there is no inherent reason for them to be focus marked in the cases under consideration. This explains why they cannot be reconstructed into their base positions at LF in the cases considered so far where they c-command a Q-adverb overtly. It is thus expected that a sentence like (20b) below is odd, even though there is a strong accent on the NP-complement of the quantificational determiner: there is simply no good reason for focus-marking the quantificational DP.

(20) a. I love teaching classes on formal semantics at this university:

b. ?? Every STUdent is usually SMART.

Note, however, that this makes the following prediction: if there is an independent reason for focus marking, even universally quantified DPs that c-command a Q-adverb overtly should receive co-varying interpretations. This seems to be borne out, as is evidenced by (21b) below:

(21) a. Death metal concerts are spooky:

b. Every MALE musician usually wears a long black COAT, and every FEmale musician usually has painted BLOOD stains all over her face.

plausible bridging relation to this individual are introduced at the same time (cf. Umbach 2001 for further discussion).

In the case of (21b), the focus accents on *male* and *female* are licensed because of contrast: it is thus expected that the sentence is acceptable, as the quantificational DPs can be reconstructed to a position where the respective situation variables can be bound by the Q-adverb at LF.

Furthermore, also in the case of (22b), the universally quantified DP receives a co-varying interpretation, as its being focus marked is licensed by the preceding question in (22a):

(22) a. Who stands usually in the first row at a Bob Dylan concert?

b. Every man over FIFty usually stands in the first row at a Bob Dylan concert.

We thus have an explanation for the different behaviour of universally quantified DPs and singular definites in adverbially quantified sentences: while in case of the latter, there is an inherent reason for focus marking that enables them to be reconstructed at LF, in case of the former there is no such inherent reason. They therefore – in the absence of other factors – have to be c-commanded by a Q-adverb overtly in order to be interpreted as co-varying with the situations quantified over by this Q-adverb.

This account leaves open the following two questions: first, how do QVEs come about in sentences with singular indefinites in general? And secondly, why do both singular indefinites that c-command Q-adverbs overtly and ones that are c-commanded by them receive co-varying interpretations? In the final section, I will sketch answers to these two questions.

5 QVEs with Indefinites

As already mentioned, in the case of indefinites co-variation does not depend on the Q-adverb's binding the free situation variable within the NP-complement of the indefinite article. This variable can therefore be resolved to w_0 by default.

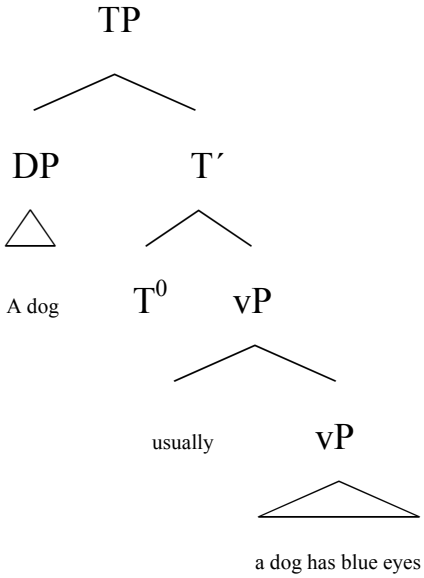
This has the consequence that singular indefinites receive co-varying interpretations without having to be reconstructed at LF. Furthermore, in contrast to singular definites and universally quantified DPs, no contextual licensing is required. Rather, the situations quantified over can be defined on the basis of their containing an individual that satisfies the respective NP-predicate alone (cf. section 1). We thus have to ensure that in the cases under consideration, the singular indefinites are interpreted in the restrictor of the respective Q-adverb. Therefore, it has to be specified how LFs are to be interpreted where the indefinite DP is not reconstructed, but remains in a position where it c-commands the Q-adverb.

Note that according to many event- or situation-semantics approaches to QVEs, the Q-adverb always adjoins to IP/TP, taking the whole clause as its second argument (i. e. as its nuclear scope), whereas the restrictor is determined on the basis of the focus value of the clause or on the basis of contextual information (cf. Rooth 1995, von Fintel 1994 and Herburger 2000). This, however, is incompatible with our approach, which strongly relies on the assumption that Q-adverbs can adjoin to TP OR vP and are not allowed to move to a clause-initial position covertly. Consider a simple sentence like (23) below:

(23) A dog usually [has blue EYES]$_F$.

I assume that it is not the case that at LF the copy left behind by a moved DP *has to be* replaced by a variable, which is furthermore bound by a lambda-operator inserted directly beneath the higher copy (as in the case of the universally quantified DP in (13) above; cf. Heim and Kratzer 1998). Rather, this is only an option. In principle, it is also possible to retain the full copy at LF, as long as the result is interpretable (see Hinterwimmer 2005 for details). I thus assume that (23) above is represented at LF as given in (24) below:

(24)



Furthermore, I assume that the higher copy can be shifted to a situation predicate via the following type-shifting operation: the predicate *λxλs. in (x, s)* is applied to its denotation, as shown in (25) below (see Hinterwimmer 2005 for details).

(25) $\lambda Q_{<e, <s, t>>}\lambda s.\ \exists x[dog(x, w_0) \wedge Q(x, s)] \Rightarrow$
$[\lambda Q_{<e, <s, t>>}\lambda s.\ \exists x[dog(x, w_0) \wedge Q(x, s)]\ ]\ (\lambda x \lambda s.\ in\ (x, s)) =$
$\lambda s.\ \exists x[dog(x, w_0) \wedge in(x, s)]$

With these assumptions in place, the LF in (24) can thus be interpreted as given in (26) below (cf. section 1):

(26) $[\ \lambda Q_{<s, t>}\lambda P_{<s, t>}.\ Most´\ (P)\ (Q)\ ]\ (\lambda s.\ \exists x[dog(x, w_0)$
$\wedge\ has\_green\_eyes(x, s)])(\lambda s.\ \exists x[dog(x, w_0) \wedge in(x, s)]) =$
$Most\ s\ [s \in min\{s´: \exists x[dog(x, w_0) \wedge in(x, s´)]\}]$
$[\exists s´´ \geq s.\ s´´ \in min\{s´´´: \exists x[dog(x, w_0) \wedge has\_green\_eyes(x, s´´´)]\}]$

Let us finally turn to the question why also in cases like (27) below, where the Q-adverb c-commands the indefinite DP overtly, a QV-reading is available:

(27) Usually, a dog [has blue EYES]$_F$.

Remember that my account relies on the assumption that Q-adverbs have to be base generated in their respective surface positions. Therefore, the only option

for the indefinite DP to be interpreted in the restrictor of the Q-adverb is the following: it has to be moved across the Q-adverb at LF to a TP-adjoined position[4] (cf. Chierchia 1995).

At first sight this seems to contradict my assumption that covert movement of a Q-adverb is prohibited because the same result could have been achieved in a more economical way – namely by base generating it in TP-adjoined position (cf. section 4.2.1)). In the case of (27), the situation seems to be similar: there is a more economical derivation that achieves the same result – namely the one corresponding to (23) above, where the Q-adverb is base generated in vP-adjoined position, and where the indefinite DP does not have to be moved across the Q-adverb at LF in order to be interpreted in its restrictor.

Note, however, that there is a crucial difference between the two cases. In the first case, what needs to be compared are two ways in which one and the same element (the Q-adverb) reaches a certain position: namely via base generation, or via movement. In the second case, however, whole derivations would have to be compared with respect to the global number of steps involved, as there is no option with respect to the position occupied by the indefinite DP: it simply cannot be base generated in TP-adjoined position. Rather, the only option for the indefinite DP to reach this position is via LF-movement. I assume that this is the reason why covert movement of the indefinite DP is not blocked in cases like (27).

6 Conclusion

In this paper, I have offered an account of how co-varying interpretations come about in the case of adverbially quantified sentences with singular definites or

[4] Note that there are independent reasons to assume that DPs can be moved to TP-adjoined positions at LF – namely in cases where QR has to be postulated.

universally quantified DPs: the Q-adverb binds the situation variable contained within the NP-complement of the respective determiner. Furthermore, I have shown how word order differences between sentences with universally quantified DPs and ones with singular definites can be reduced to differences with respect to focus marking in combination with a newly observed constraint according to which only focal DPs can be reconstructed at LF.

References

Berman, Stephen (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.

Büring, Daniel (2004): Crossover Situations. Natural Language Semantics 12, 23–62.

Chierchia, Gennaro (1995): Dynamics of Meaning. University of Chicago Press, Chicago.

Chomsky, Noam (1995): The Minimalist Program. Cambridge, Mass.: MIT Press.

Elbourne, Paul (2005): Situations and Individuals. Cambridge, Massachusetts: MIT Press.

Enç, Mürvet (1981): Tense without Scope: An Analysis of Nouns as Indexicals. PhD dissertation, University of Wisconsin.

Endriss, Cornelia and Stefan Hinterwimmer (2005): Quantificational Variability Effects with Plural Definites. In: E. Maier, C. Bary & J. Huitink (eds.), Proceedings of the Sinn und Bedeutung IX (9th annual meeting of the Gesellschaft für Semantik), Nijmegen, S. 87–101.

von Fintel, Kai (1994): Restrictions on Quantifier Domains. PhD thesis, University of Massachusetts, Amherst.

Heim, Irene (1982): The Semantics of Definite and Indefinite Noun Phrases. PhD thesis, University of Massachusettes, Amherst.

Heim, Irene and Angelika Kratzer (1998): Semantics in Generative Grammar. Oxford: Blackwell.

Herburger, Elena (2000): What Counts. Focus and Quantification. Cambridge, Mass.: MIT Press.

Hinterwimmer, Stefan (2005): Q-adverbs as Selective Binders. The Quantificational Variability of Free Relatives and Definite DPs, PhD thesis, Humboldt University, Berlin.

Kamp, Hans (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.

Kratzer, Angelika (1989): An Investigation of the Lumps of Thought. Linguistics and Philosophy 12, 607–653.

Kratzer, Angelika (2004): Covert Quantifier Restrictions in Natural Languages. Handout of a talk given at the Milan Meeting 'Covert Variables at LF' (Palazzo Feltrinelli, Gargnano).

Kusumoto, Kiyomi (2005): On the Quantification over Times in Natural Language. Natural Language Semantics 13: 317–357.

Lappin, Shalom and Tanya Reinhart (1988): Presuppositional Effects of Strong Determiners. Linguistics 26:1021–1037.

Musan, Renate (1995): On the Temporal Interpretation of Noun Phrases. PhD dissertation, MIT. [Published in 1997 by Garland Press, New York.]

Percus, Orin (2000): Constraints on Some Other Variables in Syntax. Natural Language Semantics 8, 173–229.

Rooth, Mats (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.

Selkirk, Elisabeth (1984): Phonology and Syntax: The Relation between Sound and Structure. Cambridge, Mass.: MIT Press.

Sharvy, Richard (1980): A More General Theory of Definite Descriptions. The Philosophical Review 89, 607–624.

de Swart, Henriette (1993): Adverbs of Quantification: A Generalized Quantifier Approach. New York: Garland.

Umbach, Carla (2001): (De)accenting Definite Descriptions. Theoretical Linguistics 27, 251–280.

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Functional Similarities between Bimanual Coordination and Topic/Comment Structure

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Human manual action exhibits a differential use of a non-dominant (typically, left) and a dominant (typically, right) hand. Human communication exhibits a pervasive structuring of utterances into topic and comment. I will point out striking similarities between the coordination of hands in bimanual actions, and the structuring of utterances in topics and comments. I will also show how principles of bimanual coordination influence the expression of topic/comment structure in sign languages and in gestures accompanying spoken language, and suggest that bimanual coordination might have been a preadaptation of the development of information structure in human communication.

Keywords: Topic/Comment, Handedness, Evolution of Language

1 Introduction

While language is presumably unique to humans, there are possible prelinguistic features that developed in the course of human evolution which predate features of language, and might have even been essential for its evolution. A number of such possible preadaptations for human language have been discussed, like the permanent lowering of the larynx, the ability to control one's breath, or the inclination of humans to imitate. In this paper I would like to point out another candidate for a preadaptation, namely the functional differentiation of the hands and the way in which they cooperate in manual actions.

To be sure, a number of researchers have tried to establish a relation between (a) the fact that humans show lateralization in their forelimb use to a greater degree than other primates, and (b) the development of the human lan-

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guage faculty, which is characterized by a pronounced lateralization of the brain. For example, MacNeilage (1986) proposed a relation between the form/content structure of human language and bimanual action, and Annett (2002) argues that a manual lateralization required a cerebral laterialization that, once established, laid the foundation for the development of language. Here I would like to point out a possible connection not seen so far, namely between the pervasive topic/comment structuring that we find in human language and the functional asymmetry of the hands in bimanual tasks.

I will first remind the reader that topic/comment structuring is indeed an essential and well recognized feature of human language, and characterize its function in human communication. Secondly, I will summarize findings on bimanual coordination which show that the two hands play quite different roles in many tasks that involve both hands. Then I will identify a number of functional similarities between these seemingly widely divergent domains of human behavior, and I will show that these similarities show up when the hands function as organs of communication, as in gesture and sign language. I conclude with a possible scenario according to which asymmetric bimanual coordination played a role in the rise of the topic/comment structures in communication.

2 Topic/Comment Structure in Communication

2.1 Topic/comment structure in linguistics

The structuring of utterances into a topic part and a comment part is a pervasive phenomenon in human language well known to language scholars over the last centuries. It has been identified by medieval Arab grammarians in their distinction between *mubtada* 'beginning' and *xabar* 'news' as differing from the grammatical subject/predicate distinction, cf. Goldenberg (1988). It was introduced into modern European thinking about language by Weil (1844) as *le point du depart* and *l'énonciation*, and by Gabelentz (1869) and Paul (1880) as *psy-*

chologisches Subjekt and *psychologisches Prädikat*, respectively. It is worthwhile to read the initial attempts to define this fundamental distinction:

(1) There is then a point of departure, an initial notion which is equally present to him who speaks and to him who hears, which forms, as it were, the ground upon which the two intelligences meet; and another part of discourse which forms the statement (*l'énonciation*), properly so called. This division is found in almost all we say.
(Weil 1844/1978: 29)

(2) Evidently I first mention that which animates my thinking, that which I am thinking about, my psychological subject, and then that what I am thinking about it, my psychological predicate.
(von der Gabelentz 1869, 370f., author's translation)

(3) The psychological subject is […] that which the speaker wants the hearer to think about, to which he wants to direct his attention, the psychological predicate that what he should think about it.
(Paul 1880, author's translation).

Marty (1884) questions whether all sentences are structured this way (cf. later Kuroda 1972, Sasse 1987). He distinguishes "categorical" sentences for which this is the case, from "thetic" sentences that do not have a constituent identifying a psychological subject. But even thetic sentences may have a psychological subject that is just not realized as part of the utterance because it is given in the situation of utterance. Marty's remark also suggests a wider notion of potential topics including situations and events.

(4) The psychological subject is not expressed in the sentence *es brennt* 'there's fire'. But it would be wrong to believe that there is none. In this case we find a combination of two ideas as well. On the one hand there is the realization of a concrete phenomenon, and on the other the notion of burning and fire which already rests in the soul and under which the phenomenon can be subsumed. (Marty 1884, §91, author's translation).

The notions of topic and comment were prominently introduced into American linguistic thinking by Hockett (1958):

(5) The most general characterization of predicative constructions is suggested by the terms "topic" and "comment" […]: The speaker announces a topic and then says something about it.

It played a central role in the tradition of the Prague School (Firbas 1964, Daneš 1970, Sgall e.a. 1986), which tends to use the terms *theme* and *rheme* and identifies them with "old" and "new" information, similar to the influential article by Chafe (1976). However, even though this correlation of Topic and Comment to entities mentioned before or expressions used previously, and to entities being introduced and new expressions holds in many cases, it is not a necessary one. Halliday (1967) showed that the comment can contain given expressions, and Reinhart (1982) showed that topichood, while strongly correlated with old information, cannot be reduced to it.

Reinhart (1982) also elucidated the notion of topic in terms of a formal model of information and communication. Information can be modelled as a set of file cards that identify an entity and list properties of that entity and its relations to other entities. A topic expression identifies a file card by naming the entity it collects information about, and a comment expression adds information to it. This notion has been made more precise in the framework of file change semantics (Heim 1983) by Portner & Yabushita (1998). Thus, while the two sentences in (6) are true under the same circumstances, they carry different information under normal prosody: while (a) is an utterance about Jacqueline Kennedy, (b) is an utterance about Aristoteles Onassis.

(6) a. Jacqueline Kennedy married Aristoteles Onassis.
b. Aristoteles Onassis married Jacqueline Kennedy.

Various authors have pointed out phenomena that are now subsumed under the notion of contrastive topics (cf. e.g. Jacobs 1984, 1996; Lambrecht 1994; Molnár 1998; Büring 1998). What is special about contrastive topics is that they do not only identify an entity about which a comment is made, but in addition signal that, at the current point of discourse, there are other entities about which a comment could have been made which would have resulted in a coherent contribution. Hence contrastive topics indicate that the speaker chooses among a number of alternative topic candidates.

The notion of "topic" has been used in a wide variety of ways, including reference to presupposed information and contextually given expressions, which arguably are phenomena of a different nature. Chafe (1976) and more recently Jacobs (2004) have argued that one should differentiate between a notion of topic that identifies the entity about which a comment is made (the aboutness topic), and another notion that sets the frame for which a proposition holds (the frame setting topic). The following sentence is clearly about Onassis, so *Onassis* is its aboutness topic. The predication is restricted to financial aspects, indicating that Onassis may not be fine altogether; so *financially* is the frame setting topic. However frame setters can be analysed, they are clearly different from aboutness topics.

(7) Financially, Aristoteles Onassis is doing well.

Frame setters might set a temporal frame (*last year*), a local frame (*in Greece*), a hypothetical frame (*if he had won the election*), and other types that are not easy to generalize about but apparently have important aspects in common.

It is safe to say that the notion of topic/comment structuring, with a number of modifications, refinements and clarifications, has withstood the test of times better than most other linguistic notions, even quite fundamental ones like

subject and object, or noun and verb. It is a powerful concept that has been used to explain a wide range of phenomena, from case marking patterns (see e.g. DuBois 1987) to quantification (see e.g. Partee 1991). While it is disputed whether all human languages have a grammaticalized subject/predicate structuring, there is not a single language for which the topic/comment structure has been claimed to be irrelevant.

2.2 Properties of the topic/comment structure

While topic/comment structure has turned out to be an important feature of human languages, the forms in which this feature can be realized in particular languages are quite diverse (cf. e.g. Gundel 1988).

In many languages there are specialized syntactic constructions that indicate topics, like the English *as for* construction, cf. (8). Japanese and Korean are well known to have postpositions *wa* and *nun* to mark topics, cf. the Japanese example in (9).

(8) As for the elections, people hope to see more candidates to support these goals.

(9) Sakana wa tai ga ii
fish TOP red snapper NOM excellent
'As for fish, red snapper is excellent.'

Also, we frequently find dedicated syntactic positions for topics. The examples in (8) and (9) above illustrate this, as the topic phrases obligatorily occur as sentence-initial, in fact pre-clausal phrases (cf. the ungrammaticality of **People, as for the elections, hope to see...*). But frequently, topic positions have been identified in which an expression receives a topical interpretation without any additional marking. In English, left-dislocated phrases, and generally non-subject

phrases at the left periphery, are interpreted as topics provided they have no focus accent, as in (10).

(10) a. The Romans, they are crazy.
b. The next day, we went down to the village.

Left-dislocation is a common way to mark topics (cf. Lambrecht 2001), but there are also languages with grammatical topic positions within the clause. For example, Szabolcsi (1997) identified a sentence-initial topic position in Hungarian that differs from cases like (10.b) as it also can identify subjects as topics. Also, Frey (2000) argues for a topic position in the front of the German middle field. What all these findings have in common is that topics tend to occur early within the sentence or within the clause.

Interestingly, this tendency for topic initiality can also be found in the formal language of mathematics. For example, equations are typically given in the form illustrated in (11). In spite of the commutativity of the equality relation, this is a statement about f(x), the value of x when f is applied to it, hence this sign typically occurs at the beginning of the equation.

(11) a. $f(x) = x^2 + 3x + 1$ (usual order)
b. $x^2 + 3x + 1 = f(x)$ (unusual order)

A topic need not assume a grammatical function such as subject or object, witness examples (8), (9) and (10.b). However, there is a strong statistical correlation between subjects and topics in running texts (cf. the seminal collections in Li (1976) and Givón (1985)) that suggests that subjects emerged as grammaticized combinations that prototypically combine topichood and some semantic role, like agenthood. The tendency for sentence-initial realization of topics then explains why most human languages have, in their basic word order, subjects

that are sentence-initial. With the creation of subjects as grammatical pivots, a new device of topic marking becomes available: passive voice, which raises objects to subject position.

Topics typically refer to an entity that already has been mentioned in the previous discourse, is supposed to be part of the common background knowledge of speaker and hearer, or at least construable from known entities, as e.g. *the next day* in (10.b). On the other hand, indefinites may occur as topics in generic sentences. In these cases, however, the indefinites can be argued to specify the restrictor set of a generic quantifier, which in itself is topical. For example, (12.a) is a statement about potatoes in general, and bare plurals and mass nouns as in (12.b) have been analyzed as names of kinds in Carlson (1977) (see Krifka e.a. 1995 for discussion).

(12) a. A potato contains vitamin C, amino acids, and thiamine.
b. Potatoes contain vitamin C, amino acids, and thiamine.

If the topic is a non-generic indefinite, which may happen, then it is construed as specific, as an entity that can be identified, but not necessarily by the addressee, as in (13). But many languages disallow indefinite topics altogether, as for example Chinese (cf. Li & Thompson 1981), where indefinite subjects in most cases cannot be sentence-initial.

(13) One of my friends had a car accident yesterday.

That topics are given, and hence presupposed, is also the reason for an asymmetry observed by Strawson (1964), who reported his intuition that (14.a) has no truth value in our world because the king of France does not exist, whereas (b) is simply false.

(14) a. The king of France visited the exhibition.
b. The exhibition was visited by the king of France.

Turning to quantified NPs, such as *every friend of mine*, it has been observed (by Barwise & Cooper 1981) that all natural-language quantifiers have the property that it is sufficient for verifying them to look at the extension of their noun (here: *friend of mine*), and to the VP extension only insofar as it intersects with the noun extension.

(15) Every friend of mine has sent me a birthday present.

Quantified statements can be seen as topic/comment structures, where the quantifier – here *every* – indicates the degree to which a predication holds – here, a total degree (cf. Löbner 2000). The observed asymmetry has been called "conservativity". The statement can be verified by first identifying the set of friends of mine, and then checking whether all of them have the property of having sent me a birthday present.

As a consequence of the fact that they refer to given or construable constituents, topics are typically expressed in a prosodically weak way – they are deaccented. This is illustrated in the following contrastive pair of examples. In the context suggested in (16.a), *my purse* is not a topic, and it gets an accent; in (b), it is a topic, and it cannot get an accent.

(16) a. A: What happened? B: My púrse was stolen!
b. A: What happened to your purse? B: My purse was stólen!

Deaccentuation may signal topics even in cases in which, for grammatical reasons, they occur in other positions than sentence-initially. One case is the following small text, from Reinhart (1982).

(17) Kracauer's book is probably the most famous ever written on the subject of the cinema. Of course, many more people are familiar with the book's catchy title than are acquainted with its turgid text.

The second sentence is about Kracauer's book. Notice that the topic phrase *the book* is clearly deaccented in this case.

Topics are often pronominalized, as in *it was stolen! ,* and in many languages they may be not realized phonologically at all, as e.g. in Chinese. There is one case in which topics receive an accent, namely with contrastive topics. Here, accent indicates that the speaker selects one topic out of a set of several topic candidates. But even in this case the topic does not carry the main accent of the sentence (in the following, ` represents secondary accent, and ´ represents primary accent).

(18) A: How are your parents doing?
B: My mòther is still wórking, but my fàther has retíred.

Another phenomenon concerning the encoding of topic and comment has been pointed out by Jacobs (2004), who captured frequent findings about topic/comment structuring by claiming that topics and comments cannot be informationally "integrated". On an observational level, this means that topic and comment form distinct phonological phrases. If a sentence like *the train arrived* is meant to be an assertion about the train, it is realized as in (19.a), with two phrases each carrying an accent, not as in (19.b), with one phrase carrying just one accent.

(19) a. (the tràin) (arríved)
b. (the tráin arrived)

Jacobs interprets this as indicating that in the first case, the meaning of *the train* and *arrived* are addressed independently, and then they are combined. In the second case, a simple thought, that an arrival of the train happened, is expressed.

2.3 Is topic/comment structuring necessary for communication?

Topic/comment structuring is so ubiquitous in human communication it may appear a virtual necessity for communication and/or for the storage of information. However, this is not so.

There are simplifying, but quite far-reaching theories of linguistic communication that work without any notion of topic. For example, Stalnaker (1974) suggested a theory of communication in which an information state is a set of situations or possible worlds (the worlds that are compatible with the description of the information state), and updating of this state consists in restricting this set. No notion of topic is necessary. Similarly, even though classical discourse representation theory as developed by Kamp (1981) assumes discourse referents in addition to possible worlds, the notion of topic is not required. Of course, there are suggestions how to include topic/comment structuring in the theory developed by these authors, such as Reinhart (1982), Jäger (1996), or Portner & Yabushita (1998). But the point is that they are not essential for the theoretical reconstruction of what happens in communication according to theories like Stalnaker's or Kamp's.

Also, in theories of storing and retrieving information in a database, the notion of topichood is superfluous. Consider the following relational database of vulcanoes, dates of their eruptions, and strengths of the eruptions:

(20)

Vulcano	**Year**	**Strength**
Pinatubo	7460 BC	6+
Sakura-Jima	3550 BC	4
Karymsky	2500 BC	5
Pinatubo	3550 BC	6
Sakura-Jima	2900 BC	4

Is there a "topic column" in this table? It is tempting to consider the names of the vulcanos as such, but observe that names can occur multiple times, just as years and strengths. Also, in database queries there is no dedicated topic:

(21) a. When did Pinatubo erupt?
Query: name = 'Pinatubo', year = X
Result: X = 7460 BC, 3550 BC

b. Which volcano erupted around 3550 BC?
Query: name = X, year = '3550'
Result: X = Sakura-Jima, Pinatubo

Typically, a query specifies the values of certain features, while leaving the values of others open. But the constant parts are not in any way topics in the query language. For example, there is no necessity to formulate a query in which items that stay constant come first. The way in which search algorithms work, e.g. for the programming language PROLOG, is blind for the order of specification; the query "year = X, name = 'Pinatubo'" will give the same result as (21.a).

In animal communication, topic/comment structuring also seems to be lacking. Animals do not identify an object and then comment on it. It is even questionable whether they can refer to objects in the first place. Tomasello and

Zuberbühler (2002) state: "Virtually no ape gestures are referential in the sense that they indicate an external entity (i.e., there is no pointing in the human fashion)." The warning calls of Vervet monkeys signal, for example, "danger from above / an eagle", or "danger from the ground / a snake" (cf. Struhsaker 1967), but they do not first identify a particular region, or a certain type of animal, and then say something about it. Tomasello (2003) notices that chimpanzees produce attention-getting gestures but appear to have no strategy of combining such gestures with ones that communicate more specific semantic content that could be seen as precursors of topic/comment structures. The only instance remotely comparable to topic/comment structuring I am aware of occurs in species that are very far removed from humans (T. Fitch, pers. comm.). There is some justification to see a topic/comment structure in bee communication, as they bring some pollen to the hive (the topic) and indicate with their dance the direction and distance where more of it can be found (the comment).[1]

This contrasts drastically with human communication, for which topic/comment structuring is an essential feature. There is also evidence that topic/comment structuring occurs early and effortlessly in the process of language acquisition; for example, De Cat (2002) adduces evidence that French children use topic/comment structures early on in their second year.

2.4 Topic/comment structure and predication

One well-recognized, but still little-understood semantic property of human language is that it consists, to a large part, of predications that have truth values. For example, a minimal sentence like *Mary left* consists of a predicate, *left*, that is combined with a name; the result can be true or false in a given situation. The standard semantic model for this, going back to Frege (1892), is that the predi-

[1] This case was suggested to me by Tecumseh Fitch.

cate is a function that maps entities, supplied by names, to the truth values True or False. As far as I can see, there is no predication in animal communication (cf. also Nehaniv 2005). A Vervet monkey performing a warning call for a snake does not say something like: *Over there, there is a snake*, but rather announces *Snake!*, or *Beware of Snake!*, which triggers a particular behavior in the addressees. Humans can lie by claiming that a predicate applies to an argument, yielding True, where in fact they know it yields False. Animals cannot lie, they only can deceive, e.g. by uttering a warning call where there is actually no warrant for it. To appreciate the difference, consider a house owner who warns a prospective thief by: *I have a dog.* This is a lie if there is no dog. Now consider a house owner who warns by: *Beware of the dog!* This is not a lie, it is a deception.

How did predication develop from animal signalling systems? Surprisingly, this is a question that has hardly ever been asked, let alone answered. Nehaniv (2000, 2005) has suggested that predication emerged from the simple symmetric association of two ideas via a stage in which one idea has a topic role, and the other one is a comment. The genealogy of predication can be sketched as follows, where "a + b" denotes symmetric association of ideas a, b, and a ← b denotes that an idea b is commented on an idea a.

(22) Stage 1: association between ideas:
Berries + *Sweetness,* = *Sweetness* + *Berries.*
Stage 2: topic/comment structure:
Berries ← *Sweetness*, or *Sweetness* ← *Berries.*
Stage 3: predication:
Berries are sweet, or *Sweetness is berryish*.

The starting point is the simple association of two ideas, which denotes that the two referents often occur together, in whichever way. In our example, berries occur where sweetness occurs, and sweetness occurs where berries occur. This

is how Hume conceived of association through contiguity (cf. Hume, *An Essay concerning Human Understanding*). This association is essentially symmetric. In a topic/comment structure, a first element of asymmetry arises: One term refers to an entity given, the other expresses something new. We can say that one idea is "about" another one. In our example, we identify the concept of berries and add the concept of sweetness to it, or vice versa. The relation is easily reversible. It gets solidified in the case of predication, where one idea refers to an object, and the other is predicated about it, for example when we say that berries are sweet. Now the relation is not easily reversible anymore. Typically, we must make use of a grammatically marked nominalized form of a predicate if we want to make it subject, as in *Sweetness is berryish.* Languages might differ quite drastically in how well developed a predication relation they have. There are topic-prominent languages that do not have a well-established subject relation (cf. Li & Thompson 1976), and there are languages in which the distinction between nouns and verbs, the typical categories suited for topics and comments, is less clear, if present at all (cf. Sasse 1991).

Granted that this scenario still does not tell us where truth values came from. But at least it provides a road map for the asymmetry that is essential for truth values. If the combination of two ideas α, β leads to a truth value, and if one idea is simple, then the other one must be conceived of as containing one element that does the combining and mapping to a truth value. As indicated above, the topic/comment structures can be seen as the source of predication.

The claim that there is no predication in animal communication might be questioned on the basis of the evidence for the suggestion of Hurford (2003) that a functional precursor or neurological equivalent of the predicate-argument structure might exist in the visual processing.[2] Researchers have long identified

[2] Thanks to an anonymous reviewer for making me aware of this connection.

a dorsal stream that identifies the location of objects, corresponding to arguments (or more specifically, to argument variables, or deictically identified entities), and a ventral stream that identifies the qualities of objects, corresponding to predicates. While this structure might be a functional precursor of both predicate/argument structure and asymmetric bimanual communication, I would like to point out that the proposal here differs from Hurford (2003) insofar as it concerns communication, and not simple categorization. Communication is seen as an action that dynamically changes the information content of the common ground, just as manipulation is an active process that changes the properties of entities in the environment. Categorization, on the other hand, is ~~a~~ more passive in that it adjusts the information state of an individual to its environment.

Nevertheless, there is an obvious connection here: The way in which the common ground is changed may reflect the predicate-argument structure rooted in more elementary features of categorization. In the hypothetical development of (22) we have assumed, with Hume, that it all starts with a symmetric association of ideas, like *Berries* + *Sweetness*. This may be wrong if one "idea" is deictically identified, as in *This is sweet*. A paraphrase like *Sweetness is this-ish* is impossible. Even the periphrase *Sweetness is berryish* is strange, as we normally use nouns in a deictic function.

2.5 Recursivity of topic/comment structure

The way in which asymmetric bimanual action was characterized so far does not allow, in a straightforward way, for recursivity, as humans only have two hands for manipulation, with at most ancilliary functions assigned to the feet.[3] Topic/comment-structure in communication is also typically non-recursive. For example, it has been observed that *wa*-marked NPs rarely occur in embedded

[3] As the anonymous reviewer points out, this is different with non-human primates.

clauses in Japanese. However, we do find cases that can be understood as recursive topic/comment structures, as in the following example:

(23) As for my siblings, my sister lives in Lithuania, and my brother lives in Armenia.

Here, *as for my siblings* constitutes the general topic, and *my sister* and *my brother* constitute subtopics. The comment to *as for my siblings* is the rest of the sentence, which itself consists of two topic/comment structures.

Such topic/comment structures and the way in which they structure human discourse ~~of~~ have been investigated by a number of researchers, such as van Kuppevelt (1995), Roberts (1998) and Büring (1998, 2002). Typically, the topics in such cases are related to each other, e.g. the referent of *my sister* is a part of the referent of *my siblings*.

While recursivity of topic/comment structures may not directly follow from manual action, it is evident that once it is established in communication, the general feature of human language of allowing for recursivity (cf. Hauser e.a. 2002) can affect topic/comment structures as well. In this sense, recursivity of topic/comment structures does not contradict the idea that it is originally derived from a non-recursive process.

3 Bimanual Coordination in Human Action

3.1 The evolution of manual laterality and language

One of the striking features of human behavior is the differential use of the hands. In all current human populations, most people use their hands in distinct ways for a great number of tasks, like throwing stones, removing a tick, eating with a spoon, or writing with a pen. This has led us to speak of a dominant hand and a non-dominant hand. In all human populations, most people will prefer to

use the right hand for such tasks, and this can even be reconstructed for much of human history (cf. Faurie & Raymond 2004, who give an overview and report results, in particular, of hand prints at paleolithic cave sites). Statistics about handedness are surprisingly unreliable because different tasks were considered; they vary between 5% and 20% of left-handers in given populations. There is a genetic factor involved that is still little understood, as monozygotic twins can exhibit different handedness (see Annett 2002, Corballis 2002, 2003 for genetic explanations).

For non-human primates there are reports about asymmetry in hand use, but it is considerably weaker, and there is ongoing debate about this issue. MacNeilage (1984, 1990) finds evidence for a successive development in primates: Prosimians have a left-hand preference for manual prehension, whereas the right hand is used for clinging to branches. There is no real bimanual coordination yet. Monkeys appear to have a weaker left-hand preference for grasping, and a right-hand preference for manipulation, presumably acquired because clinging to trees became less important and freed the right hand for other tasks to some degree. Apes show this tendency even more pronounced: The left hand tends to be used for prehension or other tasks that make strong visuospatial demands, whereas the right hand is preferred for manipulations like joystick-controlled computer games. Schaller (1963) reports that gorillas prefer the right hand to initiate chest-drumming, which functions as a dominance signal. Hopkins e.a. (2005) found that captive chimpanzees predominantly use the right hand in pointing to desired objects that they cannot reach without help by the eperimenter. But Palmer (2002) criticizes research on handedness in apes quite generally as inconclusive. In any case, it seems clear that the lateralization of hand use is considerably farther developed in humans than in non-human apes.

Manual lateralization has been related to the other well-known lateralization in humans, the location of speech in the brain. A causal link between these do-

mains was suspected already by Broca in 1865, and is supported by various types of evidence. For example, Rasmussen and Milner (1977) have shown that left handedness is positively related to right-cerebral dominance for speech, and Knecht e.a. (2000) have shown that left cerebral activation during word generation is positively related to the degree of right-handedness. Manual lateralization has been implied in the evolution of language. Annett (2002) and McManus (2003) assume that the same genetic mutation is responsible both for handedness and brain lateralization, thus enabling the development of human language; also, MacNeilage e.a. (1984) consider manual lateralization a precursor of the brain lateralization necessary for the development of human language. Furthermore, there is evidence that the homologue of Broca's area in monkeys and apes (area F5) contains mirror neurons that are important for the perception and interpretation of manual actions and grasping, which Corballis (2002, 2003) took as evidence for a gestural language that predates spoken language in humans, an hypothesis previously advanced by Kendon (1991), Kimura (1993), Rizzolatti and Arbib (1998) and McNeill (2005). In addition, there is evidence that the dominant hand is used more frequently when gesturing, in particular when gestures accompany speech (cf. Kimura 1973). This even holds for apes; see Vauclair (2004) for a recent overview of research results.

3.2 Asymmetric bimanual coordination

There is a general shortcoming in the traditional view of manual laterality, which assumes that one hand is doing the job and the other is just an appendix that is used for ancillary tasks in case a second hand seems useful. This view dismisses the differential function of the two hands in bimanual action. As a matter of fact, both hands have similarly important functions in many tasks. Even in the eight tasks used by Annett (1967) to determine handedness, five refer to acts like sweeping, striking a match, using scissors or threading a needle

that crucially require an intricate coordination of the activities of both hands. Even for apparently monomanual tasks the non-dominant hand is important, for example in throwing an object, where it is crucial for balancing the body. The role of the non-dominant hand can also be seen in handwriting, perhaps the classical test for handedness. Athènes (1984) could show that the speed of handwriting reduces by 20% when subjects are instructed not to use the non-dominant hand for fixating and repositioning the paper on which they wrote.

Surprisingly, there are relatively few studies that investigate the importance of coordination of both hands. Perhaps the first one is the Frame/Content Model of MacNeilage, cf. MacNeilage e.a. (1984). According to this model, the non-dominant hand holds an object, and the dominant hand acts upon it. That is, the non-dominant hand provides the "frame" into which the dominant hand inserts "contents". MacNeilage (1986) argues that this is a homologue to the frame/content organization of speech, in particular organization of syllables (frames) and segments (contents), and of syntax (frames) and words (contents). However, MacNeilage (1998) distances himself from this explanation. He argues that no conceivable adaptation regulating hand movements could have been transferred to the vocal system, and suggests instead that the opening and closing movement of the mouth was a precursor to syllable structure. While it is certainly possible to make a strong argument for mandibular motion related to CV (Consonant-Vowel) syllable structure, the frame/content structure relates to other levels of linguistic organization as well that are not directly related to the phonetic realization of language, such as the slot-and-filler structure in syntax and semantics. (In this structure, an intransitive verb like *snore* opens a slot for a subject, and a verb like *hit* opens two slots, one for the agent, and one for the patient). For structures of this sort the cyclic mandibular motion does not seem a more likely precursor than bimanual coordination as sketched above. This holds in particular as there is growing evidence that the supplementary motor area

(SMA) close to Broca's area is involved both in the planning of hand movements and in speech production; also, as mentioned above, the physiological homologue of this area in the monkey brain, F5, contains neural networks relating to manual actions such as grasping and manipulating an object, as well as the corresponding mirror neurons (cf. Rizzolatti and Arbib 1998, Alario e.a. 2006, Fadiga & Craighero 2006).

A second study stressing the specifics of bimanual coordination is Guiard (1987). In his Kinematic Chain Model, he argues for a differential role of hands seen as "motors" that form a "kinematic chain", following three principles:

(a) Spatio-temporal reference of motion. The motion of the dominant hand typically finds its frame of reference[4] in the results of motion of the non-dominant hand. For example, the nondominant hand fixes the position of an object, whereas the dominant hand manipulates it. Examples are threading a needle, positioning paper in writing, or handling the cue in billiard. Notice that these observations correspond to the frame/content model of MacNeilage.

(b) Spatio-temporal scale of motion. The non-dominant hand produces motions on a more coarse-grained scale in time and space, whereas motions of the dominant hand are quicker and more precise. Experimental evidence for this includes pointing, finger tapping and tracing of points with a cursor. This is consonant with the postural role of the non-dominant hand and the manipulative role of the dominant hand.[5]

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[4] Note that this notion of reference is different from the one used before, of referring to an object.

[5] A particularly interesting example is playing the violin: In spite of the high additional demand on finger coordination, it is the nondominant hand that is used for holding the violin, thus providing a frame of reference for the bow held in the dominant hand, in addition to providing a frame of reference for its own fingers. This follows from (a). But the conven-

(c) Precedence of non-dominant hand in action. The contribution of the left hand to a bimanual action starts earlier than the contribution of the right hand. The non-dominant object first has to prehend the object before the dominant hand can start manipulating it. In addition, during the action, the non-dominant hand often repositions the object while the dominant hand pauses and gets into action only after the object is in the desired position.

Viewed in this way, bimanual coordination shows surprising similarity to topic/comment articulation, to which we turn in the next section.

4 Bimanual Coordination and Topic/Comment Structuring

4.1 Similarities between bimanual coordination and topic/comment structuring

It turns out that there are a number of similarities between topic/comment structuring and asymmetric bimanual coordination, as seen in the Frame/Content model or the Kinematic Chain model.

This is quite obvious for frame-setting topics and the Frame/Content model, whose very name captures this similarity. As we have seen, a frame-setting topic identifies a temporal, local or other frame, to which a statement is added that is supposed to hold in this frame, as discussed in example (7). This corresponds strikingly to the way in which the frame/content model viewed the interaction of the two hands, one providing a frame into which another adds content.

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tional way of holding a violin runs against (b), as the finger movements of the non-dominant hand are more rapid and more precise than the bow movements of the dominant hand. This might be tentatively interpreted by stating that frame issues are more important than issues of speed and precision, as far as hand alignment is concerned.

There is also a natural interpretation for aboutness topics from the viewpoint of the Kinematic Chain model. As we have seen, the aboutness topic "picks up" or identifies an entity that is typically present in the common ground of speaker or hearer, or whose existence is uncontroversially assumed. This corresponds to the preparatory, postural contribution of the non-dominant hand when it reaches out and "picks up" an object for later manipulation. The comment then adds information about the topic, which in turn corresponds to the manipulative action of the dominant hand. The file-card metaphor of Reinhart (1982) expresses this similarity nicely: The speaker, as it were, takes out the file card with the non-dominant hand, and writes down information on it with the dominant hand.

This description of topic selection and comment attribution is compatible with the fact that sometimes new information is added when selecting a topic, as in the following example:[6]

(24) A: Did I tell you about my new neighbour?
B: Who is it?
A: Well, she / the bastard is a professor of Oxford.

Choice of *she / the bastard* as topic expressions adds new information, about the gender of the referent or the attitude of the speaker to the referent. However, this added information is clearly to be accomodated, and not part of the main message. For example, if B says: *No, that's not true*, then B denies that the referent is a professor of Oxford, not the gender or attitude information.

Beyond these general aspects of similarity, there are a number of more specific points. One concerns the temporal sequence of hand movements and topic/comment structures. As we have seen, the actions of the non-dominant

[6] As suggested by the anonymous reviewer.

hand typically precede the corresponding motions of the dominant hand in bimanual manipulations. This directly corresponds to the typical temporal order in which topic/comment-structures are serialized, with the topic being mentioned first, and then elaborated by the comment. A second point of similarity concerns the scale of motion. We have seen that the motions of the non-dominant hand are more coarse-grained, whereas the motions of the dominant hand tend to be on a more fine-grained scale, both spatially and temporally. In addition, the movements of the dominant hand are more frequent, and generally expend more energy. This is related to the realization of topic/comment structure, where the topic tends to be de-accented, and the comment typically bears more pronounced accents. Furthermore, notice that the prehension of an object by the non-dominant hand is, in a sense, static, as it does not affect the internal nature of the object. This is only done by the manipulation of the object by the dominant hand. Quite similarly, identifying a topic does not change the information state yet, but only prepares a change; the change itself is executed by the comment.

4.2 Hand dominance in sign languages and gesture

If there is a relation between hand dominance in bimanual action and topic/comment structure, we should expect to find evidence for it in sign languages, which use hands to communicate, and also in gestures that accompany spoken language. Unfortunately, only few studies in these two active fields of research have recorded the hand dominance of subjects, let alone have formed hypotheses about differential roles of the dominant and the non-dominant hand in communication.

For sign languages, Sandler (2005) summarizes findings about the differential role of dominant and non-dominant hand. The non-dominant hand appears to play a rather minor role in lexical representation. It is largely redundant, but plays a supporting role in a restricted number of handshapes. In particular, for

bimanual signs it often forms a "place of articulation"; the dominant hand moves towards the non-dominant hand. This is very similar to what we find in manipulative bimanual coordination. The nondominant hand may also function as a classifier that signals the semantic class of a participant, for example in the combinations of the signs APPROACH (dominant hand: pointed finger) + PERSON (non-dominant hand: imitation of walking). Again, this can be related to the frame/content distinction, with the more general classifier providing for a frame. Furthermore, the non-dominant hand marks prosodic boundaries by the so-called hand spread that is quite similar to intonational phrasing in spoken languages.

In addition to the functions mentioned above, the non-dominant hand is used to express discourse coherence. Gee and Kegl (1983) observe that a classifier signed by the non-dominant hand can be maintained while the dominant hand signs new information which is understood to be focused. Emmorey & Falgier (1999) describe such a case in American Sign Language in which a classifier is signed with the non-dominant hand as a kind of backgrounded discourse topic:

(25) My friend has a fancy car, a Porsche.
[Sign: Classifier for car, non-dom. hand, kept throughout the following.]
(She) drives up and parks. (She) enters a store, does errands, and when finished, she gets back to her car and zooms off. [Classifier signed with non-dom. hand moves away.]

Leeson & Saeed (2002) report related cases from Irish Sign Language, in which the topic sign is maintained by the non-dominant hand. Consider the following example, where *nd* and *dh* refers to the nondominant hand and the dominant hand, respectively.

(26) HOUSE nd HOUSE
dh TREE (be-located-behind)

The authors comment: “HOUSE is (…) topicalized. The informant holds the sign for house with his non-dominant hand to maintain the referential status of the topicalized constituent. HOUSE is normally articulated with two hands, as in the initial sign. A one-handed version of the normally two-handed sign TREE also occurs with this segment. The signer articulates this with his dominant hand, thus indicating that this has assumed higher informational status (i.e., this is new information) than the preceding constituent, HOUSE.”

Liddell (2003) devotes a whole chapter to what he calls “buoys”, signs produced by one hand that are kept constant, serving as conceptual landmarks while the other hand continues to sign. This includes signs that structure discourse, like the “list buoy” used to list a number of elements in a discourse sequence, a “theme buoy” by which the non-dominant hand identifies a topic of discourse, and a “pointer buoy” that points at objects that are of longer-lasting interest for a stretch of discourse and seem to be commented upon in the discourse. It is, not surprisingly, always the non-dominant hand that signs buoys.

Something quite similar has been reported for gesture accompanying spoken language by Enfield (2004). This article describes a gestural sequence called “symmetry-dominance” in the description of fish traps by Lao fishermen that may turn out to be much more widespread, if not universal. The sequence consists of two parts. In the first part, a bimanual symmetrical gesture describes the shape of an object (here, a particular type of fish trap). In the subsequent second part, one hand holds the position, representing topical information, and the other hand executes a new gesture that represents new or focal information, that is, the comment. Consider the following example for illustration:

(27)

HR (dominant)	HL (non-dom.)	Speech (translated)
Depicting trap move forward as if being placed.	= HR	'And (they) place it in the rice fields, also.'
fish swimming into trap	HOLD as previous	'Now, when a fish is going to go down (into it) … it goes in and is inserted there
fish coming out of trap, hold outside trap		'and it can't get back.'
fish going inside trap, with repeated movement of 'jamming', holding inside trap		'(It) goes in and gets jammed in there.'

The hand that holds the position quite evidently sets a frame in which the information that corresponds to the other hand has to be interpreted. Interestingly, it is always the non-dominant hand that keeps the position, and is associated with that frame-setting function.

It should be stressed that while there are highly relevant cases of asymmetric use of the hands in signing and gesturing, hands movements are very often symmetric, and often only one hand is used, especially if the other engages in other, non-communicative abilities. Hence effects of topic/comment structure on signing and gesturing will be subtle, and carefully designed experiments will be necessary to establish or refute this association between gesture/signing and information structure. It might also be that information structure plays a role in symmetric gestures that correspond to thetic utterances which cannot be differ-

entiated in topic and comment parts, as in spontaneous expressions of joy, amazement, fear, defense, etc., which often appear to be symmetrical.[7]

4.3 Bimanual coordination as a preadaptation for topic/comment structuring?

The similarities between asymmetric bimanual coordination and topic/comment structuring, and the different roles of the two hands in gesturing, suggest that the manual coordination typical for humans and perhaps higher primates may be a preadaptation that facilitated the development of topic/comment structure in communication. The basic idea is this: Humans and their immediate ancestors have acquired or refined, possibly over several millions of years, the ability to manipulate small objects by grasping and positioning them with the non-dominant hand, and modifying them with the dominant hand. Once established, this way of handling objects in the real world was the model for the treatment of objects in communication. Here again, topics were picked up freely, to be modified by comments.

This hypothesis is particularly plausible if one assumes a gestural predecessor of human language, as the same organs, the hands, would have been used both for object manipulation and for communication, and we have seen evidence for a differentiated role of the hands in gesturing and signing even today. That there is such evidence is encouraging, as few researchers have explicitly looked at the differential role of the hands in gesture and signing in relation to topic/comment structuring. Investigations aimed at this issue directly might very well unearth further phenomena that point towards a relation between handedness dominance and the manual expression of information structure.

It should be stressed that the hypothesis is not tied to the assumption of a gestural stage in the development of human language. We could also imagine

[7] Thanks to the anonymous reviewer who pointed this out.

that the way of manipulating objects had led to a particular way of conceptualizing objects as things that can be picked up, held constant, and modified, which then served as a model for communication.

As for the neurological part of the hypothesis, there is evidence that the precursor of (parts of) the Broca area was specialized for bimanual action, in particular the sequencing of actions (cf. references cited earlier, and McNeill 2005). Topic/comment structuring is a special case of sequencing, and so a general adaptation designed for the sequencing of manual actions might well have been adopted for this purpose. It would be interesting to find out whether, in addition to the sequencing function, there is evidence for special neural circuitry responsible for the differential use of the two hands in bimanual manipulations, which then might have been co-opted by the newly acquired tasks of the the Broca area, communication.

On a symbolic level, the similarities between bimanual coordination and topic/comment structuring are quite striking. Just as *homo habilis* can selectively pick up an object, position it appropriately, and modify it in various ways, *homo loquens* can selectively pick up a topic matter and modify it by adding, changing or subtracting information about it. This is quite different from how most animals deal with the objects in their environment, and it is very different from how they communicate.

References

Alario, F.-Xavier et al. 2006. The role of the supplementary motor area (SMA) in word production, Brain Research 1076, 129-143.

Annett, Marian. 1967. The binomial distribution of right, left and mixed handedness. Quarterly Journal of Experimental Psychology 327-333.

Annett, Marian. 2002. *Handedness and brain asymmetry. The Right Shift Theory*, Psychology Press, Sussex.

Athènes, S. 1984. Adaptabilite et developpement de la posture manuelle dans l'ecriture: Etude comparative du droitier et du gaucher, Unpublished memorandum, Université de Aix-Marseilles III.

Barwise, Jon & Robin Cooper. 1981. Generalized quantifiers and natural language. *Linguistics and Philosophy* 4, 159-219.

Büring, Daniel. 1998. *The 59th Street Bridge Accent***,** Routledge, London.

Büring, Daniel. 2002. On D-trees, beans, and B-accents. *Linguistics and Philosophy* 39-61.

Carlson, Greg N. 1977. A unified analysis of the English bare plural. *Linguistics and Philosophy* 1, 413-456.

Chafe, Wallace L. 1976. Givenness, contrastiveness, definiteness, subjects, topics and point of view. In Charles N. Li, *Subject and Topic*, Academic Press, New York, 27-55.

Corballis, Michael C. 2002. *From hand to mouth: The origins of language***,** Princeton University Press, Princeton.

Corballis, Michael C. 2003. From hand to mouth: Gesture, speech, and the evolution of right-handedness. *Behavioral & Brain Sciences* 26. 199-260.

Danes, Frantisek. 1970. One instance of the Prague school methodology: Functional analysis of utterance and text.. In P. Garvin. (ed.) *One instance of the Prague school methodology: Functional analysis of utterance and text*, Mouton, Paris, The Hague.

De Cat, Cécile. 2002), Syntactic manifestations of very early pragmatic competence. In R. Bok-Bennema, B. Hollebrandse, Kampers-Manhe & P. Sleeman, *Romance languages and linguistic theory*, 17-32.

DuBois, John W. 1987. The discourse basis of ergativity. *Language* 63, 805-855.

Emmorey, K. & B. Falgier. 1999. Talking about space with space: Describing environments in ASL.. In E.A. Winston, *Story telling and conversations: Discourse in deaf communities*, Washington D.C, Gallaudet University Press, 3-26.

Enfield, Nick J. 2004. On linear segmentation and combinatorics in co-speech gesture: A symmetry-dominance construction in Lao fish trap descriptions. *Semiotica* 149, 57-123.

Fadiga, Luciano & Laila Craighero. 2006. Hand actions and speech representation in Broca's area. *Cortex* 42, 486-490.

Faurie, Charlotte & Michel Raymond. 2004. Handedness frequency over more than ten thousand years. *Proc. R. Soc.Lond. B. Suppl)* 271. 43-45.

Firbas, Jan. 1964. On defining the theme in functional sentence analysis. *Traveaux Linguistique de Prague* 1, 267-280.

Frege, Gottlob. 1892. Über Sinn und Bedeutung. *Zeitschrift für Philosophie und philosophische Kritik, NF* 100. 25-50.

Frey, Werner. 2000. A medial topic position for German. *Linguistische Berichte*

Gee, James Paul & Judy Kegl. 1983. Narrative/story structure, pausing, and American Sign Language. *Discourse Processes* 6, 243-258.

Givon, T. (ed.) . 1985. *Topic Continuity in Discourse: a Quantitative Cross-Language Study***,** John Benjamins, Amsterdam, Philadelphia.

Goldenberg, G. 1988. Subject and predicate in Arab grammatical tradition. *Zeitschrift der deutschen morgenländischen Gesellschaft* 138, 39-73.

Guiard, Yves. 1987. Asymmetric division of labor in human skilled bimanual action: The kinematic chain as a model. *Journal of Motor Behavior* 19, 486-517.

Gundel, Jeanette K. 1988. Universals of topic-comment structure. *Studies in Syntactic Typology*. Eds. Hammond, Michael Edith Moravcsik, Jessica Wirth. John Benjamins, Amsterdam, 209-239.

Halliday, M. A. K. 1967. Notes on transitivity and theme in English, Part 2. *Journal of Linguistics* 3, 199-244.

Hauser, Marc D., Noam Chomsky & W. Tecumseh Fitch. 2002. The faculty of language: What is it, who has it, and how did it evolve?. *Science* 298, 1569-1579.

Heim, Irene. 1983. File change semantics and the familiarity theory of definiteness. *File change semantics and the familiarity theory of definiteness*, Walter de Gruyter, Berlin, 164-190.

Hockett, Charles. 1958. Two models of grammatical description. *Readings in Linguistics*, University of Chicago Press, Chicago.

Hopkins, William D. et al. 2005. The distribution and development of handedness for manual gestures in captive chimpanzees. Pan troglodytes). Psychological Science 16. 487-493.

Hurford, James. 2003. The neural basis of predicate-argument structure. *Behavioral and Brain Sciences* 26: 261-283.

Jacobs, Joachim. 1984. Funktionale Satzperspektive und Illokutionssemantik. *Funktionale Satzperspektive und Illokutionssemantik*, 25-58.

Jacobs, Joachim. 1996. Bemerkungen zur I-Topikalisierung. *Sprache und Pragmatik* 41, 1-48.

Jacobs, Joachim. 2001. The dimensions of topic-comment. *Linguistics* 39, 641-681.

Jäger, Gerhard. 1996. *Topics in Dynamic Semantics*. Ph.D. thesis, Humboldt University Berlin. CIS-Bericht 96-92, Centrum für Informations- und Sprachverarbeitung, Universität München.

Kamp, Hans. . 1981. A theory of truth and semantic representation. *Formal Methods in the Study of Language*. Eds. Groenendijk, J.A.G. T.M.V. Janssen, M.B.J. Stokhof. Amsterdam: Mathematical Centre Tracts 135. 277-322.

Kendon, Adam. 1991. Some considerations for a theory of language origins. *Man* 26, 188-221.

Kimura, Doreen. 1973. Manual activity during speaking. I. Right-handers.. *Neuropsychologia* 11. 45-50.

Kimura, Doreen. 1993. *Neuromotor mechanisms in human communication*, Oxford University Press. Oxford.

Knecht, S. e.a. 2000. Handedness and hemispheric language dominance in healthy humans. Brain 123. 2512-2518.

Krifka, Manfred et al. 1995. Genericity: an introduction. In Greg N. Carlson & F. J. Pelletier, *The generic book*, Chicago, London, The University of Chicago Press, 1-124.

Kuroda, S.-Y. 1972. The categorical and the thetic judgment, Evidence from Japanese syntax. *Foundations of Language* 153-185.

Lambrecht, Knud. 1994. *Information structure and sentence form. Topic, focus, and the mental representation of discourse referents***,** Cambridge University Press, Cambridge.

Lambrecht, Knud. 2001. Dislocation. In Martin Haspelmath, Ekkehard König, Wulf Österreicher, & Wolfgang Raible, *Language typology and language universals Vol. 2*, Berlin, Mouton de Gruyter.

Leeson, Lorraine, and John I. Saeed. 2002. Windowing of attention in simultaneous constructions in Irish Sign Language. ISL). *High Deserts Linguistic Society* 5, Ed. Cameron, Terry. University of New Mexico, Albuquerque.

Li, Charles & Sandra Thompson. 1981. *Mandarin Chinese: A functional reference grammar***,** University of California Press, Berkeley.

Li, Charles N. ed. *Subject and Topic*, Academic Press, New York.

Li, Charles N. & Sandra A. Thompson. 1976. Subject and Topic: A new typology of language. In Ch. Li. (ed.). *Subject and Topic*, Academic Press, New York.

Lidell, Scott K. 2003. *Grammar, Gesture, and Meaning in American Sign Language***,** Cambridge University Press, Cambridge.

Löbner, Sebastian. 2000. Polarity in natural language: predication, quantification and negation in particular and characterizing sentences. *Linguistics and Philosophy* 23, 213-308.

MacNeilage, Peter F. 1986. Bimanual coordination and the beginnings of speech. Eds. Lindblom, Björn & Rolf Zetterstrom, Precursors of Early Speech, New York: Stockton Press.

MacNeilage, Peter F. 1990. *Grasping in modern primates: The evolutionary context.* Norwood: Ablex.

MacNeilage, Peter F. 1998. The frame/content theory of evolution of speech production. *Behavioral and Brain Sciences* 21, 499-546.

MacNeilage, Peter F. et al. 1984. Functional precursors to language and its lateralization. *American Journal of Physiology. Regulatory, Integrative and Comparative Physiology)* 15, 912-914.

Marty, Anton. 1884. Über subjektslose Sätze und das Verhältnis der Grammatik zu Logik und Psychologie. *Vierteljahresschrift für wissenschaftliche Philosophie.*

McManus, Chris. 2003. *Right hand, left hand. The origins of asymmetry in brains, bodies, atoms and cultures.* Phoenix House.

McNeill, David. 2005. *Gesture and thought***,** University of Chicago Press, Chicago.

Molnár, Valéria. 1998. Topic in focus. *Acta Linguistica Hungarica* 45, 89-166.

Nehaniv, Chrystopher L. . 2000. The making of meaning in societies: Semiotic & information-theoretic background to the evolution of communication. Society for the Study of Artificial Intelligence and Adaptive Behavior. 73-84.

Nehaniv, Chrystopher L. 2005. Open problems in the emergence of evolution of linguistic communication: A road map for research. *Proc. Second International Symposium on the Emergence and Evolution of Linguistic Communication,* 86-93.

Palmer, A. Richard. 2002. Chimpanzee Right-Handedness reconsidered: Evaluating the evidence with funnel plots. *American Journal of Physical Anthropology* 118, 191-199.

Partee, Barbara H. 1991. Topic, focus and quantification. In St. Moore & A.Z. Wyner, *Proceedings of SALT I*, Cornell, 159-188.

Paul, Hermann. 1880. *Prinzipien der Sprachgeschichte***,** Leizpig.

Portner, Paul & Katsuhiko Yabushita. 1998. The semantics and pragmatics of topic phrases. *Linguistics and Philosophy* 21, 117-157.

Rasmussen, t. & B Milner. 1977. The role of early left-brain injury in determining lateralization of speech functions. *Annals of the New York Academy of Sciences* 299, 355-369.

Reinhart, Tanya. 1982. *Pragmatics and linguistics: An analysis of sentence topics***,** Indiana University Linguistics Club, Bloomington, Indiana.

Rizzolatti, Giacomo & Michael Arbib. 1998. Language within our grasp. *Trends in Neuroscience* 21, 188-194.

Roberts, Craige. 1998. Focus, the flow of information, and universal grammar. In Peter W. Culicover & Louise McNally, *Syntax and semantics. The limits of syntax(29).* San Diego, London, Boston, Academic Press, 109-160.

Sandler, Wendy. 2005. Phonology, phonetics and the nondominant hand. *Lab-Phon* 8. See also http://www.ling.yale.edu:16080/labphon8/Talk_Abstracts/Sandler.html

Sasse, Hans-Jürgen. 1987. The thetic/categorical distinction revisited. *Linguistics*, 511-580.

Sasse, Hans-Jürgen. 1991. Predication and sentence constitution in universal perspective. In Dietmar Zaefferer. (ed.), *Semantic universals and universal semantics*, Berlin / New York, Foris. 75-95.

Sgall, Peter, Eva Hajicová & Jarmila Panevová. 1986. *The meaning of the sentence in its semantic and pragmatic aspects***,** Reidel, Dordrecht.

Stalnaker, Robert. 1974. Pragmatic presuppositions. In Milton K. Munitz & Peter K. Unger, *Semantics and Philosophy*, New York, New York University Press, 197-214.

Strawson, Peter. 1964. Identifying reference and truth value. In D. Steinberg & A. Jakobovitz. (eds.). *Semantics. An interdisciplinary reader*. Cambridge University Press.

Struhsaker, T.T. 1967. Auditory communication among vervet monkeys. (*Cercopithecus aethiopis*). In S. A. Altmann, *Social communication among primates*, Chicago, Chicago University Press. 281-324.

Szabolcsi, Anna (1997. Strategies for scope taking. In Anna Szabolcsi, *Ways of scope taking*, Dordrecht, Kluwer, 109-154.

Tomasello, Michael & Zuberbühler. 2002. Primate Vocal and Gestural Communication. Eds. Bekoff, Marc Colin Allen, Gordon M. Burhgardt, *The Cognitive Animal,* MIT Press, Cambridge, Mass.

Tomasello, Michael. 2003. The pragmatics of primate communication. In Jef Verschueren, *Handbook of pragmatics*, Amsterdam, John Benjamins.

Van Kuppevelt, Jan. 1995. Discourse structure, topicality, and questioning. *Journal of Linguistics* 31, 109-147.

Vauclair, Jacques. 2004. Lateralization of communicative signals in nonhuman primates and the hypothesis of the gestural origin of language. *Interaction Studies* 5, 365-386.

von der Gabelentz, Georg. 1869. Ideen zu einer vergleichenden Syntax. *Zeitschrift fur Völkerpsychologie und Sprachwissenschaft* 6, 376-384.

Weil, Henri. 1844. *De lordre des mots dans les langues anciennes comparées aux langues modernes***,** Joubert, Paris. Translated by Ch. W. Super, *The order of words an the ancient languages campared with that of the modern languages.* 1978, Amsterdam, John Benjamins

Wilson, Frank. 1998. *The Hand. How its use shapes the brain, language, and human culture*. Pantheon Books.

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Focus Expressions in Foodo*

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This paper aims at presenting different ways of expressing focus in Foodo, a Guang language. We can differentiate between marked and unmarked focus strategies. The marked focus expressions are first syntactically characterized: the focused constituent is in sentence-initial position and is second always marked obligatorily by a focus marker, which is *nɪ* for non-subjects and *N* for subjects. Complementary to these structures, Foodo knows an elliptic form consisting of the focused constituent and a predication marker *gɛ́*. It will be shown that the two focus markers can be analyzed as having developed out of the homophone conjunction *nɪ* and that the constraints on the use of the focus markers can be best explained by this fact.

Keywords: focus constructions, scope of focus, focus types, Foodo

1 Introduction

In my paper I would like to point out the various possibilities of expressing the pragmatic category of focus in Foodo. Foodo is spoken in a relatively small area within the province of Donga in the Northeast of Benin close to the border to Togo. The number of Foodo speakers is about 20 – 25,000 (cf. Plunkett 1990,

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Gordon 2005). The Foodo area is a linguistic island surrounded by various different Gur languages such as Kabiye, Lokpa and Tem. In the region, Dendi, Hausa and Fulfulde are also spoken.

First, let us provide some basic typological properties of Foodo. The basic sentence structure is SVO. The language has a productive noun class system, in which the noun is marked with prefixes as well as some suffixes[1], and adjectives, determiners and pronouns show concord to the noun prefixes. The phonological system of Foodo differentiates between two distinct phonological tones, which have mainly lexical but also grammatical functions. Apart from this, there is a downstepped high tone as well as several downdrift phenomena.

Genetically, Foodo is one of the Guang languages within the Kwa language family. Within Guang, Foodo belongs to the Northern group with Gonja as its most prominent member. The great majority of Guang languages are spoken in Ghana; Foodo, besides Tchumbuli, therefore represents a Guang exclave in Benin.

The paper aims at presenting different ways of expressing the pragmatic category focus in Foodo. This entails that my primary object has been to observe formal means used to mark information which according to the seminal defintion of Dik is “the most important or salient in the given communicative setting” (Dik 1997: 326).

First, we can account for the fact that focus is not obligatorily marked in any case. Rather, we observe a number of instances in which focus is expressed without any formal marking. In such cases, we speak of an unmarked focus strategy. Example (1)[2] presents such an unmarked SVO sentence in the perfective, here the first sentence of a narrative, in order to introduce to you the canonical sentence structure.

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[1] Foodo is one of the rare Kwa languages if not the only one showing also noun suffixes in addition of prefixes. But as Plunkett (2006: 2) pointed out "... these suffixes are much less developed than the prefixes, and agreement is based on the prefixes not the suffixes."

[2] The data was elicited on the basis of the “*Questionnaire on information structure*” developed by the SFB (cf. Skopeteas et al. 2006).

(1) mí càŋŋá à náá lòkòtólô.
1sg.poss friend PF go hospital
'My neighbour went to the hospital.'

Besides, there are a number of strategies to mark new or important information in a sentence in Foodo, and these strategies, above all, will be subject of investigation here. The most widely applied strategy to express focus involves syntactic movement to the sentence-initial position plus an additional morphological marking after the constituent, which is *nɪ* for non-subjects and *N* for subjects. The structure with the subject marked by the focus marker *N* does not only serve to express focus on the subject itself but also to mark focus on the whole sentence. These syntactically marked structures serve to denote new information as well as contrastive focus. The paper will focus on the structural constraints governing its use. Complementary to these structures, Foodo knows another form which is constructed using an elliptic form consisting of the focused constituent and a predication marker *gɛ́* which follows it. After presenting the different structures, it will be shown that the two focus markers can be analyzed as having developed out of the same element, the homophone conjunction *nɪ*, and that the constraints on the use of the focus markers can be best explained by this fact.

2 Marked vs. Unmarked Focus

2.1 Marked focus

2.1.1 Sentence initial position + focus marker *nɪ*

The first strategy to mark focus has two characteristics, a syntactic one and a morphological one. The focused element, be it a complement of the verb or an adjunct, is placed in sentence-initial position whereby its canonical position in the clause remains unfilled. Additionally, the focused element has to be followed by the focus marker *nɪ* which carries a tone polar to the preceding one.

This structure is viable in all forms of tense and aspect, with the exception of the future tense.

The following examples are presented to illustrate this strategy. First, its use within a sentence in the imperfective is displayed in example (2). Here, the out-of-focus part does not show any differences to non-focus-marked sentences, i.e. it is not characterized by a dependent or relative verbal morphology as it is known for example from different Gur languages or from Hausa. This would be utterly impossible because the required functionally and morphologically differentiated verb paradigms do not exist in Foodo.

(2) ‘For whom do you wash the car?’
mí sí nì ǹ néé f'ólí sà.
1sg.poss father FM 1sg IPF wash PREP
‘I wash them for MY FATHER.’

Example (3a) is a wh-question asking for the object. The interrogative pronoun *mìné* “what” opens the sentence, the focus marker follows it. This is the only way to formulate questions about a complement. The related answer in example (3b) shows the same *ex-situ* construction. In both cases, the focused element leaves a gap at its canonical position. Furthermore, another property is important here: after focus marker *nɪ* no perfective marker *a* is allowed. Both markers are mutually exclusive, as Idrissou Seriki already pointed out (1993: 33). Compare for instance example (1), where the preverbal perfective marker is present, with the question in (3a)[3], which lacks it.

(3a) question: mìné nì ɔcíím wî?
what FM woman eat
‘What did the woman eat?’

(3b) reply: àcéé nì ɔ wî.
beans FM 3sg eat
‘She ate BEANS.’

[3] For an explanation of the pronominal forms in (3b) compare section 3.

Example (4) is the *ex-situ* answer to the question for the directional complement of the verb 'go'. It is fronted and marked by use of the focus marker. Apart from objects and locative complements, this strategy can also be used with temporal and modal adverbs.

(4) 'Where did the woman go?'
túúlé nì ɔ náá.
Europe FM 3sg go
'She went to EUROPE.'

To sum up this section, we can conclude that by employing the focus marker *nɪ* following the focused sentence-initial element, non-subject focus is expressed and this again is used to express new-information focus as well as contrastive focus, i.e. corrective, selective and restrictive focus, but not the expansive one though.

2.1.2 Sentence initial position + focus marker *N*

The second strategy to mark focus differs from the first one by the use of another focus marker, namely *N*, which is put after the subject and assimilates to the following consonant. This is shown in the examples by adding the phonetic value of the focus marker. Concerning another feature of *N*, namely the tonal behavior of it, we follow the observations made by Gray Plunkett. According to him, the homorganic nasal has a lexical high tone, which is subject to changes when the word preceding it ends with a high tone[4]. Furthermore, it seems that the high tone of the focus marker spreads when the following verb has a low tone. These two observations are subject to future research (Plunkett 2007, p.c.).

Apart from the focus marker, we find the normal SVO structure of the sentence. Because there are no apparent other properties of this construction in

[4] The examples follow the orthographic conventions of the Foodo orthography developed in Benin on the basis of the "Practical Orthography of African Languages" (Westermann 1927, [2]1930). The focus marker in the examples is therefore always given as velar nasal. The tone marking is as follows: (´) high tone, (`) low tone, (ˆ) falling tone, (ˡ) downstep.

simple clauses, the focus marker *N* has to be used obligatorily. Example (5) is the answer to the question "Among them, who is not coming quickly?". It is thus representing new information focus on the subject. The focus marker is following the subject and the out-of-focus part of the sentence is identical to a non-focus-marked sentence in the imperfective.

(5) 'Among them, who is not coming quickly?'
ɔ̀nyíḿ ˈŋ́ [m] ˈmɛ́ nɛ́ɛ́ bà mánáḿ.
man FM NEG IPF come quickly
'THE MAN is not coming quickly.'

Whereas there are no changes to the out-of-focus part in the imperfective, as in example (5), the same restrictions as with the first strategy can be observed, i.e. it is not allowed to use the perfective marker *a* and the focus marker in one and the same sentence. Example (6) displays this lack of the perfective marker. It is taken from a discussion about which one of two possible suspects, man or woman, has stolen the watch that is missing. The speaker disagrees with his dialogue partner who claims that the woman has stolen the watch. Thus the context imposes contrastive focus on the subject.

(6) 'THE WOMAN has stolen the watch!'
ɔ̀nyíḿ ˈŋ́ [n] cúú wáácì.
man FM take watch
'THE MAN has taken the watch.'

Furthermore, focusing the subject with the use of the focus marker *N* is generally not possible in the future tense and demands a different structure (cf. 2.1.3.).

In example (7), the speaker is disagreeing to the claim that a third person has eaten the beans and is correcting it such that it becomes clear that the speaker himself ate the beans. If the focused subject is realized as pronoun, this is always done so in its emphatic form.

(7) ‘HE ate the beans.’
ààyí, mí ˈŋ́ [ŋ] wî.
no, 1sg.emph FM eat
‘No, it’s me who has eaten (them).’

Additionally, the same construction with focus marker *N* is used to mark sentence focus as well. Consider example (8) which is the answer to the question “What happened?”. It is therefore a case of all-focus sentence. The same kind of marking also occurs in text initial sentences, cf. (9).

(8) ‘What happened?’
mí lɔ́ɔ́lɪ̂ ŋ́ [ɲ] nyáńdâ.
1sg.poss car FM break
‘MY CAR BROKE DOWN.’

(9) ɔ́bíˈlɛ́ɛ́ ˈɔ́kú ˈŋ́ [n] cínâ, mʊ̀ wʊ̀lɪ̂ ɔ́pî.
old.man INDEF FM stay, 3sg alone house
‘Once there was an old man, he lived alone in his house.’

As the examples show, marking the subject with the focus marker *N* first fulfils the function of expressing all types of focus on the subject, new information focus as well as contrastive focus. Second, it serves to establish sentence focus, for example in text-initial sequences as in (9) above.

2.1.3 Focussing of the sentence-initial element in the future

As I already pointed out, it is not possible to focus the subject using the strategy with focus marker *N* or to focus the non-subject using the ex-situ strategy presented in 2.1.1. Focusing a constituent in future clauses is only possible with a sub-strategy of the latter one, i.e. the focused element has sentence-initial position and is followed by focus marker *nɪ*; additionally, the morpheme *yɛ̀* is introducing the out-of-focus-part of the clause, as is exemplified in (10) for non-subject focus and in (11) for subject focus.

(10) ‘What do you need the bricks for?’
òbóó nì yɛ̀ á ˈpɔ́lí là.
hut FM COMPL 1pl.FUT construct PREP
‘For the HUT we are going to build.’

(11) ‘It’s the man who will eat the yams.’
ɔ̀cíúḿ nì yɛ̀ ɔ́ ˈwí ˈkújóò.
woman FM COMPL 3sg.FUT eat yams
‘It’s the WOMAN who will eat the yams.’

In non-focal contexts, this additional morpheme *yɛ̀* can best be analyzed as some sort of conjunction or complementizer. It can be found following verba dicendi et sentendi (12), as such introducing complement clauses. It is also present in clauses expressing an intention (13) or in relative clauses in the future (14).

(12) ‘What did she say?’
ɔ́ káŋ̀ yɛ̀ bàá kùù kúyúù
3sg say COMPL 3pl.PF cut tree
‘She said that they cut a tree.’

(13) ɔ́ dɛ́ támáà yɛ̀ ɔ́ kùù ìnúḿ.
3sg have intention COMPL 3sg.FUT cut meat
‘He is going to cut the meat.’

(14) ɔ̀cíúḿ máŋ yɛ̀ ɔ́ ˈwí ˈkújóò, ...
woman REL COMPL 3sg.FUT eat yams
‘The woman who will eat the yams ...’

From these examples, one can probably conclude that the core meaning of *yɛ̀* is to introduce sentences expressing events the realization of which is intentional and somehow uncertain.

But *yɛ̀* is not part of simple clauses in the future. These clauses are built with the future auxiliary which is realized after nominal subjects as *i* with high tone, and is in case of a pronominal subject only expressed by a high tone on the pronoun (15).

(15) ɔcíúḿ ˈí wí ˈkújóò. ɔ́ ˈwí ˈkújóò.
woman FUT eat yams 3sg.FUT eat yams
'The woman will eat yams.' 'She will eat yams.'

But why can *yè* not be dropped in focus constructions in the future? I will come to this point in section 3.

To conclude, this structure of a focused sentence-initial element followed by the focus marker *nɪ* and an additional complementizer serves to express focus on the subject and non-subject in future tense clauses, regardless of the type of focus which is expressed.

2.1.4 Focused element + *gɛ́*

The elliptic structure with a morpheme *gɛ́* following the focused element (be it a noun phrase or a whole sentence) is used to express all kinds of focus irrespectively of pragmatic subtypes or scope. As far as I can see, it occurs in complementary distribution with the focus marker *N* or *nɪ.*

Thus, example (16) is an alternative to example (4), the reaction to the statement "HE ate the beans." in contrasting the two possible referents, namely a third person and the speaker himself.

(16) 'HE ate the beans.'
ààyí, míí gɛ́. (cf. 4)
no, 1sg.emph PRED
'No, it's ME.'

In example (17), a possible answer to the question "Would you rather like the black or the white clothes?" is produced where the selected object, or only part of it, is marked with *gɛ́*.

(17) 'Would you rather like the black or the white clothes?'
(àtɔ́kɛ́ɛ́) áfúˈúló gɛ́.
(clothes) white PRED
'It's the WHITE (ones).'

The scope of *gɛ́* can be the whole of the sentence as in the answer to the question "What happened?" seen in example (18). This structure is ambiguous insofar as the answer could also possibly well be given in reply to a question about the verb, like "What did they do?", which according to my data is the preferred structure for verb focus.

(18) 'What happened?'
bàá yúúlɪ́ ˈmí sàǹdɛ̀ɛ́ gɛ́.
3sg.PF steal 1sg.poss sheep PRED
'THEY HAVE STOLEN MY SHEEP.' ~ 'They HAVE STOLEN MY SHEEP.'

I have analyzed *gɛ́* here as predicator, i.e. as copula-like element, because it can also be found in an identifying context, as for instance as reply to the question "What's that over there?" (19).

(19) 'What's that over there?'
òbóó gɛ́.
house PRED
'It's a house.'

In such a context, the use of *gɛ́* is obligatory, it cannot be dropped. But in the focus examples just presented, its use is optional. It is also quite common to reply to a question for the object, like in (17), in a very short form, only mentioning the object which was asked for. *gɛ́* can therefore not be seen as genuine focus marker but rather as element which further emphasizes the element in question.

2.2 Unmarked focus

Apart from the marked constructions above, there are cases where neither syntactic nor morphological nor phonological means[5] are employed to express focus. This is above all the case with non-subject focus, especially if new information focus is concerned. The structure is ambiguous insofar as it serves to express focus in dependence to the context either on the object/adjunct or on the whole predicate, i.e. the verb plus complement. But also focus on the whole sentence does not need to be marked by postposing the focus marker to the subject (as is shown in example (5)) and is not even allowed in case of underspecified subjects (18) or future events. Finally, the unmarked strategy is the preferred one in order to focus the predicate.

While the object wh-phrase has to be placed *ex-situ* (cf. (3a)), the object phrase in the corresponding answer can be both *in-situ* and *ex-situ*, cf. (20) vs. (4) as two possible replies to the question "Where did the woman go?". The fact that in Foodo complements which represent new information do not have to be fronted but may stay in their canonical position fits well into the picture obtained for other SVO languages investigated in our project (i.e. Gur and Kwa languages) where the postverbal position is the default (non-subject) focus position.

(20) 'Where did the woman go?'

ɔ́ɔ́	náá	túúlé.		cf. (4)	túúlé	nɪ̀	ɔ̀	náá.
3sg.PF	go	Europe			Europe	FM	3sg	go

'She went to EUROPE.'

Apart from this, sentence focus can be unmarked as well, e.g. as a reply to the question "What will happen?" as shown in example (21). An answer to questions about possible events in the future is always unmarked in my restricted data, what could have to do with the special restrictions for focusing in

[5] As far as I know until now, prosodic means alone do not play any role in focus marking in Foodo. Nevertheless, this is still a matter of future research.

future clauses. This can be accounted for by defining the events whose actual occurrence is not sure or dubitable.

(21) ‘What will happen?’
kpídéé ˈí yíláá ˈdúfɔ́lí.
dog FUT catch boy
‘THE DOG WILL CATCH THE BOY.’

When the subject of a sentence is a non-referential, expletive expression, as in (22), the focus can not be realized with the usual subject focus construction but stays either unmarked or is marked with *gɛ́* which serves to additionally emphasize the focused element, here the whole sentence. In all of these unmarked cases, the interpretation of the sentence is determined only by the context.

(22) ‘What happened?’
bàá kúlíí ˈóbéè.
3pl.PF give_birth child
‘A CHILD HAS BEEN BORN.’

Also, expressions with focus on the verb (23) or the auxiliary (24) do not have to be marked, as the examples show, and are in most cases not marked at all according to my data. (23) is a reply to the question “What did Gbanaa do?”, (24) on the other hand is contrasting the statement that the beating will happen in the future by stating that it has already happened.

(23) ‘What did Gbanaa do?’
Gbáˈnáá à sɔ̀ɔ̀ mótô.
Gbanaa PF buy motorbike
‘Gbanaa HAS BOUGHT A MOTORBIKE.’[6]

[6] The context of elicitation is quite unclear concerning the question whether contrast is involved in this structure or not.

(24) ‘The woman hit the boy.’
ààýí, ɔ́ bɛ̀ɛ́ ˈdá ʊ̀ŋ̀.
no, 3sg FUT hit 3sg.OBJ
‘No, she WILL hit him.’ (focus on auxiliary)

3 Analysis

To sum up, I would like to address the focus markers *N* and *nɪ* and their exceptional deviation in the perfective I have mentioned before. In Foodo two homophones exist in addition to the focus marker *nɪ*. First, *nɪ* is a sentence connecting conjunction, and second, it is used as a predicator comparable to *gɛ́* but with the meaning of “here is”, i.e. with an additional deictic component in its meaning.

I would like to concentrate on the usage of *nɪ* [7] as a conjunction. In example (25) – again taken from a discussion about a stolen watch – the act of coming is connected with the act of taking the watch forming a sequence of events. Both actions are perceived as being finished and real, which is the same case as in example (26) where the act of coming and the act of eating are marked in the perfective as two consecutive actions. In both sentences, the second clause displays the same deviation from the “normal” perfective form (which is instantiated in the first part of sentence (26)) as we can observe in marked focus constructions (cf. example (25)). The perfective in simple clauses is built up using a perfective morpheme *a-* preposed to the verb (cf. example (1) and (23)). In case of pronominal subjects, this morpheme gets assimilated to the pronoun that precedes it in terms of its vocal quality, *ɔ̀ɔ́* in example (26). In the second part of the coordinated sentences (25) and (26) – i. e. after the conjunction *nɪ*, the perfective is not marked again but the subject has to be indicated to show subject identity or non-identity[8] with the one in the first part of the sentence. Using the conjunction *nɪ* is constrained to the contexts shown in the examples

[7] The tone of the conjunction behaves similarly to that of the focus marker, i.e. it is polar to what precedes it when there is no pause before the conjunction. When there is a pause before it, the tone is always high.

[8] In case of different subjects, a special demonstrative pronoun is used.

above, i.e. sequences of real, finished actions in the indicative. It cannot possibly be used with non-finished or unreal actions where another conjunction, namely *là* has to be used (27).

(25) ɔcíɪ́ḿ ˈŋ́ [m] bá nì ɔ cúú wáácì.
woman FM come CNJ 3sg take watch
'THE WOMAN came and took the watch.'

(26) ɔ́ɔ́ bà ní ò ɲı̀ bìlɪ̀jáà.
3sg.PF come CNJ 3sg eat dough
'He came and ate the dough.' (Plunkett 2005: 1)

(27) ɔ́ bà là ɔ́ ɲı̀ bìlɪ̀jáà.
3sg.FUT come CNJ 3sg.FUT eat dough
'He will come and eat the dough.' (Plunkett 2005: 2)

* ɔ́ bà ní ɔ́ ɲı̀ bìlɪ̀jáà.

As I have shown, the same restrictions for marking the perfective after the conjunction *ní* apply to the marked focusing strategies with focus marker *N* or *nɪ*. Idrissou Seriki in her description of the Foodo verbal system thus concludes that the focus marker *N*[9] and the predicative marker of the perfective are mutually exclusive. (1993:33)

This is pointing towards the conclusion that the similarity between focus marker and (sequential) conjunction in the perfective *nɪ* is not just a homophonic occurrence but rather that the conjunction as well as the entire sequential structure is a possible source for the development of marked focus structures in Foodo, as Anne Schwarz and I have shown to be the case for other languages such as the Kwa languages Ewe, Akan and Lelemi, and the Gur languages Buli and Dagbani (Fiedler & Schwarz 2005; Fiedler & Schwarz, to appear).

[9] Idrissou Seriki only mentions this mutual exclusion for the focus marker *N*, but regarding her examples, the same exclusion can be seen for *nɪ*.

This analysis that the focus marker could be developed out of the conjunction is further supported by Hansford (1990) who describes the morpheme *ne* which follows the focused constituent in Chumburung, a closely related Guang language, as a "clause introducer" (1990: 88).

The uniform behavior of *N* and *nɪ* concerning the perfective and the fact that subjects and non-subjects of sentences in the future demand the focus marker *nɪ* both suggest tracing back both focus markers to the same morpheme, namely *nɪ*. The form *N* that is used for subject focus therefore represents a grammaticalized, reduced form of *nɪ* whereby the exact conditions for this reduction of the focus marker in the subject focus case have to remain unclear for the moment.

Tracing back both focus markers to the conjunction *nɪ* and perhaps to the whole sequential construction also means that we analyze the focus constructions in Foodo as bisected structures, the first part of the sentence represented by the focused element and the second part introduced by the conjunction. As this conjunction is only allowed in the perfective (in imperfective clauses no such conjunction seems to be used) and is excluded from sequences of events in the future (conjunction *là*), it cannot occur in focus constructions expressing future events. But because of already being grammaticalized into a focus marker, *nɪ* has to be used in this function as morphological focusing device in the future as well. On the other hand, it cannot fulfill the function of a sentence conjunction here; it is a mere focus marker. In order to maintain the bisected structure it is therefore necessary to include another sentence conjunction or complementizer. For this, *yɛ̀* is a good candidate because of its inherent meaning of introducing clauses expressing intentional und uncertain events.

4 Conclusion

The findings in Foodo assert the observations in different Gur and Kwa languages we made in our project "Focus in Gur and Kwa languages". First, this concerns the fact that focus in Foodo does not have to be marked. If it is marked,

then it is expressed by syntactic as well as morphological means. The focus markers *N* and *nɪ* as well as the fact that subject focus in contrast to non-subject focus has to be marked obligatorily, manifest a subject/non-subject-asymmetry. The fact that the same construction can be used to express subject as well as sentence focus including stage setting is an interesting observation because this feature is constitutive to Gur languages of the Oti-Volta branch which we have so far been working on. It has been observed among the Kwa languages only in Lelemi, a Ghana-Togo-Mountain language while it seems to be less viable in Akan and Gbe.

References

Bearth, Thomas. 1999. The contribution of African linguistics towards a general theory of focus. Update and critical review. *Journal of African Languages and Linguistics* 20:121-156.

Dik, Simon. 1997. *The theory of functional grammar I. The Structure of the Clause*.vol. 1: Functional Grammar Series 20. Berlin: Mouton de Gruyter.

Fiedler, Ines, Reineke, Brigitte, and Schwarz, Anne. 2005. Let's focus it: Fokus in Gur- und Kwasprachen. In *Sprach- und literaturwissenschaftliche Beiträge zum 16. Afrikanistentag*, ed. Gerald Heusing, 31-54. Hamburg: LIT Verlag.

Fiedler, Ines, and Schwarz, Anne. 2005. Focus constructions and relative clauses. In *Interdisciplinary Studies on Information Structure 3*, eds. Shinichiro Ishihara, Michaela Schmitz and Anne Schwarz, 111-142. Potsdam: Potsdam University.

Fiedler, Ines, and Schwarz, Anne. to appear. Focus or narrative Construction? In *Focus strategies in Niger-Congo and Afroasiatic - On the interaction of focus and grammar in some African languages*, eds. Enoch Aboh, Katharina Hartmann and Malte Zimmermann. Berlin: de Gruyter.

Gordon, Raymond G., Jr. (ed.). 2005. Ethnologue: Languages of the World, Fifteenth edition. Dallas, Tex.: SIL International. Online version: http://www.ethnologue.com/.

Hansford, Keir Lewis. 1990. *A grammar of Chumburung. A structure-function hierarchical description of the syntax of a Ghanaian language*, School of Oriental and African studies (Dept. of Phonetics of linguistics), University of London: PhD thesis. 83-98.

Gundel, Jeanette K. 1988. Universals of topic-comment structure. In *Studies in Syntactic Typology*, eds. M. Hammond, E. A. Moravcsik and J. R. Wirth, 209-239. Amsterdam: J. Benjamins.

Idrissou Seriki, Lékiatou. 1993. *Le système verbal du foodo*, Département d'Etudes Linguistiques et de Traditions Orales, Mémoire de maîtrise en linguistique, Université Nationale du Benin.

Lambrecht, Knud. 1994. *Information structure and sentence form. Topic, focus, and the mental representations of discourse referents*. Cambridge: Cambridge University Press.

Plunkett, Gray C. 1991. *The tone system of Foodo nouns*, Dep. of Linguistics, University of North Dakota: M.A. thesis.

Plunkett, Gray C. 1997. *Foodo: Les classes nominales.* Ms.

Plunkett, Gray C. 1997. *Foodo: Pronoms.* Ms.

Plunkett, Gray C. 1998. *La structure de l'imperatif et de l'injonctif en Foodo.* Ms.

Plunkett, Gray C. 2005. *Foodo: Questionnaire des verbes*. Ms.

Plunkett, Gray C. 2005. *Foodo: Lexicon.db*. Toolbox-Datei.

Plunkett, Gray C. 2006. An overview of the tone system of Foodo and its implications for a standard orthography. Paper presented at *International Workshop on the description and documentation of the Ghana-Togo-Mountain Languages*, Bishop Konings Social Centre, Ho, Ghana.

Sasse, Hans-Jürgen. 1987. The thetic/categorial distinction revisited. *Linguistics* 25:511-580.

Sasse, Hans-Jürgen. 1995. "Theticity" and VS order: a case study. *Sprachtypologie und Universalienforschung* 48:3-31.

Snider, Keith L. 1990. *Studies in Guang phonology*. Rijksuniversiteit te Leiden: PhD thesis.

Skopeteas, S., Fiedler, I., Hellmuth, S., Schwarz, A., Stoel, R., Fanselow, G., Féry, C. & Krifka, M. 2006. *Questionnaire on information structure (QUIS)*. In Interdisciplinary Studies on Information Structure 4. Working Papers of the SFB 632. Universität Potsdam.

Westermann, Diedrich. ^{2}1930. Practical orthography of African languages. *Memorandum 1. International Institute of African Languages and Cultures*. London.

Abbreviations

CNJ	conjunction
COMPL	complementizer
DEM	demonstrative pronoun
emph	emphatic pronoun
FM	focus marker
FUT	future
INDEF	indefinit
INF	infinitive
IPF	imperfective
NEG	negation
OBJ	object
PF	perfective
pl	plural
poss	possessive pronoun
PRED	predicator
PREP	pre-/postposition
REL	relative pronoun
SF	subject focus
sg	singular
SUB	subordinator / complementizer

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The Particles *lé* and *lá* in the Grammar of Konkomba

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The paper investigates focus marking devices in the scarcely documented North-Ghanaian Gur language Konkomba. The two particles *lé* and *lá* occur under specific focus conditions and are therefore regarded as focus markers in the sparse literature. Comparing the distribution and obligatoriness of both alleged focus markers however, I show that one of the particles, *lé,* is better analyzed as a connective particle, i.e. as a syntactic rather than as a genuine pragmatic marker, and that comparable syntactic focus marking strategies for sentence-initial constituents are also known from related languages.

Keywords: morphological focus marking, syntactic focus marking, conjunction, topic-comment, Konkomba

0 Preliminaries

This paper discusses the divergent status of the two particles *lé* and *lá* in the grammar of Konkomba. The interest in the language and these two particles arose in the course of a broader investigation into focus in several Gur and Kwa languages and the question that came up soon after the first exploration into focus in Konkomba[1] was: How many focus markers are there in Konkomba? Previous studies claim that there are two focus markers, *lá* and *lé*. I am going to argue that only Konkomba's particle *lá* should be analyzed as focus marker

[1] I am very grateful to my language assistant Kpaamu Samson Buwor for his interest and cooperation in this research as well as to the DFG which made the investigation into Konkomba financially possible. This paper was initially presented at the 38th Annual Conference on African Linguistics at the University of Florida, March 22-25, 2007 and was reviewed by Ines Fiedler and Svetlana Petrova whom I would also like to thank here for their comments.

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whereas the use of particle *lé* is due to a bisected syntactic configuration which is required under specific focus conditions.

The paper is structured as follows: Section 1 gives a brief survey on the geography, speakers, genetic affiliation and linguistic documentation of Konkomba and introduces some basic linguistic properties of the language. Section 2 raises the question whether and why Konkomba should need two focus markers. Section 3 concerns the distribution and analysis of the particle *lá* and section 4 that of the particle *lé.* Section 5 reanalyzes the latter and section 6 concludes with some indications where the focus system of Konkomba meets and where it diverges from that of related languages.

1 The Language

Konkomba (language code ISO 639-3: xon) is spoken by about 500,000 speakers (2003) in the North-Eastern parts of Ghana (also scattered throughout North Central Ghana) and by approximately 50,100 speakers in Northern Togo (cf. Gordon 2005). Konkomba, of which the self domination is *lɪkpakpaa ~ lɪkpakpalɪn* is highly split into several clan dialects. Genetically, the language is classified as one of the Gurma subgroup within the Oti-Volta branch of the North Central Gur languages (Manessy 1979, Naden 1989).

Linguistic documentation of Konkomba is extremely scarce, as shown by the following short list. It includes all academic linguistic works on the language I am aware of among which the starred forms could not be consulted for this paper.

Abbott, Mary and Mary Steele. n.d. [1973]. *An introduction to learning Likpakpaln (Konkomba)*. Tamale: Institute of Linguistics.

*Langdon, Margaret A. 1997. The place of mother tongue literacy in social development in three African contexts. *Notes on Literacy* 23(4): 1-44.

Langdon, Margaret A., Mary Steele, and others, compilers. 1981. *Konkomba-English (Likaln-Likpakpaln) dictionary.* Tamale: Ghana Institute of Linguistics.

*Ring, J. Andrew. 1991. Three case studies involving dialect standardization strategies in northern Ghana. In Gloria E. Kindell (ed.), *Proceedings of the Summer Institute of Linguistics International Language Assessment Conference,* Horsleys Green, 23-31 May 1989, 281-87. Dallas: Summer Institute of Linguistics.

*Steele, Mary and Gretchen Weed. 1967. Collected field reports on the phonology of Konkomba. Collected Language Notes, 3. Accra: Institute of African Studies, University of Ghana.

Steele, Mary. 1977 [pr. 1976]. Konkomba Data Sheet. In West African Language Data Sheets, ed. M. E. Kropp Dakubu, 358-364: West African Linguistic Society.

*Steele, Mary. 1991. Translating the tetragrammaton YHWH in Konkomba. *Notes on Translation* 11(4): 28-31.

Tait, David. 1954. Konkomba Nominal Classes. Africa: Journal of the International African Institute 24:130-148.

The language data for the focus investigation were elicited by me with a Konkomba speaker from Saboba (Likpakpaa dialect) in Northern Ghana during two short field stays in 2006. Comparison between available and my new data indicates a high degree of (sub-)dialectal variation. To summarize, the general as well as my personal knowledge about basic grammatical properties of Konkomba is rather small and the need for basic grammatical research is still very high, as it also emerges from the brief sketch concerning phonological, morphological and syntactic features of the language in the following subsections.

1.1 Tone system

While it is clear that Konkomba *is* a tone language, further information about its features is urgently required, and tone is omitted in most works, only the learning material by Abbott & Steele (1973) represents a partial exception. Tone is occasionally marked there by recognizing the level tones High, Mid, Low, and a downstepped High. It is thus not excluded that Konkomba has in fact three tonemes (High, Mid, Low), although in Steele's contribution to the Data Sheets (1977) only the two level tones High and Low and a Downstep are reported. I am not aware of any "minimal triplet" so far, so that in example (1), only a minimal pair for the lexical function of High and Low tone is given.

(1) *úpíí* 'woman' vs. *úpìì* 'sheep (sg.)'

For the moment, my tone transcription should be regarded with caution, since it is just based on the auditory impression while the general principles and rules concerning tone have not yet been systematically worked out.

1.2 Vowel system

A similar research need as for tone concerns the vowel system: Most sources[2] list six short and six corresponding long oral vowels (cf. 2), among which especially the front vowels seem to be subject to heavy centralization and some of the long vowels seem to be subject to diphthongization (/ɔɔ/ = [^{w}a]). In Tait's publication on the noun classes (1954), symbols for nine short vowels are used (as indicated in brackets in 2).

(2) /i, e, a, ɔ, o, u/ + length, including diphthongization, e.g. /ɔɔ/ = [^{w}a]
(i, ɪ, e, ɛ, ə, a, ɔ, o, u)

[2] Abbott & Steele 1973, Langdon & Steele et al. 1981, Steele 1977

It is not clear how appropriate the six vowel system actually is and whether there is vowel harmony in ATR or Height operating as known from related languages.

1.3 Word order

Rather uncontroversial are general syntactic properties of the language, which resemble those in related languages of the Gurma subgroup and the wider Oti-Volta branch: The basic word order is SVO which in Konkomba is maintained across different clause types, polarity, and with lexical as well as with pronominal arguments.

(3) mń bà ú-bɔ̀.
1sg want CL-dog
I want a dog. SVO

(4) kí-!díí-kpóò wɔ̀.
CL-house-old.CL? collapse
The old house collapsed. SV

Most modifiers follow their nominal head, but associative constructions are head-final and the language has postpositions.

1.4 Noun class system

As most other Gur languages, Konkomba has maintained an inherited noun class system in which gender is established by concord affixes and overtly expressed by affixes on the categorized noun, too. Concord occurs among others with demonstratives (example 5), the specifying interrogative ‘which’, and some numerals. Pronominal forms in different syntactic functions agree with their antecedent’s gender.

(5)

ú-já	**w**-ɛ̀	‘that man’
bú-sù	**bw**-ɛ́	‘that tree’
ń-dààm	**mw**-ɛ́	‘that drink’
lí-ké!ké-**r**	**l**-ɛ́	‘that cloth’

As is also known from other languages especially of the Gurma group, Konkomba displays ambilateral nominal affixes, i.e. nouns often contain class prefixes and suffixes at the same time. Comparing both affix types, the prefixes show up as the newer class exponents, while most of the suffixes are subject to heavy erosion.

(6)

ú-já / **bí**-já-**b**	‘man, male’
lí-díchà-**r** / **ŋ́í**-díchɛ̀	‘compound, building’
bú-sù / **í**-swì-**ì**	‘tree’
ń-ɲì / -	‘water’
lɔ́ɔ̀ / lɔ́ɔ́-**tìì**	‘car’ (< English ‘lorry’)

The class prefixes of nouns elide in certain contexts, first of all at the head in an associative construction, where its stem is preceded by the possessor and the possessive morpheme *aa*-.

(7) **lí-**díchà-r
CL-compound-CL
‘a/the compound’

tí-m **àà-**díchà-r
1pl-DJ POSS-compound-CL
'our[3] compound'

ú-já **áá-**díchà-r
CL-man POSS-compound-CL
'the man's compound'

In certain inalienable associative constructions (cf. example 8b), neither the possessive morpheme *aa-* nor a disjunctive possessive pronoun may be used.

(8) a. **w-áá-**!táádà-r
3sg-POSS-trousers-CL
'his trousers' alienable

b. **ú-**!dó not: *w-áá-!dó
3sg-house
'his house' inalienable

1.5 Verb system

Konkomba has an aspectually based verb system partly marked by verb suffixes, as is often found in Gur languages. There is a very short description of verb classes displaying suffix differences between perfective and imperfective in the dictionary (Langdon & Breeze 1981: 9).

[3] Some pronominal possessors (1/2 pl) seem to be constituted by a disjunctive, "emphatic" form.

(9)	Perfective	Imperfective	
	ŋar	ŋar	‘sweep’
	ŋa	ŋaa-**ni**	‘do, prepare, cook’
	ji-**n**	ji	‘eat’

Also familiar from other Gur languages is the use of preverbal means to express several tense-aspect-modality-polarity features beyond the perfective / imperfective distinction.

(10) ù **bí** !fín-ní wááwàì.
3sg be.LOC wash-IPF things
‘He is washing things.’

2 Two Focus Markers?

The primary aim of my research into Konkomba was to get a first insight into its focus system. The investigation of focus is not necessarily restricted to identifying marked focus constructions. I rather regard focus as a semantico-pragmatic notion irrespective of its potential or requirements for overt marking. In this respect, I follow the functional definition of focus given by Dik, according to whom “The focal information in a linguistic expression is that information which is relatively the most important or salient in the given communicative setting, and considered by S[peaker, A.S.] to be most essential for A[ddressee, A.S.] to integrate into his pragmatic information.” (Dik 1997: 326). This general notion of focus includes two major subtypes, namely *assertive focus,* also known as *information focus* or *completive focus,* on the one hand, and *contrastive focus* on the other hand, adapting Hyman & Watters (1984). For the elicitation of utterances and short texts which allow the focus identification, I mainly used the Questionnaire on Information Structure (QUIS, cf. Skopeteas et

al. 2006) which was developed within our Research Group (SFB 632) and included some additional language-specific elicitation tasks.

It is known that the particles *lé* and *lá* in Konkomba provide important clues for the addressee's pragmatic interpretation of the utterance. Accordingly, the particles are labelled as "focus markers" in the Konkomba-English dictionary by Langdon et al. (1981: 43). Two examples provided in the dictionary are given in (11a) and (12a). As the examples show, both particles follow the focal constituent of the sentence. My own data elicitation confirmed this result, cf. (11b) and (12b). In the context of an information question, the focal status of a postverbal constituent or of the sentence-initial subject respectively is reflected by the postposed particle *lá* or *lé*.

(11) a. m cha kinyaŋ ni **la**.
1sg go market at LA
'It's the MARKET that I am going to.' (Langdon et al. 1981: 43)

b. Context: What did she eat?
ù ŋmán !ŋítùùn **lá**.
CL chew beans LA
'She ate BEANS.'

→ *characteristic for complement focus (object, adjunct):* SVO/A *lá*

(12) a. min **le** ban nnyɔk.
1sg.DJ LE want medicine
'It is I who want medicine.' (Langdon et al. 1981: 43)

b. Context: Who ate the beans?
ú-pí wɛ̀ (**lé**) ŋmàn.
CL-woman DEM LE chew
'THIS WOMAN ate them.' ~ 'It is THIS WOMAN who ate them.'

→ *characteristic for subject focus:* S (*lé*) V

As indicated by the parentheses for particle *lé* in (12), there is a difference concerning the obligatoriness of the two particles: while *lá* seems to be obligatory under focus conditions, *lé* is optional.

The pragmatic interpretation of the particles as focus markers rather than their grammatical interpretation relies on the fact that neither *lá* nor *lé* are grammatically required *per se*. Hence, sentences lacking one or the other particle, as indicated in (3-4) above, are still well-formed, and only inappropriate in certain contexts.

For the moment we can conclude that at first sight, Konkomba seems to provide two focus markers. In order to evaluate this situation, a closer look at the distribution of these particles is required.

3 Particle *lá*

With respect to the particle *lá* we can make the following observations:

First, *lá* marks focus on any single constituent placed after the verb, be it a verb argument or not. The subject, however, is excluded from this option. The focal constituent is typically found in immediate postverbal positions – though this does not seem to be obligatory – and is followed by clause-final *lá*.

(13) a. Do you want the black cloth or the white cloth?

mí bà lí-pí!píín **!lá**.
1sg want CL-white LA
'I want the WHITE one.'

b. Do you like him or me?

ń gèè sí **lá**.
1sg like 2sg.DJ LA
'I like YOU.'

c. Where did the woman eat?

ù jí !ú-!dó **lá**.
CL eat CL-house LA
'She ate AT HOME.'

d. When did you buy the beans?

ǹ dá-ŋì kpíŋgír !dáá **lá**.
1sg buy-CL "Monday" day LA
'I bought them on MONDAY.'

Second, *lá* is also used to mark focus on a part of a complex constituent, like the possessor in example (14). In this case, the particle does not intervene, but is placed after the complex phrase.

(14) Do you want his or my car?

mí bà w-àà-lɔ́ɔ́ **!lá**.
1sg want CL-POSS-car LA
'I want HIS car.'

Additionally, *lá* is also regarded necessary in certain cases of wide focus, namely when focus comprises not only the postverbal complement but the selecting verb as well. This is the case in example (15) where the foregoing question triggers VP-focus.

(15) a. What did the woman do?

ù ŋmán !ŋí-tùùn **lá**. = example (11)
CL chew CL-beans LA
'She ATE BEANS.'

b. What did you do yesterday?

ń fī dá !símá **lá**.
1sg yesterday buy groundnuts LA
'I BOUGHT GROUNDNUTS yesterday.'

Finally, *lá* also occurs when just the verb of the utterance is in focus.

(16) a. What did they do to the tree?

bí gà-bù **lá**.
CL cut-CL LA
'They CUT it'

b. Where did they buy it?

bì sù **lá**.
CL steal LA
'(But) They STOLE it!'

With respect to verb focus, it has to be noted however, that in certain contexts other particles (like *ya*) are regarded as appropriate while *lá* is not accepted. Such cases need more investigation and have been omitted here.

The particle can also be used in elliptic utterances, as they may occur in answers to a question or in dispute. As example (17a) illustrates, the particle is however not necessary to render the verbless utterance a predication, i.e. it doesn't function as copula or as predicative element. Rather, it seems to add some special emphasis to the meaning conveyed by the focal constituent.

(17) How many houses collapsed?

a. tì-wéé.
CL-many
'MANY.'

b. tì-wéé **lá**.
CL-many LA
'Unnecessarily MANY.'

Since the particle *lá* is not a copula itself, as is reported for some related languages (cf. Reineke, to appear), it can also appear in copular constructions as exemplified in (18). The same example also demonstrates that the particle is typically absent under negation.[4]

[4] Whether it is completely excluded throughout negation has still to be checked.

(18) S1: There are three yams.

S2: nà-á !yé ŋì-tá, nì yé ŋ̲ì-n̲àà̲ **lá**.
CL-NEG COP CL-three CL COP CL-four LA
'It is not three yams, it is FOUR (yams).'

It is important to set the focus marker *lá* apart from similar particles with a rather different function. These are both functioning as interrogatives: one represents a locative interrogative particle with the meaning 'where?' and the other one serves the formation of the specifying interrogative 'which', as shown in (19).

(19) a. ù bí **là**?
CL be.LOC where
'Where is he?'

b. kí-!**lá**-díí wɔ̀ ...?
CL-which-house collapse
'Which house collapsed ...?'

From these observations I conclude that the particle *lá* is indeed best to be analyzed as a focus marker, regardless of its restriction to the postverbal position and of the presence of competing devices in the case of narrow verb focus. The focus marking particle *lá* follows a focal constituent, whether it is new or contrastive focus, whether the focus is quite narrow or whether it is as wide as a complex VP.

4 Particle *lé*

Turning to particle *lé,* the following observations can be obtained:

The particle *lé* always occurs in the preverbal field, which is the immediate preverbal position in case of subject focus, as can be seen in (20). Example (20b) further illustrates that narrow focus on a part of a complex subject phrase is formally not distinguished from focus extending over the whole subject constituent.

(20) a. Who prepared the beans, the woman or the man?

ú-pí **!lé** ŋà.
CL-woman LE prepare
'The WOMAN cooked them.'

b. How many tyres spoilt?

(ŋí-tà) ŋì-lé **lé** pù.
(CL-tyre) CL-two LE spoil
'TWO tyres spoilt.'

The particle *lé* may also be used when a sentence-initial constituent which is *not* the subject represents the focal information, as in example (21a/b). These sentences represent pragmatically more marked variants of the examples (13c) and (13d) above, where the same sentence constituent was focussed in its canonical postverbal position.

(21) a. ú-!dó, **lé** ù jì.
CL-house LE CL eat
'She ate AT HOME.'

b. kpíŋgír !dáá, **lé** ǹ dá !ŋí-tùùn.
"Monday" day LE 1sg buy CL-beans
'I bought them on MONDAY.'

Note however that sentence-initial focus on non-subjects is not just triggered by a WH-question or a simple contradiction, but is subject of further requirements present in the context.

Compared to some other African languages in which the formal realization of information structural categories has been investigated so far, WH-questions and their answers are not regularly formed in the same way in Konkomba. In Konkomba, the particle *lá* does not show up in WH-questions, as focus markers in other African languages typically do. The particle *lé*, on the other hand, does occur with WH-questions, although not obligatorily. Its presence however does not seem to change the meaning of the utterance.

(22) ŋmá (**lé**) !ŋmán !ŋí-tùùn?
who (LE) chew CL-beans
'Who ate the beans?'

Another difference between *lé* and *lá* concerns their behaviour in elliptic constructions. Unlike *lá, lé* is not even *optionally* allowed to be used, as illustrated in example (23b).

(23) Who ate the beans?

a. àjúá **lé** !ŋmán ŋí-tùùn.
Ajua LE chew CL-beans
'AJUA ate the beans.'

b. àjúá. not: *àjúá **lé**.
Ajua
'AJUA'

Restrictions also exist concerning the combination of both particles within one clause. It is not allowed to use both together, as indicated in example (24).

(24) What happened?

ú-pí **!lé** ŋmán ŋí-tùùn. not: *úpí **!lé** ŋmán ŋítùùn **lá**.
CL-woman LE chew CL-beans
'A WOMAN ATE BEANS.'

Multiple occurrences of *lé* on the other hand are allowed within a sentence, although not in a single clause. Furthermore, the co-occurring particles *lé* cannot all be attributed a focus marking function. The sentences in (25) provide examples for such multiple *lé*'*s* in a complex sentence. The first occurrence of *lé* in (25a) follows the focal subject, while the second use of *lé* joins another clause to the preceding one. Here, all conjuncts share the same subject reference, so the subject identity is expressed by *kí* in the last conjunct. In addition, in (25b), *lé* is also used in a case of subject change.

(25) a. ú-pí-nè-kpír **lé** !dá ŋí-tùùn, **lé** !kí ŋàà.
CL-woman-?-old LE buy CL-beans LE SID prepare
'The OLD WOMAN bought the beans and cooked them.'

b. ú-pí-nè-kpír !dá ŋí-tùùn, **lé** !kí ŋàà, **lé** !tí ŋmàn.
CL-woman-?-old buy CL-beans LE SID prepare LE 1pl chew
'The old woman bought beans, cooked them and we ate them.'

Obviously, the second occurrence of *lé* in (25a) is a conjunction that links together two related conjuncts. The same holds for all uses of *lé* in (25b). The conjunction conveys a sequential meaning, in that the actions encoded by the

joined clauses never overlap and imply temporal succession. Unsurprisingly, a corresponding conjunction ‘and, and then’ is also listed in the dictionary.

The question arising here is of course: How justified is it to distinguish between a clause-initial conjunction *lé* and post-focal particle *lé* or how close might they be related?

Structurally, both *lé* occurrences can not be distinguished when the subject of the *lé*-clause has no co-referential expression in the preceding part of the sentence, i.e. when the sentence-initial focus constituent is not the subject, respectively when the subject is changed in the sequential clause. The parallel structures in both cases are illustrated in (26). The focus configuration with a sentence-initial non-subject can therefore be regarded as a bisected construction which always contains a clause boundary before particle *lé*.

(26) NP_i (predicate) # ***lé*** NP_j predicate
(*lé* as clausal conjunction & *lé* after non-subject focus constituent)

When there is co-referential relationship across *lé*, focus construction and sequential clause construction are however structurally different from each other, as illustrated in (27a/b). In sequential environments, the subject identity indicating particle *ki* is required to follow the conjunction *lé* (27a), but after a subject focus constituent, no additional subject indication occurs (27b). Hence, the syntactic configuration between focused subject and non-focal predicate seems different from that between sequential same-subject clauses and it is not clear, whether the subject focus construction should really be regarded as extra-clausal.

(27) a. NP_i predicate # ***lé*** ki_i predicate (*lé* as clausal conjunction)
b. NP #? ***lé*** predicate (*lé* after subject focus constituent)

Despite this lack of congruence, it seems obvious that there is a close structural correspondence between *lé* as a clausal conjunction and as a post-focal particle. In most cases the particle has to be followed by a predicate provided with a subject reference. Such a reference is only missing in those cases where there is no predicate at all preceding particle *lé*, i.e. in the focus subject construction.

I conclude from these observations, that the far-going structural correspondences between particle *lé* occurrences in both functions indicate that there is indeed a close relationship between clausal conjunction and focus marking particle *lé* and that it is only the particle *lé* following a focused *subject* which creates difficulties for the analysis of *lé* as clausal conjunction. Therefore, it remains suspicious whether *lé* really constitutes a genuine second focus marker restricted to focus constituents in sentence-initial position, i.e. a place where it is always followed by more verbal information. I propose to analyze particle *lé* better as a connective particle that is used to link a clause to the previous context – whether focal or not – rather than regarding it as a focus marker. Hence, particle *lé* occurs in *syntactic* focus marking configurations, in which the focus constituent is in sentence-initial position rather than somewhere near the verbal predicate in non-initial position.

5 Reanalysis

We have seen that focal information in Konkomba is often morphologically indicated, using particles *lé* and *lá.* Within a simple sentence, these particles exclude each other and their complementary distribution is determined by the position of the focal information within the sentence: *lé* occurs only when sentence-initial information is in focus while *lá* occurs elsewhere, as sketched in (28a/b).

(28)	a.	sentence-initial focus constituent:	S *lé* V (O)
			O *lé* S V
		(focal subject or other)	→ connective particle
	b.	non-sentence-initial focus constituent:	S V (O) *lá*
		(never focal subject)	→ focus marker

It has been proposed here to analyze only particle *lá* as genuine focus marker and particle *lé* rather as a connective particle which is not even obligatory in sentence-initial focalization. We have also seen that focus marker *lá* is regularly applied under the respective focus conditions, but doesn't occur in WH-questions and that it is quite ambiguous as to the scope of focus which can be narrow or as wide as a complex VP. The assumed connective particle *lé,* on the other hand, represents a marked choice which can be applied in WH-questions but which is not obligatory.

As the dichotomy between sentence-initial and non-sentence-initial focus constituents in the focus marking system in Konkomba is independent from the syntactic function the focus constituent plays in the sentence, another basis for the opposition of the two focus strategies (applying either *lé* or *lá*) is required. It is widely accepted and it has been motivated by cognitive or syntactic performance principles that the sentence-initial position is preferred for topical information (Gundel 1988, Givón 1988, Primus 1993 among others) and that the pragmatic topic function can be carried out to divergent degree by the subject of a sentence (Li & Thompson 1976 among others). Konkomba can be regarded to have the same preference for a sentence-initially placed topic, about which something is commented in the following predicate. In the unmarked case, the subject takes over the function of the sentence topic about which the rest of the sentence comments. The topical subject is often provided by material that is treated as presupposed and shared by the discourse participants, while unshared,

new or even controversial information is supplied in connection with the predicate. Hence, the predicate commenting about a topical subject represents the basic domain for focus.

(29a) illustrates the assumption that in Konkomba, focus marker *lá* seems to signal the fact that the focal information is part of the comment, while it may remain ambiguous whether the focal information comprises the verb, a post-verbal complement or all together. Particle *lé* on the other hand (29b) signals the absence of a topic-comment structure based on a a topical subject. In these deviating configurations, the sentence-initial constituent is in the realm of focus which can even expand over the whole sentence. The predicate is linked to the sentence-initial constituent with the help of the connective particle *lé*.

(29) a. [S] **topic** [V (O) *lá*] **comment = focus domain**

b. [X] **focus** *lé* (S) V (O)
[X *lé* (S) V (O)] **focus**

What appears as subject/non-subject asymmetry in the focus marking of sentence constituents in Konkomba – namely the use of connective particle *lé* but not of *lá* with focal subjects versus focal non-subjects – is according to the hypothesis in (29) just a consequence of the fact that in Konkomba the subject is restricted to the preferred sentence-initial topic position and is excluded from the comment where focus marker *lá* could apply (ruling out a configuration with sentence-final focal subject: *V(O)[S]$_{\text{focus}}$ *lá*).

6 Comparative Remarks

Comparing the findings in Konkomba with the focus systems of some related Gur languages of the Oti-Volta group, we face several parallels, but also

appealing differences to be pursued in future research. Two aspects shall be mentioned here:

First, Konkomba provides a focus marking morpheme with a structure identical to that of *lá* which is widely attested among its relatives. Several Oti-Volta languages have a particle with a similar function and some parallel, but not identical restrictions, among them Dagbani (Olawsky 1999), Gurene (Dakubu 2000), Dagaare (Bodomo 2000), Yom (Fiedler 2006) and others. Interestingly, the position of the focus marker with respect to postverbal focus constituents differs, in that the focus marker must precede, rather than follow it in part of the languages. Furthermore, the distribution of the assumed cognate focus marker may differ among the languages with respect to its use under negation or in WH-questions.

Second, several related languages of the Oti-Volta group display a subject/non-subject asymmetry with respect to sentence-initial focus constituents similar to the one we found in Konkomba, and they also require a special focus marking device for the sentence-initial focal subject. Interestingly, however, sentence-initial subject and non-subject constituents are often treated less homogenously than they are in Konkomba, as demonstrated in (30). This table displays the particles in Buli and Dagbani which follow sentence-initial focus constituents.

(30)

Focus on sentence-initial: Followed by particle:	Subject	Non-subject
Konkomba	*lé*	*lé*
Buli	*lē*	*lē, tè*
Dagbani	*N*	*kà*

Interestingly, while these particles have a special distribution in Buli and Dagbani in the sense that they differentiate stronger between subject and non-

subject than in Konkomba, I have shown that they are also better analyzed as syntactic rather than as pragmatic markers (Fiedler & Schwarz 2005). They indicate sub- or coordination in the language and are *also* applied in syntactically derived focus configurations. Like *lé* in Konkomba, the nature of these particles following sentence-initial focus constituents is primarily a syntactic one and is not simply restricted to the function of focus marking.

Abbreviations in Glosses

CL	class
COP	copula
DEM	demonstrative
DJ	disjunctive pronoun
NEG	negative marker
POSS	possessive marker
SID	subject identity

References (others than those listed in section 1)

Bodomo, Adams B. 2000. *Dàgáárè*. (Languages of the world / Materials 165). Lincom Europa: München.

Dakubu, M. E. Kropp. 2000. The Particle la in Gurene. *Gur Papers / Cahiers Voltaïques* 5:59-65.

Dik, Simon. 1997. *The theory of functional grammar I. The Structure of the Clause*.vol. 1: Functional Grammar Series 20. Berlin: Mouton de Gruyter.

Fiedler, Ines & Anne Schwarz. 2005. Out-of-focus Encoding in Gur and Kwa. In Ishihara, Shinichiro, Schmitz, Michaela & Anne Schwarz (eds.). *Interdisciplinary Studies on Information Structure 3*. 111-142. Potsdam: Potsdam University.

Fiedler, Ines. 2006. Focus Expressions in Yom. *Cahiers Voltaïque/Gur Papers 7: 112-121*.

Givón, Talmy. 1988. The pragmatics of word order: predictability, importance, and attention. In *Studies in syntactic typology*, eds. Michael Hammond, Edith A. Moravcsik and Jessica R. Wirth, 243-285. Amsterdam.

Gordon, Raymond G., Jr. (ed.), 2005. *Ethnologue: Languages of the World,* Fifteenth edition. Dallas, Texas: SIL International. Online Version: http://www.ethnologue.com/**.**

Gundel, Jeanette K. 1988. Universals of topic-comment structure. In *Studies in Syntactic Typology*, eds. M. Hammond, E. A. Moravcsik and J. R. Wirth, 209-239. Amsterdam: J. Benjamins.

Hyman, Larry M., and Watters, John R. 1984. Auxiliary focus. *Studies in African Linguistics, Supplement* 15:233-273.

Li, Charles N., and Thompson, Sandra A. 1976. Subject and Topic: A New Typology of Language. In *Subject and topic*, ed. Charles N. Li, 457-489. New York/San Francisco/London: Academic Press.

Manessy, Gabriel. 1979. *Contribution à la classification généalogique des langues voltaiques*. Paris: Centre National de la Recherche Scientifique; SELAF.

Naden, Anthony J. 1989. Gur. In *The Niger-Congo languages*, ed. John Bendor-Samuel, 141-168. New York: University Press of America.

Olawsky, Knut J. 1999. *Aspects of Dagbani grammar. With special emphasis on phonology and morphology*: LINCOM studies in African linguistics; 41. München, Newcastle: Lincom Europa.

Primus, Beatrice. 1993. Word order and information structure: A performance-based account of topic positions and focus positions. In *Syntax. Ein internationales Handbuch zeitgenössischer Forschung*, eds. Joachim Jacobs, Arnim von Stechow, W. Sternefeld and Theo Vennemann, 880-896. Berlin / New York: Walter de Gruyter.

Reineke, Brigitte. To appear. Identificational operation as a focus strategy in Byali. In *Focus Strategies in Niger-Congo and Afroasiatic – On the Interaction of Focus and Grammar in some African Languages*, eds. Enoch Aboh, Katharina Hartmann and Malte Zimmermann. Berlin: de Gruyter.

Skopeteas, Stavros, Fiedler, Ines, Hellmuth, Sam, Schwarz, Anne, Stoel, Ruben, Fanselow, Gisbert, Féry, Caroline & Manfred Krifka. 2006. *Questionnaire on Information Structure (QUIS).* Interdisciplinary Studies on Information Structure 4. Working Papers of the SFB 632. Universität Potsdam.

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Information Structure in Linguistic Theory and in Speech Production: Validation of a Cross-Linguistic Data Set

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The aim of this paper is to validate a dataset collected by means of production experiments which are part of the *Questionnaire on Information Structure*. The experiments generate a range of information structure contexts that have been observed in the literature to induce specific constructions. This paper compares the speech production results from a subset of these experiments with specific claims about the reflexes of information structure in four different languages. The results allow us to evaluate and in most cases validate the efficacy of our elicitation paradigms, to identify potentially fruitful avenues of future research, and to highlight issues involved in interpreting speech production data of this kind.

Key words: cleft constructions, clitic doubling, de-accenting, focus position, presentational constructions, scrambling, topicalization

1 Preliminaries

This paper investigates the empirical results observed in a subset of the speech production data that have been obtained through the experiments included in *Questionnaire on Information Structure*. Although data has also been obtained in a number of relatively under-researched languages, the purpose of this paper is to explore the results in languages for which the reflexes of information

[1] This paper is a product of the project D2 "Typology of information structure" which is part of the *Sonderforschungsbereich* "Information Structure", University of Potsdam & Humboldt University Berlin (sponsored by the German Research Foundation, DFG). The paper evolved through the work on the data set obtained by this project and reflects the analyses made in common with Gisbert Fanselow, Caroline Féry, Manfred Krifka, and Malte Zimmermann.

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structure are comparably well documented: French, Greek, German, and Hungarian. This comparison between our results and the literature allows us to evaluate and validate the experimental paradigms implemented during data collection. In addition we identify issues specific to the type of data collection techniques involved, which we and other researchers need to be aware of when assessing the results of the *Questionnaire on Information Structure* in less well researched languages.

The *Questionnaire on Information Structure* (hereafter, QUIS) is designed for the investigation of information structure from a typological perspective. It provides a tool for fieldworkers for collection of natural linguistic data, both spoken and written. The aim is to facilitate the elaboration of grammars of information structure in genetically diverse languages and to allow for typological comparison on the basis of parallel datasets created with identical means.

The core of QUIS is a set of 29 experimental tasks which use visual stimuli (pictures and short films) to manipulate discourse conditions that are known to have an impact on information structure. These tasks together with an accompanying language profile questionnaire and a set of translation-based tasks are published in a reference manual (Skopeteas et al 2006). The Reference Manual and additional materials for use of QUIS in the field are available to the linguistic community via the QUIS website.

As a general principle, the production experiments that are included in QUIS are 'straightforward' implementations of the discourse conditions at issue. What is meant by 'straightforward', is that we have applied exactly the contexts that are used in the theoretical literature in the setting of production experiments. For instance, an 'all-new' context is implemented experimentally in the most obvious way, by showing a picture to the informant and asking the question '*what happens?*'. This is exactly the context that the theoretical literature uses in order to make generalizations about sentential form in the all new condition. The

difference in our production data corpus is, of course, that it contains semi-spontaneous answers to this question and not judgments based on speakers' intuitions about the optimal sentence form for this context. Similarly, an agent-given context is established by presenting a picture sequence in which the agent referent appears in the sequence prior to the target sentence. As we shall see below, this type of implementation of discourse conditions has the advantage of having a direct correspondence to the claims in the literature, but the disadvantage that components of the experimental setting or procedure may intervene and introduce unwanted or unexpected effects.

The following sections are devoted to different subjects in different languages: French presentational constructions (see 2); German scrambling and topicalization (see 3); German intonational patterns (see 4); Greek clitic doubling (see 5); and the Hungarian focus position (see 6). Although largely unrelated issues in syntax and phonology are treated, each section follows the same pattern: i) hypotheses from the literature regarding language-specific reflexes of information structure are set out; ii) the results observed in that context in our dataset are described, and discrepancies are discussed.

2 French: Presentational Constructions[2]

2.1 Hypothesis

It has been argued that spoken French obeys a constraint by which focus is dispreferred in preverbal position (see Lambrecht 1994, 2001). This constraint predicts that whenever the subject is part of the focal information of the sentence, the use of a canonical SVO sentence is avoided. Since subject-verb inversion is not possible in French, the only alternative available to satisfy this

[2] The data from Quebec French has been collected, transcribed and evaluated by Alain Thériault in cooperation with the project D2.

constraint is to use a bi-clausal construction. Different types of bi-clausal constructions occur in these contexts as it is exemplified in (1) and (2).

(1) Context:
'Why are you walking so slowly?'
Answer (French):
J'ai mon pied qui me fait mal.
(lit. trans.) 'I have my foot that hurts me.' (Lambrecht 2001: 487)

(2) Context:
'How do you know?'
Answer (French):
C'est Huma qui me l'a dit.
(lit. trans.) 'It is Huma that told it to me.' (Lambrecht 2001:490)

Here we will examine the effects of this constraint in 'all new' contexts. According to Lambrecht (2001), the construction which occurs in this context in spoken French is a 'sentence focus cleft with presentational eventive function'.

(3) (a) Y a mon prof qui n'arrive pas à expliquer l'emploi des clivées.
'It is my professor who does not manage to explain the use of clefts.'
(b) Mon prof n'arrive pas à expliquer l'emploi des clivées.
'My professor does not manage to explain the use of clefts.'
(Lambrecht 2001:508)

Thus, we expect that 'all new' contexts will induce bi-clausal constructions of the kind presented in (3a), while the corresponding mono-clausal construction in (3b) is suboptimal according to the constraint against preverbal focus.

(4) Hypothesis:

In French, 'all new' contexts will trigger presentational constructions.

Unfortunately, there are no previous quantitative empirical studies that directly address the predictions of the constraint on preverbal focus. Two corpus works on spoken French may be considered as indirect evidence for the constraint (cited from Lambrecht 1984): François (1974) finds 46 subject NPs, among 1440 NPs in his corpus, which implies a preference for avoiding lexical NPs in subject position, and similarly Jean Jean (1981) finds that only about 2.5% of the subjects in the corpus are full NPs. Neither study considers the factor of context, i.e. that the subject NPs counted in these corpus queries might also be topical NPs.

2.2 Results

The production experiments included in QUIS have been collected in Québec French. All experiments were performed orally, hence the resulting data is assumed to provide evidence for the variety of spoken Québec French. The data we discuss in this section has been spontaneously produced by four young speakers (two men, two women, age range: 16-20). There are no previous accounts about a dialectal difference which could affect the application of the constraint on preverbal foci in spoken Québec French, thus – as a working hypothesis – we maintain the hypothesis about this constraint as presented in section 2.1 about European French.[3]

We will first discuss data from two tasks that elicit picture descriptions. The task 'Eventives' of QUIS is dedicated to the elicitation of 'all new' picture descriptions (total of descriptions obtained: 11). The instructor presents a picture

[3] Project D2 is currently creating a parallel data collection in European French, in order to determine whether the observations in Québec French result from a dialectal difference.

to the informant and asks a question that does not insert any part of the stimulus into the common ground: *What happens?* The task 'Visibility' elicits descriptions of picture sequences. The instructor presents two pictures that represent a small story one after the other to the informant. The first picture description is assumed to induce an utterance in an 'all-new' context (total of descriptions obtained: 57).

Of the 68 descriptions collected, two were classified as "other", since they include an explicit mention of the speaker ("on voit que..."). Some further sentences contain definite NPs, which suggests that the informant assumes that the entity in the stimulus is part of the implicit common ground he is sharing with the instructor (see illustration in (5)).

(5) (a) Le chat est dans l'eau.
'The cat is in the water.'
(b) L'homme marche.
'The man is walking.'

In other descriptions, the informant introduces the referent with only an existential sentence (see illustration in (6)).

(6) (a) Y a une corde.
'There is a rope.'
(b) Y a un chien.
'There is a dog.'

The remaining subset of descriptions is the dataset in which we can test the hypothesis in section 2.1. If the speaker does not assume that the referent is part of the implicit common ground (as in (5)) and if the speaker decides to convey more than the existence of the entity (in contrast to (6)), then – according to the

constraint on preverbal foci – we expect a presentational construction to be produced.

The data obtained through picture descriptions provide partial evidence about the constraint on preverbal foci. Out of 48 descriptions that are valid for the hypothesis at issue, 16 sentences instantiate the predicted construction (see (7a-b)), and 32 sentences contain indefinite subjects (see (7c-d)) which were expected to be banned by the constraint on preverbal foci in spoken French.

(7) (a) C'est un musicien qui joue de son instrument.
'It is a musician that plays his instrument.'

(b) Y a une femme qui est en train de marcher.
'There is a woman that is walking.'

(c) Un petit garçon coupe un arbre.
'A small boy cuts a tree.'

(d) Un homme marche.
'A man is walking.'

The overall data pattern obtained is summarized in Table 1. For validation of the experimental manipulation of "all new" contexts, two measurements have to be considered: (a) to what extent did the experimental manipulation succeed in creating a dataset in which hypotheses about the encoding of propositions in the "all new" context may be tested? (b) to what extent does the targeted data set correspond to the predictions of the previous literature on French?

In answer to (a), the relevant subset for hypotheses concerning the encoding of propositions in "all new" contexts contains the sentences in which speakers do not assume that the referents are part of the common ground and in which they do not simply assert the existence of an entity. Our experimental manipulation succeeded in generating a dataset which allows testing of the

targeted hypothesis in 70.5% of the total obtained data (i.e. 48 out of 68 sentences). With respect to (b), namely the prediction that this context will induce presentational constructions in French, our dataset provides evidence that French speakers choose the target construction in a third of the times they produce an 'all new' sentence.

Table 1: French data obtained in intended "all new" contexts[4]

total				68
other				2/68
	S assumes that referents are part of the CG			7/66
		S only asserts the existence of a referent		11/59
			categorical sentences	32/48 (66.6%)
			✓ presentational constructions	16/48 (33.3%)

The result in Table 1 confirms the theoretical account of Lambrecht (1994, 2001). Presentational constructions were indeed induced in the condition which is assumed to induce them, and it should be added that presentational constructions were elicited predominantly in all-new contexts in QUIS. However, our results contain a substantial proportion (66.6%) of sentences which are predicted to be suboptimal following Lambrecht's account (1994, 2001). Even if the constraint on preverbal focus is not categorical, the amount of categorical sentences is high, hence we wonder if the proportions in our corpus are representative of the spontaneous communication or alternatively if they have a strong influence of the used experimental setting, namely the picture description task.

We are able to address this question using QUIS, because data from other

[4] In this and following tables, grey cells contain the subset of the dataset which is valid for testing of the targeted hypothesis. Constructions which are predicted by the hypothesis are marked by '✓'.

tasks within QUIS suggest that there is a difference between picture description tasks and story telling tasks. In story telling tasks, speakers were shown a picture series which presents a short story, then were asked a question which induces a short spontaneous narrative concerning the presented pictures. The first sentence of the produced narratives in these tasks is always a presentational construction, as exemplified in (8) and (9):

(8) Qu'est-ce qui s'est passé ?
'What has happened?'
Il y avait un garçon sur la branche de cet arbre. Il est tombé et s'est fait mal au genou.
'There was a boy on the branch of this tree. He fell and hurt his knee.'

(9) Pourquoi tout le monde est attroupé? Qu'est-ce qui s'est passé ?
'Why are all these people here? What has happened?'
Y a eu un face à face entre deux voitures et les deux voitures ont pris feu.
'There was a crash between two cars and the two cars caught fire.'

This story-telling task does not elicit enough data to allow for quantitative generalizations to be made. However we suggest that, if confirmed in a larger dataset[5] this pattern indicates a difference between 'narrative-first' contexts and picture descriptions: a picture description can induce a categorical structure that directly corresponds to the perceived event, whereas in a narrative-first sentence the speaker is more likely to choose a structure designed to introduce a new referent or referents.

If this nuance between the two contexts is accurate, then it may be

[5] The project D2 in cooperation with Alain Thériault is in the process of carrying out a further data collection in QF using the manipulations that are hypothesized to be relevant, with a larger group of speakers.

appropriate to propose a minor modification in the definition of the discourse conditions which are expected to trigger presentational constructions in French: at the very least it suggests that the constraint on preverbal foci may be violable in specific contexts such as the picture descriptions which motivate the preference for categorical sentences. This will go hand in hand with the fact that clefting is not the only possibility to express focus on preverbal subjects in French, since it has been shown that this is also possible through phrasing. Féry (2001) reports the results of an experiment in which speakers were instructed to answer to questions in a natural way using canonical sentences written on cards. Of course, the stimulus here has a strong priming effect on the produced sentences. But if a SVO sentence was categorically banned in an 'all-new' context, we would expect at least some impact on the spontaneous re-formulation of the stimulus by French speakers. The proportion of spontaneously produced clefts was relatively low (0.05%), which suggests that the use of categorical sentences in 'all new' contexts is a possible option.

(10) Que ce passe-t-il à la cuisine?
'What is happening in the kitchen?'
[$_F$ Le marmiton caramélise les navets].
'The cook is caramelizing the turnips.' (see Féry 2001)

2.3 Summary

In the French dataset, we tested the hypothesis that 'all new' contexts induce presentational constructions as a result of a constraint on preverbal focused constituents in this language according to Lambrecht (1994, 2001). Experiments that aim to elicit 'all new' utterances on the basis of picture descriptions provide partial confirmation of this hypothesis: they succeeded in inducing presentational constructions at 33.3% of cases. However, the high proportion of

categorical sentences obtained in this discourse condition was surprising. Data from tasks that induce a narrative suggest that presentational constructions are almost exclusively chosen in an 'all new' context when speaker's task is to produce a whole narrative, and not only to describe the presented stimulus.

The common means to illustrate the sentential form of a language in pragmatically neutral conditions is to give it as an answer to a 'what happens?'. This practice is widely used in grammars and linguistic essays. In this sense, to present to the informant a scene through a stimulus and to ask 'what happens?' is probably the most straightforward way to implement the 'all new' context in a production experiment. However, our data implies that the description of a presented stimulus may not be the most appropriate discourse situation in order to elicit an 'all new' sentence.

3 German: Scrambling and Topicalization[6]

3.1 Hypothesis

German is a verb-second language, which is analyzed as movement of the finite verb to the C° head position. Consequently, every preverbal constituent in main clauses occurs in the Specifier position of CP. In this view then, OVS word order in main clauses results from A-bar movement. The information structural conditions that license such a movement can be narrow focus or topicalization of the object constituent (see Frey 2004, 2006; Jacobs 1997; 2001). Perception experiments carried out within the SFB 632 show that the use of a OVS order has the effect that the addressee can anticipate a new referent for the subject constituent (Weskott et al. 2006). In contrast to the preverbal constituents, OS

[6] The German data has been collected, transcribed, and evaluated by Anja Arnhold, Kathi Moczko, and Andreas Pankau. Special thanks are due to Andreas Pankau who has recapitulated the theoretical background on scrambling and topicalization in German for this paper.

order in the midfield in German results from scrambling. In this case, the order of constituents is not thematically determined, but it results from the interaction among several constraints, relating to the case marking of the arguments (nominative first), to their pronominal vs. lexical status (pronominal first), to semantic properties such as animacy (animate-first) and to their discourse status (given-first) (cf. Müller 1999; Fanselow 2001, 2003, 2004; Grewendorf & Sabel 1994; 1999; Haider 2006; Haider & Rosegren 2003). Crucially for the expected effects of information structure, asymmetries in discourse status (given vs. new) are necessary but not sufficient conditions for the choice of an OS order, i.e. the given-first principle applies optionally.

These observations about German syntax will be shown below to hold in the D2 dataset. The following predictions about word order result from the structural distinction between scrambling and topicalization.

(11) Hypothesis I:
A context inducing topicalization may license OVS in German.

(12) Hypothesis II:
Simple asymmetries of discourse status (subject=new & object=given) may license XVOS, but not OVS.

3.2 Results

Qualitative observation of the obtained data confirms the hypotheses presented in 3.1. In the experiment "Who does what?" the informant is shown a picture that presents two parallel events. Then the instructor asks him a complex question which induces an answer containing a list of pairs ($agent_1$ – $patient_1$, ..., $agent_n$ – $patient_n$, etc.) as illustrated in (13). The list of pairs is expressed as a sorted sequence whereby the most accessible set of entities in the pairs is chosen

as sorting key. Typically the sorting key is the set of agents, but a question which renders presupposed status to the set of the patients such as in (13) may induce a sorting on the basis of the set of patients. The argument that introduces the sorting key is expressed as contrastive topic since it identifies the relevant referent for each pair contrasting it to the other possible referents of the set. Thus, assuming that this experimental manipulation induces contrastive topics and following Hypothesis I, we predict that this contextual condition will induce OS order in German; since contrastive topicalization is not assumed to be a sufficient condition by hypothesis, our prediction does not imply that this is the only possible answer – answers in the canonical order are also expected. Example (13) illustrates the OS order as elicited through this experiment.

(13) Question:
'Who is looking at the hammer and who is looking at the pot?'
Answer:
Der Mann schaut den Hammer an und den Topf schaut die Frau an.
'The man is looking the hammer and the woman is looking the pot.'

A further example of contrastive topicalization is illustrated in (14) which has been elicited through the experiment "Groups". In this experiment, the informant describes two pictures: in the target picture, which is the second one, the patient constituents are given information (they are already introduced through the description of the first picture).

(14) [pict. 1] Zwei Stifte und drei Pfannen stehen auf dem Boden.
'Two pencils and three pans are on the floor...'
[pict. 2] Jetzt nehmen drei Kinder die drei Pfannen auf… in die Hand und die beiden Stifte nehmen die Frauen in die Hand.

'...now three children take the three pans... in the hand and the women take both pencils.'

Scrambling is induced through manipulation of discourse status, as for example in the following picture description (experiment "Changes"). There are no examples of OVS order in this experiment as predicted by Hypothesis II.

(15) [pict. 1] Ein Junge schiebt einen Tisch...
'A boy is pushing a table...'
[pict. 2] Ja, und danach schiebt eine Frau diesen Tisch auch weiter...
'...yes, and afterwards a woman pushes this table further...'
[pict. 3] Dann schiebt den Tisch ein Mann.
'...then, it is a man that pushes the table.'

In the data elicited through QUIS we found single examples that are in accordance with the grammatical facts of German as summarized in 3.1. However, in a quantitative view the sample of spoken German which has been created through QUIS does not correspond with the available knowledge about the frequency of OS sentences in German: we elicited only 10 OS sentences in a total of 1455 sentences with lexical subject and object constituents (0.006%). This result deviates strongly from previous corpus findings (Weber & Müller 2004 found 3% OVS sentences in the NEGRA corpus of German newspapers). This result suggests that the data sample that we have obtained for German is not representative of the properties of spontaneous speech production in this language.

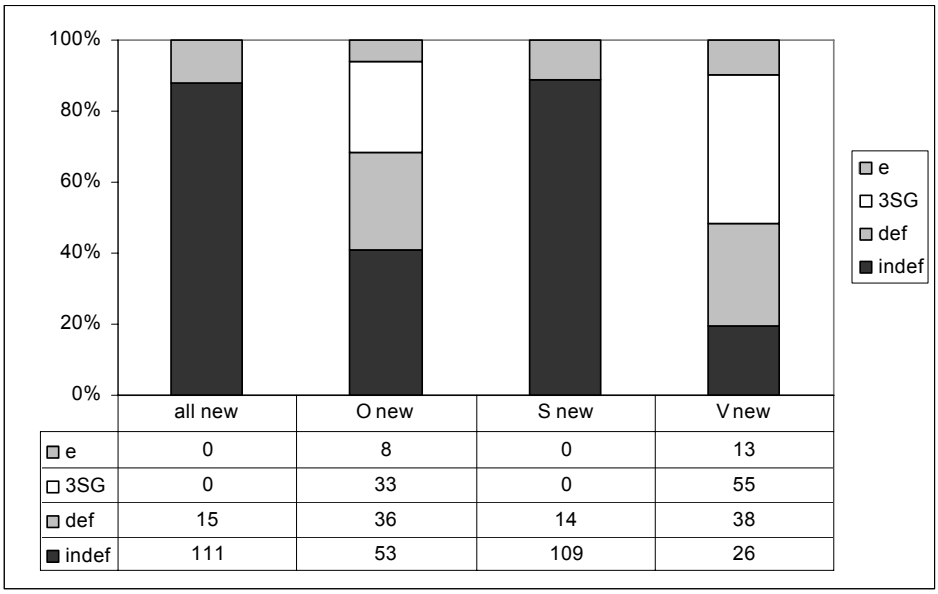
A possible explanation is that the problem lies in the experimental methods used to induce scrambling and topicalization in German: the discourse manipulations in the experimental context did not succeed in establishing the

properties of the common ground that were intended in the experimental design. We can explore this hypothesis by looking at the referential status of arguments in the data. The data presented in Figure 1 and Figure 2 summarize the results on the referential status of arguments in the experiment "Changes", which elicits descriptions of picture sequences. The first picture induces an 'all new' description, and the subsequent pictures induce descriptions in which either one argument or the verb is new information and the rest of the sentence is given (=identical with the previous picture). 132 sentences were obtained in each experimental condition.

The result shows that in the 'all new' description, both subject (see Figure 1) and object (see Figure 2) constituents are indefinite NPs in the most cases (see variable 'indef'). In the 'O new' (=object new, subject given) condition, objects are indefinite as expected, approximately 60% of subjects were encoded either through a definite NP (see variable 'def'), or through a third person pronoun (see variable '3.SG'), or elided (see variable 'e'). In contrast, the condition 'S new' (=object given, subject new) induces a substantial amount of definite object NPs, while subject NPs are indefinite for the most part. Finally, in the 'V new' (=subject and object given) condition the number of indefinite descriptions is greatly reduced both for subject and object constituents.

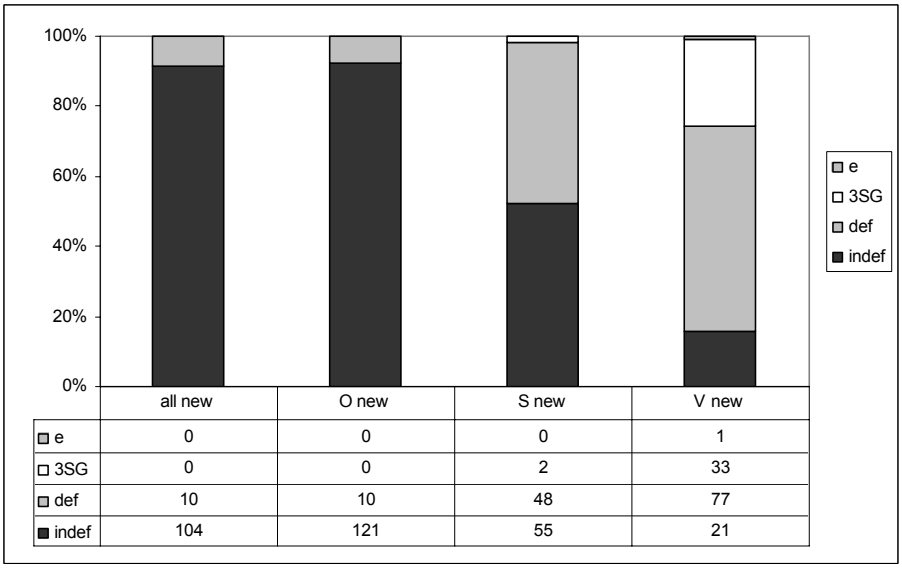
The distribution of referential statuses per condition suggests that speakers do assume the intended common ground manipulations for a substantial part of their performance in the experimental situation.

Figure 1: Referential status of subjects



	all new	O new	S new	V new
e	0	8	0	13
3SG	0	33	0	55
def	15	36	14	38
indef	111	53	109	26

Figure 2: Referential status of objects



	all new	O new	S new	V new
e	0	0	0	1
3SG	0	0	2	33
def	10	10	48	77
indef	104	121	55	21

The question that arises is why speakers realize the intended distinctions in the referential status of NPs and not in word order. Probably the answer lies in the qualitative difference between the two phenomena. In case of the referential status, speakers have to make an *obligatory* choice between an array of structures (definite NP, indefinite NP, '3.SG' pronoun, ellipsis) that do not

substantially differ in terms of markedness. In case of word order, speakers have to choose among an unmarked option (i.e., the canonical word) which applies to all discourse conditions, and a marked option, namely the object-before-subject order, which is only licensed in a subset of the possible contexts. The contextual properties that would license the marked order are available, since the experiments at issue establish an asymmetry in givenness (which could induce XVOS) or contrastively topicalized objects (which could induce OVS in German). What is certainly less well recreated in the artificial communicative situation of an experimental session, is the intention of the speaker to update the assumed common ground. The fact that he chooses the unmarked structure in contexts that license a linking anaphor to the common ground suggests that he is fulfilling the task of describing the perceived stimuli but without addressing this communication to a real addressee.

This is a possible effect of the artificial discourse setting during an experimental session. However, effects of the experimental situation should be independent of the object language, but the result obtained in German is not identical with the results obtained in other languages. Georgian speakers, for example, have used non-canonical word orders (e.g., 30% OS orders in the condition 'subject new' of the experiment "Visibility", 60% in the condition 'subject new' of the experiment "Changes", etc.) with identical experimental manipulations. In part, this result reveals a typological difference between German and Georgian, but it also shows that our experimental manipulation effectively elicits word order variation. Similar effects on word order have been observed in further scrambling languages like Konkani and Prinmi.

Some details of the experimental performance are special to the case of the German however. Participants in the experiments were students at the University of Potsdam who normally participate in a number of experimental sessions during their studies. Their familiarity with experimental situations may

have negatively affected their intentional involvement in the simulated discourse situations. For this reason, we are looking forward to create a new dataset in German with the participation of speakers that are not used to the experimental context. Some modifications in the performance of the session are also necessary in order to create a communicative session style which was not established in the previous sessions.

3.3 A comparison to Georgian

A comparison to another language from our sample is useful at this place in order to clarify whether the absence of effect on word order in German reveals a typological property of the language or results from the particular experimental manipulation we have applied. Skopeteas & Fanselow (2007) present a detailed account on the Georgian data and a structural and experimental comparison to German. We summarize the results of this study in view of their relevance for the interpretation of the result we obtained in German. Georgian is a basically SOV language. V-medial orders result from V movement, which is necessary when a constituent occupies the focus position, but it may also occur otherwise. The OS order is a form of A-movement as it is shown through asymmetries in binding and quantifier scope as well as through the well-formedness of long distance scrambling (see details in Skopeteas and Fanselow 2007). Insofar Georgian has apparent similarities to German, at least with respect to the properties of the argument orders. However, the production data we obtained in this language are very different to the German results. OS orders have been produced very often in our data. A simple givenness asymmetry, e.g. the condition ‘agent new & patient given’ of the experiment “Visibility” induced 71% SO answers and 29% OS answers. The control condition that shows the relevance of this result is the ‘agent given & patient new’ condition at which OS order does not occur at all. The obtained data clearly shows that our

experimental manipulation of givenness asymmetries successfully induces scrambling of objects over subjects and suggests that the result in German reveals a genuine typological property concerning the word order freedom in this language in speech production. The empirical result is straightforward; the interpretation of this difference is a matter of current study in our project and, since it depends on theoretical assumptions concerning the interaction between syntactic configuration and speech production, they are left out from the discussion in this paper (see a detailed account in Skopeteas and Fanselow 2007).

3.4 Summary

In this section, we have addressed the issue of scrambling vs. topicalization and we have searched the dataset created through QUIS in order to find evidence for the assumptions in the literature concerning the information structural sensitivity of these structures. In qualitative view, the dataset confirmed our expectations; in quantitative view, the dataset does not contain enough evidence to prove the dependence of the intended structures from particular context conditions. However, the comparison to Georgian revealed that the experimental manipulation we have used successfully induces OS orders in languages that allow for scrambling. This comparison suggests that our finding reveals a genuine property of German and is not a reflex of the kind of experimental implementation of givenness asymmetries which has been used in QUIS.

4 German: Intonational Patterns[7]

4.1 Hypothesis

Prosodic analysis of a subset of the data elicited in German, in selected QUIS tasks, was carried out in order to assess to what extent the findings in our data match three general claims made in the literature about the prosody of information structure in German.

A first general claim is that focus is expressed prosodically in German by means of a falling nuclear pitch accent, since focus is normally placed sentence-finally where the unmarked accent type is falling (Féry 1993, Uhmann 1991, Peters 2006). The position and type of nuclear accent observed in focus contexts was examined in relation to this generalisation. A second, related, claim is that content words which follow a narrow focus, and which are repeated from the context-setting question, are expected to be de-accented in German (Ladd 1996, Baumann 2006, Grice & Baumann 2006). The accentual properties of post-focal/given content words were examined to ascertain to what extent this expectation is fulfilled in our dataset. Finally, it has been noted that different accentuation patterns are observed in thetic vs. categorical sentences with an intransitive verb, with the nuclear accent on the subject in thetic sentences and on the verb in categorical sentences (Sasse 1987, Ladd 1996); thus accentuation patterns in intransitive sentences elicited in all-new context were examined.

We surveyed data from 20 speakers, in two QUIS tasks: 'Event Cards', which elicits all-new picture descriptions in response to a broad focus question (6 stimuli x 20 speakers = 120 tokens in all; 40 tokens were disfluent leaving 80 for analysis), and 'Anima' which elicits focus picture descriptions in response to

[7] The German data was collected by Anja Arnhold and Andreas Pankau; the main prosodic analysis was undertaken by Anja Arnhold, with additional analysis by Fabian Schübo and Sam Hellmuth. We are grateful to Anja Arnhold for reviewing the theoretical background on the prosody of information structure in German.

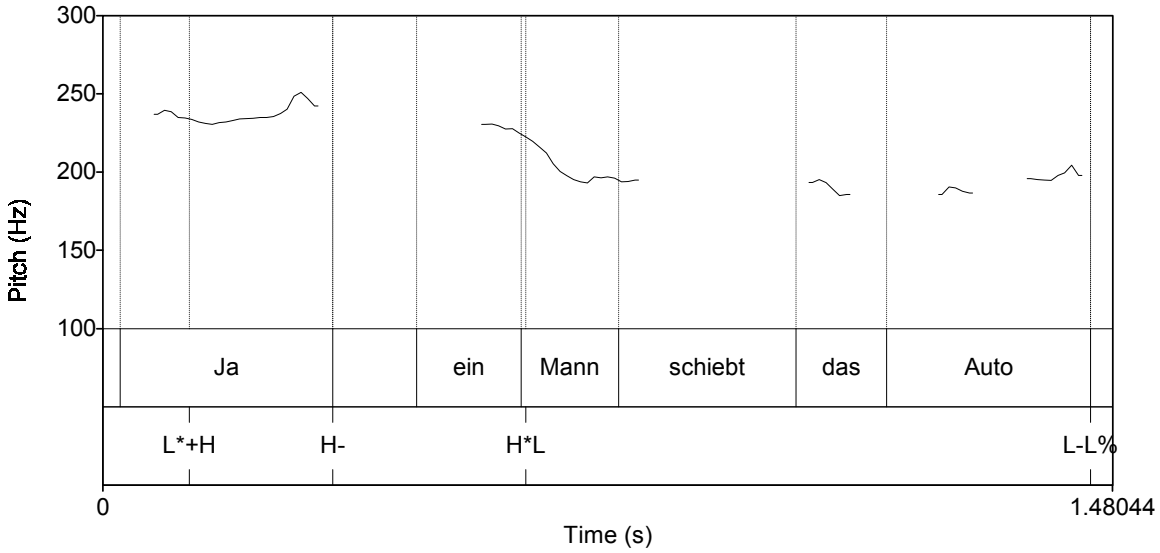
focus questions of various types (16 stimuli x 20 speakers = 320 tokens; 180 tokens were disfluent or elliptical, leaving 140 for analysis). All tokens included in the analysis were inspected auditorily by the first transcriber, a native speaker of German, with reference to F0 and spectrogram extracted using Praat 4.5; cases which were classified by the first transcriber as not matching the predicted hypotheses were additionally assessed independently by a further two prosodically trained transcribers.

4.2 Results

4.2.1 Nuclear/focal accents

Our survey found that 90% of wide focus sentences (72/80 tokens, in 'Event Cards') bore a H*L falling nuclear accent followed by low phrase- and boundary-tones, and of these, the nuclear accent was utterance-final in all but 3 tokens. In utterances containing a narrow focus (in 'Anima') again, in almost 90% of cases (127/140 tokens) the focus was expressed by means of a H*L falling nuclear accent followed by low phrase- and boundary-tones. An example is provided in Figure 3 below: the speaker is responding to the question 'Who is pushing the car?'.

Figure 3: Sample falling nuclear accent (context elicits confirmation focus on 'Mann') (token 41-8 from speaker 14)



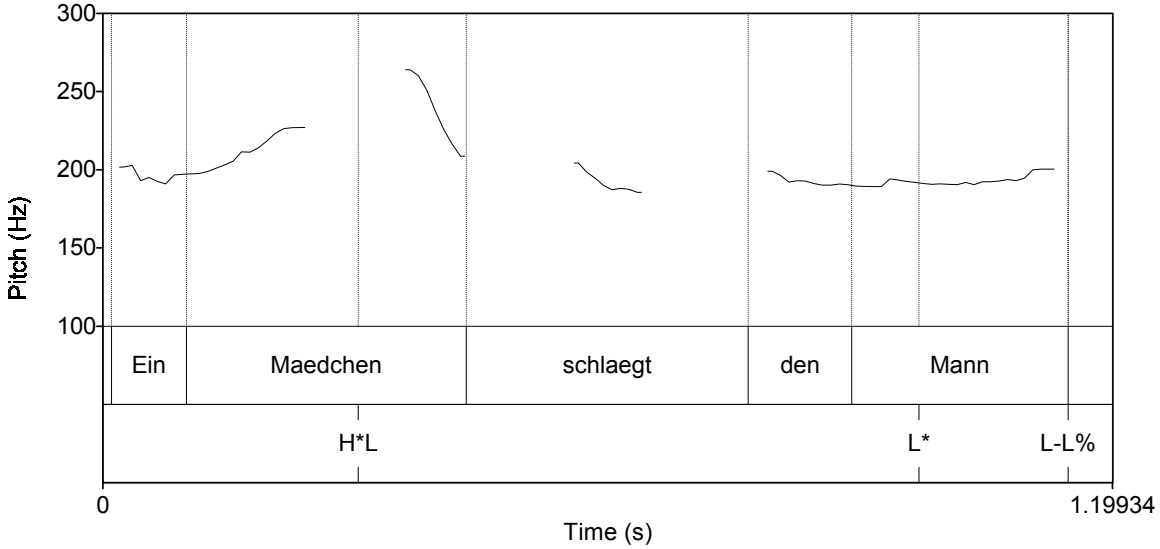
The remaining 10% of tokens (13 tokens) in the Anima task were analysed further in order to establish the patterns used: 6 tokens have a L* nuclear accent, followed by a low boundary tone; 2 have a L* nuclear accent, followed by a high boundary tone; and 5 have a rising L*H nuclear accent, followed by a followed by a low boundary tone. Overall however, the tasks 'Event Cards' and 'Anima' successfully elicited standard German prosody, with a limited degree of deviation from generalizations in the literature: the nuclear accent is in the majority of cases falling, and most exceptions to this are use of a low nuclear accent.

4.2.2 Post-nuclear de-accenting

In the 'Anima' task, 49 tokens contained a narrow focus in non-utterance-final position, and of these, referents following the narrow focus were de-accented in 73% of cases (36 tokens); in the remaining 27% of cases (13 tokens) referents following the narrow focus did not appear to be de-accented. Of these 13 atypical cases, 2 tokens showed a final fall-rise contour, (Féry 1993: H*+LH%; Grice et al 2005 [GToBI]: H* L-H%) and 3 contained a phrase break after the focussed subject (thus an additional post-focal accent is expected in the new

prosodic phrase). In the remaining 8 tokens the post-focal argument that was accented bore a L* accent, and was in all cases subordinate in prominence to a primary accent on the focussed referent. This is consistent with the distributional patterns described in Baumann (2006) across different speech production settings: under laboratory conditions Baumann found that a textually given item (repeated from the immediate discourse context as in our task) is invariably accented in German, whereas in a corpus study such items were also observed to bear a secondary accent (H*L accent). Although our cases are best analysed as instances of a post-focal L* (see for example in Figure 4 below), we suggest that the degree of variation in our corpus is consistent with the generalisations observed in the literature regarding German post-focal accentuation.

Figure 4: Post-focal L* accent on patient (in response to a wh-question eliciting narrow focus on the agent) (token 41-13 from speaker 4)



4.2.3 Eventives

Finally, we found an interesting result in the 'Event Cards' task, which was designed not only to elicit wide focus but also specifically to elicit thetic utterances, in response to an all new picture description task. In fact however, among fluent renditions of sentences containing intransitive verbs, we found that

in approximately two-thirds of the tokens the nuclear accent was on the verb rather than on the subject argument; this accentuation pattern suggests that in these two-thirds of cases speakers produced a topic-comment sentence rather than a thetic sentence. An accentual 'minimal pair' is provided in Figures 5 and 6 below, both of which are descriptions of a picture of a sleeping baby.

Figure 5: Intransitive thetic sentence (nuclear accent on the subject) (token 26-21 from speaker 8)

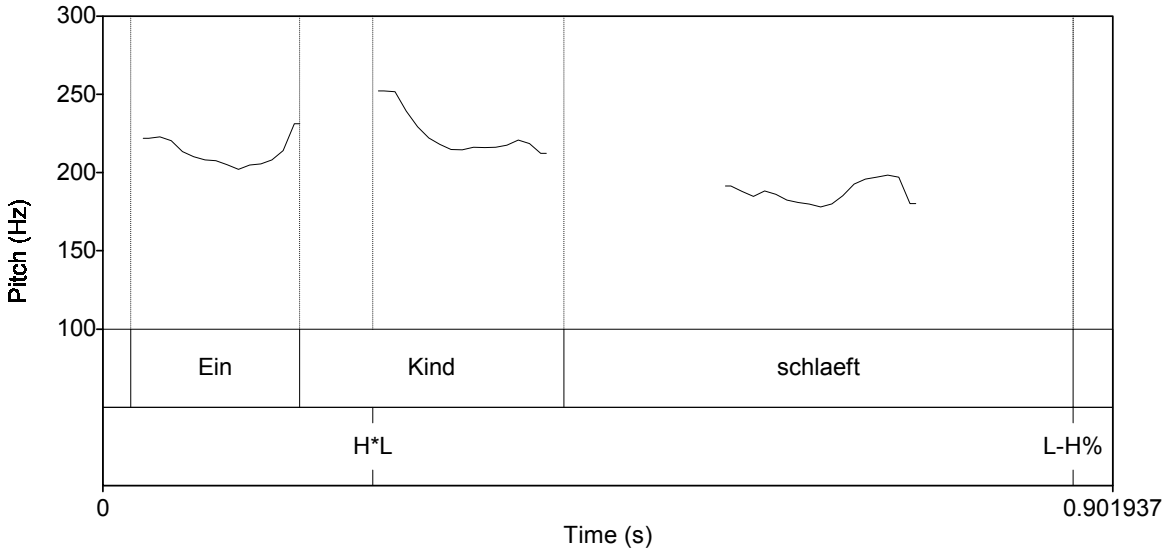
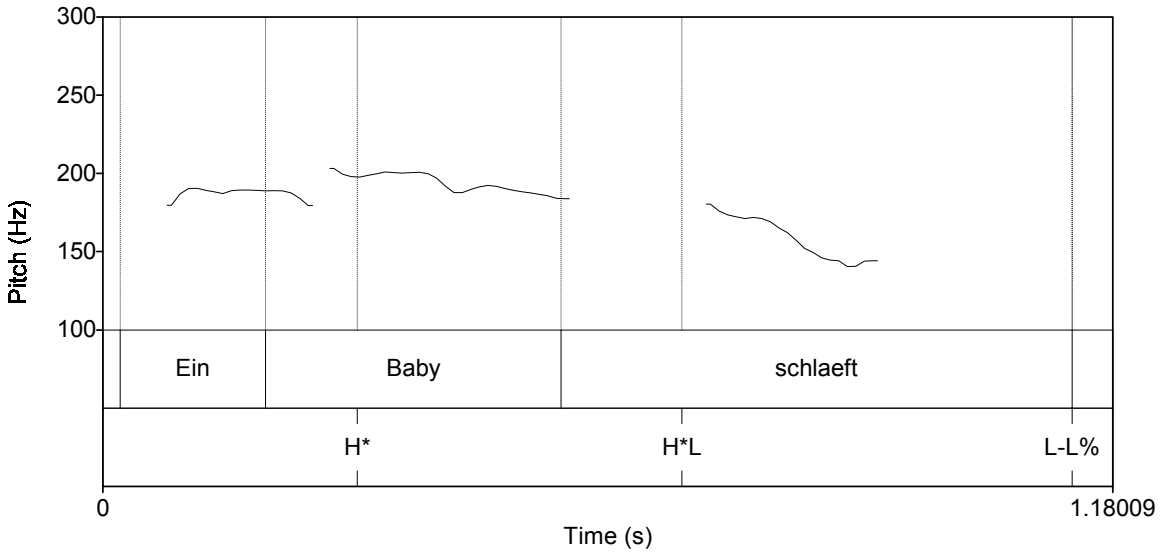


Figure 6: Intransitive categorical sentence (nuclear accent on the verb) (token 26-21 from speaker 14)



This evidence from German prosody in 'Event Cards' directly parallels the situation observed in the Québec French data in the same task (see 3.3.1.3b above) and suggests that use of a picture description is not always necessarily sufficient to elicit an all-new information structure context. We are currently piloting a revised task design of Event Cards (using the same stimuli, but with a different instruction to speakers) in order to more reliably elicit thetic utterances in this task.

5 Greek: Clitic Doubling[8]

5.1 Hypotheses

The syntactic properties of pronominal clitics are probably the most intensively studied subject in Modern Greek syntax. Pronominal clitics include a paradigm of non-emphatic personal pronouns which do not bear lexical stress (in contrast to emphatic personal pronouns that bear lexical stress) and are used for accusative and genitive constituents which are part of the VP. These include direct objects, indirect objects in genitive, and genitive adjuncts which are part of the VP (e.g. beneficiaries), but not adjuncts that are outside the VP (e.g., temporal accusative/genitive adjuncts). Pronominal clitics always occur adjacent to the verb, and are part of the same phonological word as has been shown on the basis of the Stress Well Formedness Conditions of Modern Greek (Arvaniti 1992; Drachman & Malikouti-Drachman 1999; Revithiadou 1999). With the exception of imperatives and non-finite verb forms, pronominal clitics are left adjacent to the verb in the standard variety of Modern Greek.

[8] The Greek data was collected, transcribed and evaluated by Thanasis Georgakopoulos (Univ. of Athens), Yannis Kostopoulos (Univ. of Athens), and George Markopoulos (Univ. of Athens) in conjunction with project D2.

Two syntactic constructions with pronominal clitics are of particular relevance for the study of information structure: *clitic left dislocation* (hereafter, CLLD) und *clitic doubling* (hereafter, CL). Both constructions contain a NP which is co-referent to the clitic: in CLLD, the doubled NP is left dislocated (see (16a)), while in CL the doubled NP is placed to the right of the verb (see (16b); see further Anagnostopoulou 1994, 1999; Alexiadou 1999; Revithiadou & Spiropoulos 2004). In some accounts the doubled NP in CL is treated as right dislocated, in parallel with CLLD (see Philippaki-Warburton 1994, 1998, Androulakis 2001), but many authors have challenged this view pointing out that, amongst a number of arguments: (a) there are crucial differences in the contexts that license the two constructions and (b) the doubled constituent in CL may precede the focussed constituent, which poses a syntactic problem if the doubled constituent is analyzed as right dislocated (see Anagnostopoulou 1994, Iatridou 1995, Alexiadou 1999).

(16)	(a)	to	vivlío	*to*	Diávasa.
		DEF:ACC.SG.N	book:ACC.SG.N	3.SG.ACC.N	read:AOR:1.SG
	(b)	*to*	Diávasa	to	vivlío.
		3.SG.ACC.N	read:AOR:1.SG	DEF:ACC.SG.N	book:ACC.SG.N

CLLD and CL are not licensed in identical contexts. CL requires a referent which is prominent enough in the common ground to be uniquely identified (see Anagnostopoulou 1994). Arguments in CL represent given information which is part of the information structural background (Alexopoulou & Kolliakou 2001, Valliouli 1993). These requirements of givenness and out-of-focus status are necessary conditions for CL itself, but the use of a *non-clitic doubled* postverbal constituent is always possible.

Most studies on the contextual licensing of clitic constructions are devoted to CLLD. This construction is less restrictive with respect to the discourse status and applies also with new referents that are discourse linked (Anagnostopoulou 1994). In contrast to CL, CLLD requires a pragmatic condition of some kind, to trigger left dislocation, frequently contrastive topicalization (see Iatridou 1995). Alexopoulou (1999) and Alexopoulou & Kolliakou (2001) present an attempt to identify the context conditions that license CLLD: their approach is based on the notion of 'linkhood' as defined in Vallduví (1992) and refined by Hendriks & Dekker (1996) in the 'non-monotone anaphora hypothesis'. In this framework, CLLD is induced when the referent of the doubled constituent X is an anaphor to an antecedent discourse referent Y, such that Y is not a subset or equal to X. That is, either the referent of the doubled constituent is a subset of its antecedent or the two sets do not intersect.

There are only a few quantitative empirical studies on Greek clitic doubling. Roland (1994) presents a corpus study about the occurrence of clitic doubling measuring the anaphoric and cataphoric occurrence of the referent of the clitic doubled NP which is in line with the above generalizations. Keller & Alexopoulou (2001) measure the influence of word order, sentence accent and clitic doubling on the acceptability of sentences in several contexts through magnitude estimation. Their results confirm the proposal of a (violable) constraint on doubling preverbal objects as well as a constraint on interpreting doubled objects as ground (in Vallduví's 1992 terms).

In the following section, we will explore the data obtained through QUIS in order to test two hypotheses concerning CLLD which have attracted particular attention in the literature:

(17) Hypotheses

(a) CLLD is induced when a doubled constituent is a contrastive topic.

(b) CLLD is induced when a doubled constituent is an anaphor to an antecedent referent, such that it is either a subset of it or does not intersect with it.

5.2 Results

5.2.1 Contrastive topicalization

Hypothesis (a) predicts that discourse conditions that trigger contrastive topicalization will induce clitic doubling in Greek. This hypothesis may be tested in the data obtained through the experiment "Who does what?". In this experiment, the speaker is shown a picture which presents two parallel (identical) events in which two pairs of different individuals are involved. Then he is asked a question and answers it in a "natural" way. Several question types are used in the different experimental conditions. The question relevant here is the multiple subject question, e.g. "Who is pushing the chair and who is pushing the table?". According to hypothesis (a), this question will induce contrastively topicalized object constituents (see Skopeteas & Féry, i. pr.).

In a total of 16 tokens obtained in this experiment, 2 displayed verb ellipsis in both conjuncts, and thus no cliting doubling is possible:

(18) Context:

'Who is biting the boy and who is biting the girl?'

Answer (Greek):

o	skílos	to	aGóri
DEF:NOM.SG.M	dog:NOM.SG.M	DEF:ACC.SG.N	boy:ACC.SG.N

ce	i	Gáta	to	korítsi.
and	DEF:NOM.SG.F	cat:NOM.SG.F	DEF:ACC.SG.N	girl:NOM.SG.M

‘The dog the boy, and the cat the girl.’

In 5 tokens the target construction was obtained as illustrated in (19). The object constituents in this answer are contrastive topics, indicated by CLLD.

(19) Context:

‘Who is eating the apple and who is eating the banana?’

Answer (Greek):

to	mílo	to	trói	i
DEF:ACC.SG.N	apple:ACC.SG.N	3.SG.ACC.N	eat:3.SG	DEF:NOM.SG.F
jinéka	ce	ti	banána	ti
woman:NOM.SG.F	and	DEF:ACC.SG.F	banana:ACC.SG.F	3.SG.ACC.F
drói	o	ánDras.		
eat:3.SG	DEF:NOM.SG.M	man:NOM.SG.M		

‘The woman eats the apple, and the man eats the banana.’

Alternatively, speakers have given answers in the canonical order as illustrated in (20). Notice that in the case of postverbal object constituents the requirements for CL are not fulfilled: since there is a set of two individuals that are involved as patients in the corresponding events, the referent of the object constituent is not uniquely identifiable, which renders clitic doubling unacceptable. None of the sentences with canonical order exhibit clitic doubling.

(20) Context:

‘Who is eating the apple and who is eating the banana?’

Answer:

i	jinéka	trói	to
DEF:ACC.SG.F	woman:NOM.SG.F	eat:3.SG	DEF:NOM.SG.N

mílo ce énas ánDras
apple:ACC.SG.N and INDEF:NOM.SG.M man:NOM.SG.M
trói ti banána.
eat:3.SG DEF:ACC.SG.F banana:ACC.SG.F
'The woman eats the apple, and a man the banana.'

The results obtained are summarized in Table 2. Overall 12.5% of the dataset is not relevant for the hypothesis at issue. In the remaining data, the experiment provides evidence that Greek speakers use the CLLD construction in 35.7% of cases involving contrastive topicalization of object constituents.

Table 2: Greek data obtained in double object questions

total		16
V ellipsis in both conjuncts		2/16
	canonical sentences	9/14 (64.2%)
	✓ CLLD	5/14 (35.7%)

5.2.2 Linking anaphors

Although QUIS contains experimental manipulations that should license CLLD according to hypothesis (b), unfortunately we are not table to address the hypothesis in quantitative terms. The appropriate context is found in particular in an experiment on "Bridging Topics" (description of picture sequences), which establishes the contextual environment in which anaphors to antecedent referents are associated to but not identical to the target referent. However, since a canonical sentence is also possible in this context, speakers showed a general preference for the unmarked option and did not produce a substantial number of CLLD tokens in this condition. Looking at the data qualitatively, we identify instances of CLLD in the predicted condition as illustrated in (21). The preverbal object 'goal' is a new discourse referent which is an anaphor to a

referent which is not available in the previous context but it is activated through the introduction of the frame of reference ‘football’.

(21) [picture 1 is presented]

íne	énas	termatofílakas	brostá
be:3.SG	INDEF:NOM.SG.M	goalkeeper:NOM.SG.M	in.front.of
s=éna	térma...		
LOC=INDEF.ACC.SG.N	gate:ACC.SG.N		

‘It is a goalkeeper in front of a gate...’

[picture 2 is presented]

to	goláci	tó=faje
DEF:ACC.SG.N	goal:DIM:ACC.SG.N	3.SG.ACC.N=eat:3.SG
o	típos.	
DEF:NOM.SG.M	guy:NOM.SG.M	

‘The little goal, the guy has eaten it.’

Though single examples of CLLD are obtained in the context condition illustrated in (21), the overall result shows that the licensing context as identified by Alexopoulou & Kolliakou (2001) is not a *sufficient* condition for CLLD.

The next question to ask is whether the assumed licensing context is a *necessary* condition for CLLD. We can check this hypothesis by observing data obtained by means of the experiment “Visibility”. This experiment is also based on descriptions of picture sequences: in the condition which is relevant for our purposes, the target picture contains a patient which has already been presented in the previous picture. In the account of Alexopoulou & Kolliakou (2001), this context will not license CLLD, since the target referent is equal to the antecedent.

The data obtained in this experimental condition (63 descriptions in total) illustrate different types of possible structures with given patients in Modern

Greek. 6 descriptions had to be excluded because they failed to instantiate the intended context condition.

16 further descriptions have to be ignored because they contain a sentence that introduces the new referent before the expression of the target event. In the descriptions that consist in a simple sentence, the given patient is often expressed through the clitic pronoun (12 sentences) and do not have a reference to the given referent through a lexical NP. These types of sentences are completely predictable for the contextual condition at issue, but do not contribute to the question whether a lexical NP is anteposed and clitic doubled when it refers to a given referent. The relevant subset contains the simple sentences in which the speaker decides to encode both referents in lexical NPs and this subset is the 46% of the obtained data. Since the patient is given, this context may induce two sentence types in Modern Greek: Canonical sentences with deaccented object constituents and CL. These sentence types are very well represented in the dataset (see Table 3).

The crucial point for our discussion on CLLD is that this construction has been also induced in the context of given patients, as illustrated in example (22). This pattern was encountered in 10.3% of simple sentences with two lexical NPs (3/29 sentences).

(22) [picture 1 is presented]

éna	aGóri	stécete...
INDEF:NOM.SG.N	boy:NOM.SG.N	stand:3.SG

'A boy is standing...'

[picture 2 is presented]

ce	tóra	aftó	to	aGóri	to
and	now	this:ACC.SG.N	DEF:ACC.SG.N	boy:ACC.SG.N	3.SG.ACC.N

éCi pári s=tin agaLá tu
have:3.SG take:N.FIN LOC=DEF:ACC.SG.F lap:ACC.SG.F 3.SG.GEN
énas ánDras
INDEF:NOM.SG.M man:NOM.SG.M
'...and now this boy, a man has taken it onto his lap.'

Table 3: Greek data obtained in 'given patient' descriptions

total					63
	other				6/63
		complex description			16/57
			SclV		12/41
				CLLD	3/29 (10.3%)
				✓CL	1/29 (3.4%)
				✓canonical sentences	25/29 (86.2%)

Examples like (22) suggest that the non-monotone anaphora hypothesis is not a necessary condition for Greek CLLD. However, notice that the experimental procedure does not induce a continuous narrative, since the description is interrupted through the presentation of the second picture. This interruption has the effect that the speaker often resets the discourse referents when producing the target description and accounts for the fact that the 46% of the sentences contain two lexical NPs. The fact that this aspect of the discourse flow induces CLLD suggests that the necessary condition for CLLD may not be able to be captured strictly in terms of the semantic relation between the target referent and its antecedent, but should include any contextual conditions which may motivate the speaker to render a salient state to the anaphor.

Furthermore, this result is in line with the empirical data gained through an experiment on gradient acceptability in Keller & Alexopoulou (2000). The experimental data provided evidence for a constraint DOUBLEGROUND (=

"doubled objects have to be interpreted as ground", whereby ground is the non-focussed partition of the sentence in terms of Vallduví 1992). Both orders SclVO and OclVS have been judged as highly acceptable (without significant difference between them) in the context of subject focus questions, though the doubled object constituent was part of the question background, which is not the context that licenses OclVS (i.e., CLLD) according to the hypothesis at issue.

5.3 Summary

Based on data collected through several experiments of QUIS, we have tested two basic accounts about the function of CLLD in Greek. First, we examined the hypothesis that contrastive topicalization of object constituents induces CLLD and we identified an experimental condition which outputs substantial quantitative evidence in support of this claim. Second, we examined the hypothesis that CLLD is induced when the object constituent is a linking anaphor to the common ground and we found single examples that illustrate this claim. Furthermore, we found counterexamples to this hypothesis which suggest that the hypothesis at issue does not display a necessary condition for the production of CLLD, and our finding is in accordance with other empirical data reported in recent literature.

Putting the results together, they rather suggest that the exact information structural function of CLLD or the semantic relation of the doubled constituent to the antecedent is underspecified. Anteposing a given constituent renders a salient status to it, which may be motivated by several contextual conditions: by contrastive topicalization (see 5.2.1), by a link-like anaphor (see (21)), or by properties of the discourse flow such as the reestablishment of the common ground in example (22).

6 Hungarian: Focus Position[9]

6.1 Hypothesis

Hungarian is a discourse configurational language with two preverbal positions for topic and focus respectively. In syntactic analysis of Hungarian focus constructions, focused constituents are placed in the Specifier position of a functional projection for focus (FP) (see Bródy 1990; Kiss 1992, 1998). Focus triggers movement of V-to-F which guarantees adjacency of the focused constituent to the verb. Evidence for this movement is found in the behaviour of verbal prefixes, which constitute a phrasal category in Hungarian (Spec,PredP in Kiss 2006 or PredOP in Farkas & Swart 2003) that in canonical sentences precedes the verb. When a constituent occupies the focus position, the verbal particles have to occur postverbally (Kiss 1998, 2006).

Following Kiss (1998), the Specifier of the focus position bears the feature of identificational focus, which is defined as a "subset of the set of contextually and situationally given elements for which the predicate phrase can potentially hold", and namely "the exhaustive subset of this set for which the predicate phrase actually holds" (Kiss 1998:245). While the preverbal position is reserved for exhaustive identification, postverbal constituents may bear new information focus. It is crucial that identificational focus is a feature associated with the preverbal position and only with it, which implies that it is the necessary and sufficient condition for focus movement.

Szendrői (2001, 2003) adopts a radically different viewpoint on the motivation of focus movement in Hungarian. Following the Hungarian stress rule, the most prominent stress of the clause falls on the leftmost part of an IntP. Since topicalized constituents form individual IntPs, the leftmost part of a

[9] The Hungarian data has been collected, transcribed and evaluated by Krisztian Tronka in cooperation with D2.

Hungarian clause with a preverbal topic is still the verb. If a constituent moves to the focus position, then it is this constituent that bears the most prominent stress in the clause. Postulating a Stress-Focus Correspondence principle (following Reinhart 1995), Szendrői concludes that focus movement to the left periphery is triggered by this rule, i.e. a focussed constituent moves to the preverbal position in order to receive stress. In contrast to moved constituents, postverbal constituents receive phrasal stress while main stress of the VP falls on the verb. They do not bear a [+new information focus] feature, but they may be part of a widely focussed VP. Szendrői (2001, 2003) does not deny that preverbal NPs have an exhaustive interpretation, while postverbal NPs are interpreted non-exhaustively, which she attributes to the presence or absence of movement. The main point of her account is that focussed constituents move to the left periphery in order to get stressed and not in order to be checked for [+ identificational focus].

The idea of movement driven by an identificational focus feature is furthermore challenged by Wedgwood (2003, 2007) in view of the semantic properties of this construction. Wedgwood argues that the exhaustive interpretation is not a necessary condition for movement to the preverbal position in Hungarian. The fact that many expressions in this position trigger an exhaustive interpretation results from inferences which are based on the incremental interpretation of the encoded meaning.

Summarizing the above accounts, the exhaustive identification of a constituent will induce movement to the preverbal position. Following Kiss (1998), the focused constituent moves to this position in order to be checked by the exhaustive operator and following Szendrői (2001, 2003) in order to get the prominent stress of the clause. This hypothesis does not contradict the account of Wedgwood (2003, 2007), since this account shows that exhaustivity is not a *necessary condition* for movement to the focus position.

(23) Hypothesis I:
Contexts that motivate exhaustive identification will induce movement to the focus position.

The presented accounts make different predictions in the case that the context does not induce an exhaustive identification of the referent. The critical condition is a discourse condition that triggers narrow focus (e.g., focus on one argument), but does not contain exhaustivity. The feature-driven account predicts that the constituent will be placed postverbally in this case (since it does not need to get checked by the exhaustivity operator), but the stress-driven account predicts that the constituent will be placed preverbally (in order to get in the prominently stressed position of the clause). The latter account is also in accordance with the view of Wedgwood (2003, 2007) that states that also prosodic motivation may trigger movement to the preverbal position.

(24) Hypothesis IIa (feature-driven):
Contexts that motivate focus on a single constituent without involving exhaustive identification will not induce movement to the focus position.

(25) Hypothesis IIb (stress-driven):
Contexts that motivate focus on a single constituent without involving exhaustive identification will induce movement to the focus position.

6.2 Results

Hypothesis I may be tested in the question-answer experiment “Anima”. In this experiment, the informant is shown four pictures. After 1 min., the pictures are taken away and the informant is asked four questions which belong to different question types, that all motivate an exhaustive answer. Subject questions were

always answered with a sentence, in which the subject is in the focus position, and the object in situ (see Table 4).

(26) Question: Who is looking at the girl?

a férfi néz a la:JrO

DEF man look:3.SG.PRS DEF girl-SUB

'The man is looking at the girl.'

Object questions induced movement of the object to the focus position. This was manifested in several sentence types differing in the status of the subject (topicalized, postverbal or elided, see Table 5).

(27) Question: Whom was the man pulling?

Egy nőt rángatott a férfi.

INDEF woman pull-3.SG.PST DEF man

'The man was pulling a woman.'

Table 4: Hungarian data obtained in subject questions

total		16
other		1
	✓ S_FVO	15 (100%)

Table 5: Hungarian data obtained in object questions

total		16
	✓O_FVS	3 (18.7%)
	✓ SO_FV	12 (75%)
	✓ O_FV	1 (6.2%)

The results given in Table 4 and Table 5 make clear that Hypothesis I has been fully confirmed by the data collected through QUIS.

Hypothesis II addresses the question whether movement in focus position is possible in the case of narrow and not exhaustive focus. The context condition at issue is a case of conflict for the accounts presented in 6.1, since the feature driven account does not predict focus movement in this case while the stress driven account does. QUIS provides an experiment that establishes the appropriate discourse condition (experiment "Changes"). The experimental procedure is description of picture sequences. The pictures that are described after one another differ in only one feature: either the agent, or the patient or the event changes. This experimental manipulation induced descriptions like those presented in (28).[10] In the second description, the verb is D-linked, since it is identical to the verb of the previous sentence. The new feature of the scene is the object constituent (*ládá-t* 'box-ACC'), which moves to the preverbal position.

(28) [first picture]

Egy férfi tol egy autót

INDEF man push:3.SG.PRS INDEF car-ACC

'A man is pushing a car...'

[second picture]

a férfi egy ládát tol

INDEF man INDEF box-ACC push:3.SG.PRS

'...the man is pushing a box.'

In each scene, there is only one patient for which the predicate holds, which could allow for an expression of exhaustivity. However, the description of a sequence of scenes with new patients does not meet an important condition of exhaustive identification (see definition in section 6.1): the patient is simply a new referent and not a member of a contextually or situationally given set of

[10] The available data is very few for a quantitative account.

referents for which the predicate potentially holds. For this reason, this experimental setting did never elicited expressions containing an explicit mention of exhaustivity, e.g., “now the man is pushing only a box”. An explicit mention of this kind would be true with respect to the perceived stimulus, but it would be completely unmotivated in this context because it evokes the assumption of a presupposition that the man was pushing more than one thing in the scene under description. If this understanding of the context conditions is on the right track, this example supports the stress-driven account for Hungarian focus movement.

6.3 Summary

We have shown that there are different claims about the functional motivation of the movement to preverbal position in Hungarian. All accounts presented however agree that exhaustive identification of a referent will induce movement to this position. According to the feature-driven account exhaustive identification would be the motivation for movement; according to the stress-based account exhaustive identification would be an epiphenomenon. Our data has verified the assumption that this context induces focus movement in Hungarian. Already in the small dataset obtained through the QUIS the trend of the data in exhaustivity inducing questions is completely clear.

Furthermore, we have seen that the presented accounts have different implications for contexts that induce new information focus on a single constituent. In this context, only the stress-driven account predicts movement to the preverbal position. Our production data confirms the hypothesis of this account. Supposing that the material discussed in section 6.2 is not eliciting exhaustively identified objects, we have shown by means of single examples from our dataset that exhaustivity is not a necessary condition for Hungarian focus movement.

7 Conclusions

This paper illustrates some of the issues involved in interpreting speech production data elicited by means of visual stimuli, but also demonstrates the effectiveness of this paradigm for testing hypotheses in the theoretical literature on information structure.

In all of the case studies presented above, it was necessary as a first step to identify which tokens in the dataset represent an attempt to render the intended information structure context. Tokens in which the speaker speaks about the picture itself ('I see a man pushing a car') indicates that the informant is assuming a different common ground between speaker and hearer than was intended in the design of the experiment. We suggest that cases such as these do not represent a failure of the experimental paradigm, but rather an inevitable outcome of the choice to elicit information structure by means of visual stimuli. Since our experiments elicit a good proportion of tokens in which the informants do render the information structure context as intended, the decision to adopt visual stimuli is supported, and will be further vindicated in future as the number of languages grows for which parallel data elicited with QUIS are available.

Within the subset of data in which the intended information structure context appears to have been elicited, we are able to compare the results with the predictions and generalizations in the literature. In the case studies set out above we see alternative outcomes from this comparison: in some cases our data mostly or fully match the expected results, validating the experimental paradigm implemented in QUIS; in other cases our data fail to match the expected results, but tend to do so in ways that are revealing, thus enabling us to develop more refined research questions for specific languages as well as more finely tuned experimental methodology.

References

Alexiadou, Artemis. 1999. On the properties of some Greek word order patterns. *Studies in Greek Syntax*. Kluwer Academic Publishers. 45–65.

Alexopoulou, Theodora. 1999. *The syntax of discourse functions in Greek a non-configurational approach*. Ph.D. thesis, University of Edinburgh.

Anagnostopoulou, Elena. 1994. *Clitic dependencies in Modern Greek*. PhD Dissertation, University of Salzburg.

Anagnostopoulou, Elena. 1999. Conditions on clitic doubling in Greek. In van Riemsdijk, H. (ed.) *Clitics in the Languages of Europe.* Berlin/New York: Mouton de Gruyter. 761-798.

Androulakis, Anna. 2001. Clitics and Doubling in Greek. *Reading Working Papers in Linguistics* 5, 85-111.

Arvaniti, A. 1992. Secondary Stress: evidence from Modern Greek. In Papers in Laboratory Phonology II. Gesture, Segment, Prosody. Docherty, G. and Ladd, B. (eds.). Cambridge: Cambridge University Press.

Baumann, Stefan. 2006. The intonation of givenness. Tübingen: Niemeyer.

Baumann, Stefan, and Grice, Martine. 2006. The intonation of accessibility. *Journal of Pragmatics* 38:1636-1657.

Bródy, Michael. 1990, Some remarks on the focus field in Hungarian. *UCL Working Papers in Linguistics 2*: 201–225.

Drachman, G. and Malikouti-Drachman, A. 1999. Greek word accent. In *Word Prosodic Systems in the Languages of Europe*. In: van der Hulst, H. (ed.) New York: Mouton de Gruyter.

É. Kiss, Katalin. 1992. Az egyszerű mondat szerkezete [Structure of the simple sentence]. In Kiefer, Ferenc (ed.): *Strukturális magyar nyelvtan* I. Mondattan. Budapest: Akadémiai Kiadó, 79-177.

É. Kiss, Katalin. 1998. Identificational vs. information focus. *Language* 74 (2), 245-273.

É. Kiss, Katalin. 2006. The function and the syntax of the verbal particle. In É Kiss Katalin (ed.), *Event Structure and the Left Periphery: Studies on Hungarian*. Berlin: Springer Verlag. 17-56

Fanselow, Gisbert. 2001. Features, θ-Roles, and Free Constituent Order. *Linguistic Inquiry* 32, 405-437.

Fanselow, Gisbert. 2003. Free Constituent Order. A Minimalist Interface Account. *Folia Linguistica* 37: 191–231.

Farkas, Donka F. and Henriëtte de Swart. 2003. *The semantics of incorporation: From argument structure to discourse transparency*. Stanford: CSLI Publications.

Féry, Caroline. 2001. Focus and Phrasing in French". *Audiatur Vox Sapientiae: A Festschrift for Arnim von Stechow* ed. by Caroline Féry & Wolfgang Sternefeld. Berlin: Akademie Verlag, 153-81.

Féry, Caroline. 1993. *German intonational patterns*. Tübingen: Niemeyer.

François, D. 1974. *Français parlé. Analyse des unités phoniques et significatives d'un corpus receuilli dans la région parisienne.* Paris: S. E. L. A.F.

Frey, Werner. 2004. The grammar-pragmatics interface and the German prefield. *Sprache & Pragmatik* 52: 1-39, Lund.

Frey, Werner. 2005. Zur Syntax der linken Peripherie im Deutschen. In d'Avis, Franz (ed.) *Deutsche Syntax: Empirie und Theorie*. *Symposium Göteborg 13-15 maj 2004*. Göteborg: Göteborger Germanistische Forschungen 46.

Grewendorf, Günther & Joachim Sabel. 1994. Long scrambling and incorporation. *Linguistic Inquiry* 25: 263-308.

Grewendorf, Günther & Sabel, Joachim. 1999. Scrambling in German and Japanese: Adjunction versus Multiple Specifiers. *Natural Language & Linguistic Theory* 17: 1-86

Grewendorf, Günther. 2005. The discourse configurationality of scrambling. In: Sabel, Joachim & Saito, Mamoru (eds) *The Free Word Order Phenomenon*. Mouton deGruyter

Haider, Hubert. 2006. Mittelfeld-Phenomena. In: van Riemsdijk, Henk & Everaert, Martin (eds) *The Syntax Companion*. Oxford: Blackwell

Haider, Hubert & Rosengren, Inger. 2003. Scrambling: Nontriggered Chain Formation in OV Languages. *Journal of Germanic Linguistics* 15, 203–267.

Iatridou, S. 1995. Clitics and island effects. *Penn Working Papers in Linguistics* 2, 11-31.

Jacobs, Joachim. 1997. I-Topikalisierung. *Linguistische Berichte* 168, 91-133.

Jacobs, Joachim. 2001. The dimensions of topic-comment. *Linguistics* 39: 641-682.

Jean Jean. 1981. L'organisation des formes sujets en français de conversation: Étude quantitative et grammaticale de deux corpus. In *Recherches sur le français parlé* 3. Aix-en-Provence: Publications de l'Université de Provence.

Keller, Frank, and Alexopoulou, Theodora. 2000. Phonology competes with Syntax: Experimental evidence for the interaction of word order and accent placement in the realization of information structure. *Cognition* 79.3: 301-372.

Ladd, D. R. 1996. *Intonational phonology*. Cambridge: CUP.

Lambrecht, K. 1984. A pragmatic constraint on lexical subjects in spoken French. *Papers from the Chicago Linguistic Society* 20, 239–56.

Lambrecht, Knud. 1994. *Information Structure and Sentence Form: Topic, Focus, and the Mental Representations of Discourse Referents*. Cambridge: Cambridge University Press.

Lambrecht, Knud. 2001. A framework for the analysis of cleft constructions, *Linguistics* 39.3, 463-516.

Lambrecht, Knud. 2001. A framework for the analysis of cleft constructions. *Linguistics* 39.3, 463-516.

Lambrecht, Knud. 1988. Presentational cleft constructions in spoken French. In *Clause combining in grammar and discourse*., eds. John Haiman and Sandra A. Thompson, 135-179. Amsterdam, Philadelphia: John Benjamins.

Lambrecht, Knud. 1994. *Information Structure and Sentence Form*. Cambridge: Cambridge University Press.

Müller, Gereon. 1999, Optimality, markedness, and word order in German. *Linguistics* 37, 777-818.

Peters, J. 2006. *Intonation deutscher Regionalsprachen*. Berlin/New York: de Gruyter.

Philippaki-Warburton, I. 1994. Verb movement and clitics in Modern Greek. In Philippaki-Warburton I., Nicolaidis, K. & Sifianou, M. (eds.), Themes in Greek linguistics [Current issues in linguistic theory 117]. Amsterdam: John Benjamins. 53-60.

Philippaki-Warburton, I. 1998. Functional categories and Modern Greek syntax. *The* Linguistic Review 15. 159-186.

Reinhart, Tanya. 1995. *Interface Strategies*. OTS Working Papers in Theoretical Linguistics, 95-002. Utrecht: OTS.

Revithiadou, Anthi. 1999. *Headmost Accent Wins: Head Dominance and Ideal Prosodic Form in Lexical Accent Systems*. Doctoral dissertation, LOT Dissertation Series 15 (HIL/Leiden University), Holland Academic Graphics, The Hague.

Revithiadou, Anthi & Spiropoulos, Vasilis. 2004. The Multiple Spell-Out Hypothesis and the phonological component: Evidence from Greek.

Roland, Katy. 1994. The pragmatics of Modern Greek voice: Active, inverse and passive. Givón (ed.), 233-260.

Sasse, Hans Jürgen. 1987. The Thetic/Categorical distinction revisited. *Journal of Linguistics* 25:511-580.

Skopeteas Stavros and Caroline Féry. In print. Contrastive Topics in Pairing Answers: A Cross-Linguistic Production Study. In Featherston, Sam & Wolfgang Sternefeld (Hrsg.). *Linguistic Evidence, Vol. 2*. Berlin: Mouton de Gruyter.

Skopeteas Stavros and Gisbert Fanselow. 2007. Effects of givenness and constraints on free word order. In Zimmermann, Malte & Caroline Féry (Hrsg.), *Information structure from different perspectives*. Oxford: OUP.

Szendrői, Kriszta. 2001. *Focus and syntax phonology interface*. Ph.D. dissertation, UCL.

Szendrői, Kriszta. 2003. A stress-based approach to the syntax of Hungarian focus. *The linguistic review* 20, 37-78.

Uhmann, Susanne. 1991. *Fokusphonologie: eine Analyse deutscher Intonationskonturen im Rahmen der nicht-linearen Phonologie*. Tübingen: Niemeyer.

Vallduví, E. 1992. *The informational component.* New York: Garland.

Valliouli, M. 1993. Postverbal subjects, reduplicated objects or retopicalization. In Philippaki-Warburton et al. (eds.), *Themes in Greek linguistics*. Amsterdam: Benjamins.

Weber, A. & Müller, K. 2004. Word order variation in German main clauses: A corpus analysis. *Proceedings of the 20th International conference on Computational Linguistics*, (pp. 71-77). Geneva, Italy.

Wedgwood, Daniel John. 2003. *Predication and information structure: A dynamic account of Hungarian pre-verbal syntax.* Ph. D. dissertation, Univ. of Edinburgh.

Wedgwood, Daniel John. 2007. Identifying inferences in focus. To appear in K. Schwabe and S. Winkler (eds.), *On Information Structure, Meaning and Form*. Amsterdam/Philadelphia: John Benjamins

Weskott, T., Hörnig, R., Kaiser, E., Féry, C., Kern, S., Fanselow, G., & Kliegl, R. (2006), *Information structure and the anticipation of discourse referents*. Ms. University of Potsdam.

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Encoding Information Structure in Yucatec Maya: On the Interplay of Prosody and Syntax*

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The aim of this paper is to outline the means for encoding information structure in Yucatec Maya. Yucatec Maya is a tone language, displaying a three-fold opposition in the tonal realization of syllables. From the morpho-syntactic point of view, the grammar of Yucatec Maya contains morphological (topic affixes, morphological marking of out-of-focus predicates) and syntactic (designated positions) means to uniquely specify syntactic constructions for their information structure. After a descriptive overview of these phenomena, we present experimental evidence which reveals the impact of the non-availability of prosodic alternatives on the choice of syntactic constructions in language production.

Key words: cleft constructions, lexical tone, topic affixes, verb-initial language

1 Preliminaries

Yucatec Maya is a Mayan language spoken by a population of 700,000 speakers (following the 1990 census) at the Yucatecan peninsula (Mexico). As in most other Mayan languages, the canonical order in Yucatec Maya is verb-initial (see England 1991; Norman & Campbell 1978).

With respect to information structure, Yucatec Maya shares with other Mayan languages that preverbal placement of constituents is unambiguously associated with the particular pragmatic functions 'topic' and 'focus'. The topic constituent is placed clause initially and is followed by a deictic suffix. Focus is

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encoded through cleft constructions that place the focused constituent in the immediately preverbal position.

As regards its prosodic characteristics, Yucatec Maya is exceptional in its language family in being the only Mayan language that has developed lexical tones.[1] However, lexical tone and intonation neither interact in the expression of topic nor of focus (Kügler & Skopeteas 2006).

The aim of this paper is to outline the means of encoding information structure in Yucatec Maya. Section 2 presents the morpho-syntactic devices that Yucatec Maya uses for the encoding of topic and focus. Section 3 gives an outline of the tonal characteristics of Yucatec Maya, presenting the prosodic realization of lexical tones and examining the availability of tonal reflexes of information structure. In Section 4, we present the results of a production experiment and we discuss the impact of the grammatical and prosodic properties of Yucatec Maya as outlined in sections 2 and 3 on the choice of grammatical constructions in language production. Section 5 summarizes the main results of this work.

The data were collected in December 2004 in the village of Yaxley (Quintana Roo, Mexico). The subjects that participated in all reported experiments were native speakers of Yucatec Maya and bilingual in Spanish, but exclusively use Maya in their everyday communication within the community.

2 Morpho-Syntactic Encoding of Information Structure

As mentioned in Section 1, verb initial sentences are considered to be canonical based on the criterion of structural markedness: constructions with preverbal arguments are morphologically marked, hence the verb initial order is the

[1] See Fisher (1976) for discussion of tonogenesis in the Yucatecan branch of Mayan languages.

canonical one (see Durbin & Ojeda 1978). Both VSO and VOS are possible orders in the language, but VOS, which is exemplified in (1), is considered to be pragmatically neutral.[2]

(1) T-u hàant-ah òon Pedro.
PFV-A.3 eat:TRR-CMPL avocado Pedro
'Pedro ate avocado.'

Though sentences with two postverbal arguments such as (1) qualify as canonical sentences in Yucatec Maya based on the criterion of morphological markedness, this order only very rarely occurs in corpora (1% in a corpus of 200 clauses, see Skopeteas & Verhoeven 2005). This is a consequence of the fact that verb-initial sentences are thetic, and thetic sentences only rarely occur in discourse. The most frequent sentence type with two lexically realized arguments in a corpus is generally a categorical sentence with a topicalized agent (see (2)).

Topicalized and (narrowly) focused constituents are placed preverbally, while a postverbal constituent be part of a broad focused part of the clause (as, e.g., the patient *òon* in (2)). A topicalized constituent occurs clause initially and is obligatorily right-bounded by a deictic suffix (*a'* 'D1': deixis to the 1st person; *o'* 'D2': deixis to the 2nd person; *e'* 'D3': contextually given referent).[3]

(2) Pedro-e' t-u hàant-ah òon.
Pedro-D3 PFV-A.3 eat:TRR-CMPL avocado
'As for Pedro, he ate avocado.'

[2] See Skopeteas & Verhoeven (2005) on the impact of definiteness, animacy, and ambiguity on the choice of postverbal order in Yucatec Maya.

[3] See also Bohnemeyer (1998) and Lehmann (1990) about topicalization in Yucatec Maya.

Narrow focus is assigned by the displacement of an argument in the preverbal position (cf. (3)). Focus on the agent of a transitive verb triggers a special 'out of focus' form of the verb (cf. (4)): the aspect auxiliary is dropped together with the cross-reference clitic for the agent. In the perfective aspect, the extrafocal verb bears the zero form subjunctive marker in non-clause-final position (Bricker 1979, Lehmann 1990). The constructions in (3) and (4) are cleft sentences. The main clause only contains a noun phrase which in Yucatec Maya as in many other Mesoamerican languages may constitute an independent nominal clause. Verb and postverbal argument form a relative clause (relative clauses in Yucatec Maya are not introduced through a relative pronoun). The analysis of these constructions as cleft sentences explains the occurrence of the verb form in (4): This verb form does not occur elsewhere in main clauses, and it is this verb form that is used in relative clauses that are headed by an agent NP.

(3) òon t-u hàant-ah Pedro.
avocado PFV-A.3 eat:TRR-CMPL Pedro
'It was (an) avocado that Pedro ate.'

(4) Pedro hàant òon.
Pedro eat:TRR(SUBJ) avocado
'It was Pedro who ate (an) avocado.'

3 Prosody: Tone and Intonation in Yucatec Maya

In this section, we attempt to show that information structural categories such as topic or focus are not expressed by means of post-lexical tones (intonation) in Yucatec Maya. To show this, we introduce the inventory of lexical tones of Yucatec Maya as well as their phonetic realization in section 3.3. Based on these observations, in section 3.4 we analyse target words bearing lexical tones in different syntactic positions that encode distinct information status. Comparing

the realization of lexical tones on target words occurring in broad and narrow focus as well as in topic position, we observe no further tonal effects that might arise due to intonation such as focal tone insertion as in Swedish (Bruce 1977) or Basque (Gussenhoven 2004). The following section (3.1) reviews the literature on the tone system of Yucatec Maya. Section 3.2 then introduces basic methodological issues of the production experiment as well as the data analysis.

3.1 Tone in Yucatec Maya

There is controversy in the literature regarding the tonal system of modern Yucatec Maya. All investigations agree that long vowels are obligatory tone bearing units and display an opposition between a high tone and a low tone. Short vowels are treated as contrasting two levels of pitch in Pike (1946), or as instantiating a third tone termed as "neutral" in Fisher (1976), or as having no tone in Blair & Vermont-Salas (1965). The tonal distinction as well as the distinction between long and short vowels is shown to be contrastive: *luk'ul* 'goes away' - *lúuk'ul* 'swallow' - *lùuk'* 'mud' (examples from Lehmann 1990; see also Blair & Vermont-Salas 1965 and Pike 1946).

As for the realization of tones, authors agree that the low tone is realized as a level tone (Blair & Vermont-Salas 1965, Pike 1946, Straight 1976). Concerning the lexical high tone, three different realizations have been claimed: (i) rising (Blair & Vermont-Salas 1965, Straight 1976) (ii) falling (Fisher 1976), and (iii) falling from high or high level (Pike 1946). However, Fisher (1976) shows that the falling realization occurs in monosyllabic words while in the first syllable of disyllabic words the lexical tone is realized as a rise. None of these investigations argues that the different realizations of a high tone are contrastive at the lexical level.

3.2 Procedure of the production experiment and data analysis

The speech data for the analysis reported in this section were recorded during the same field period as all the other data reported in this paper. Data elicitation took the form of a production experiment with an experimental setup that allows for separating lexical and post-lexical tones. The general procedure is inspired by the work of Bruce (1977) on the tonal aspects of Swedish word accents. Three distinct sentence structures served for the elicitation of target words in broad and narrow focus (post- and preverbal position, respectively), and in topic position (cf. section 2). The structures are listed in (5), where (5a) evokes broad focus in a sentence with the target word as a single argument of the existential verb, (5b) narrow focus in a sentence with the target word in the focus position, and (5c) topic in a sentence with the target word in the topic position. In all sentences the target words are non-initial and non-final, in order to avoid interactions with sentence initial reset or sentence-final lowering. The target words were chosen from the YUCLEX database (Lehmann s.d.), in order to consider instances of all possible tonal patterns (see Table 1).[4]

(5) a. Broad focus construction
yàan hun-túul ___ ichil le nah-o’.
EXIST one-CL.AN ___ in DEF house-D2
‘There is a ___ in the house.’

b. Narrow focus construction
ho’lyak-e’, ___ hàant-ik le òon-o’.
yesterday-D3 ___ eat:TRR-INCMPL DEF avocado-D2
‘Yesterday, it was ___ who ate the avocado.’

[4] In this article, we particularly discuss the realizations of the minimal pair *míis* ‘cat’ and *mìis* ‘broom’.

c. Topic construction
ku ts'o'kol-e' le ___ -e' h bin-ih.
afterwards-D3 DEF ___-D3 PFV go-B.3
'Afterwards, what the ___ concerns, (s)he went away.'

Table 1: Tonal patterns in lexical items. (N = neutral; L = low; H = high; grave accent indicates low tone, acute accent high tone).

tonal pattern	lexical item	translation
N	*am*	spider
L	*lòol*	flower
L	*mìis*	cat
H	*míis*	broom
H	*láal*	stinging nettle
N-N	*ahaw*	chief
N-L	*konkùum*	pot seller
N-H	*konchúuk*	shoe seller
L-N	*yùuyum*	bird
L-H	*kòolnáal*	farmer
L-L	*xtùuxkùuts*	pheasant
H-N	*yáalam*	fawn
H-L	*óochkàan*	snake
H-H	*tóokchúuk*	coal merchant

The speech data were elicited by means of question-answer pairs. Since most Yucatec Mayan speakers are not trained in reading Mayan orthography, we had to present our stimuli orally. The carrier sentences with target items as given in Table 1 were thus read by a native speaker before running the experimental sessions. The pitch contour of each provided sentence, however, was reduced to a flat level pitch in order to eliminate all linguistic information that is encoded by pitch. In the experimental sessions, informants heard the resynthesized stimuli. The informants' task, then, was to answer a generic question by repeating the text they had just heard before. All recordings were made on a DAT recorder (SONY 100) using head-mounted microphones. For the

manipulation of the test sentences and for pitch analysis we used Praat (Boersma & Weenink 2006).

In total, twelve (male and female) speakers have been recorded. However, all twelve speakers did not produce sentences with all test items. The individual time-normalized measurements are based on two to six speakers.

The pitch analysis has been made using a hanning window of 0.4 seconds length with a default 10 ms analysis frame. The pitch contour has been smoothed using the Praat smoothing algorithm (frequency band 10 Hz) to diminish microprosodic perturbations. Following Xu (1999) the pitch tracks were time-normalized with ten measuring points during the voiced part of each of the labeled intervals. The time-normalized plots reported below thus only refer to the voiced parts of the words leaving voiceless parts aside. The F0-values measured in Hertz were converted to semitones[5] to normalize across the physiological differences of male and female voices.

3.3 The phonetic realisation of lexical tones

In this section we provide an overview of the realization of lexical tones in Yucatec Maya. It has been claimed that Yucatec Maya exhibits a tonal distinction between high and low tones with additional toneless syllables (e.g. Pike, 1946). We will show the realisation of low and high tones below.

On the basis of a first inspection of empirical data gained through our production experiment, in Kügler & Skopeteas (2006) we identified a lexical low and a lexical high tone. The data presented here show systematically

[5] The conversion from Hertz into semitones is made according to the equation below with an arbitrarily chosen reference of 100 Hz (e.g. Reetz 1999):

$$f(\text{st}) = 12 \log_2 (f(\text{Hz}) / 100 \text{ Hz})$$

See also Nolan (2003) who has convincingly demonstrated that the semitone scale fits best the intonational equivalence scale; see Ladd (1996:260ff) for the notion of semitones with respect to pitch range.

analysed and normalized results. While the low tone is realized as a low level tone (see Fig. 1, right panel) which is in accordance with the previous accounts discussed above, we find evidence for the high tone being realized as a rise in pitch (see Fig 2), thus supporting the analysis of Blair & Vermont-Salas (1965), Straight (1976), and partly that of Fisher (1976). The difference in the observed contours in Fig. 1 is due to a difference in tonal structure. In the broad focus condition (left panel of Fig. 1) a high tone on the indefinite marker *huntúul* precedes the lexical low tone of the target word, whereas a toneless syllable precedes the target syllable in the topic condition.

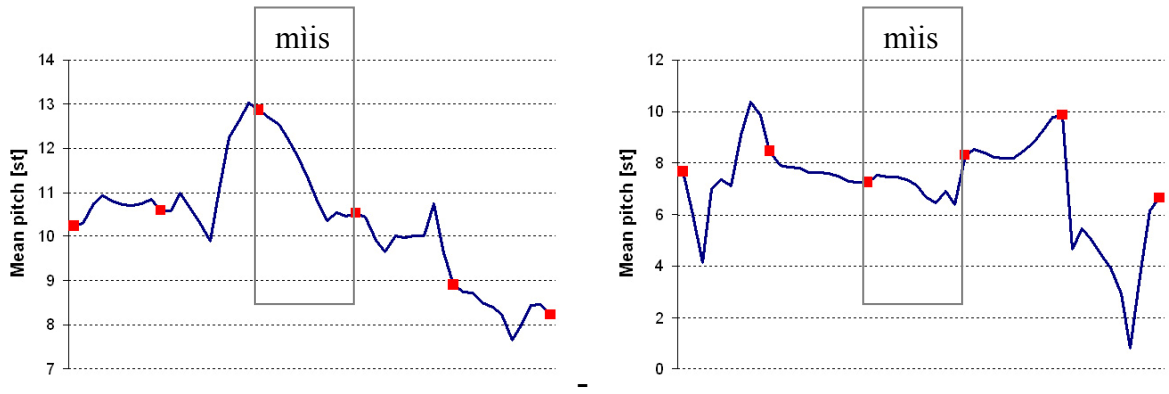

Fig. 1: Target word *mìis* 'cat' with lexical low tone; in postverbal position (broad focus and canonical word order, five speakers) in the left panel, and in preverbal topic position in the right panel (five speakers).

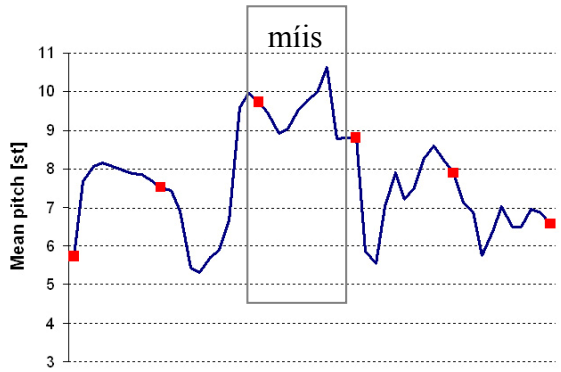

Fig. 2: Target word *míis* 'broom' with lexical high tone in postverbal position (broad focus and canonical word order, four speakers).

For syllables containing long vowels this tonal distinction is obligatory, whereas syllables containing short vowels are empty TBUs.

3.4 Tonal effects of information structure

In this section, we argue that information structure does not affect the realization of lexical tones in Yucatec Maya, i.e. the language does not encode a particular focus structure by means of intonational tones. We observe no interaction of lexical tones and post-lexical tones (intonation) meaning that Yucatec Maya does not employ additional pitch accents to express topic or focus. Properties of Yucatec Mayan intonation are dealt with in Blair & Vermont-Salas (1965) who offers a detailed annotation of intonational contours made for didactic purposes. Furthermore, Straight (1976) gives an inventory of rules that predict different realizations of the lexical tones in several tonal environments.

As already shown in Section 2, a crucial aspect of the Yucatec Mayan grammar is that the syntactic realization of the arguments is determined by information structure. As a result, it is not possible to examine the prosodic effects of information structure independently of syntax, i.e. it is not possible to design minimal pairs of identical carrier sentences that will be produced in contexts that induce distinct information structures. With this constraint in mind, the question of prosodic effects of information structure in Maya may be inspected by using the same lexical unit in different information structural – but necessarily also syntactic – positions (cf. (5) above).

In Kügler & Skopeteas (2006) we investigated the interaction between lexical tones and intonation in Yucatec Maya on the basis of a first inspection of the data, and concluded that there appears to be no tonal means for the expression of focus or topic. As illustrated in Section 2, narrow focused constituents appear preverbally (cf. (5b) above). If a word containing a lexical pre-specified tone occurs in the focus position, the underlying shape of the tone

as described in Section 3.3 remains preserved. Thus, we observe no interaction of lexical tone and intonation (in the form of particular pitch accents) for the expression of focus. The data presented here are calculated means of six speakers. Consider the pitch track of the monosyllabic target word *míis* 'broom' with lexical high tone in narrow focus position in the left panel of Fig. 3. The target word is realized with the rise in pitch identical to the high tone rise established in Section 3.3. There appears no further tonal event that might be analyzed as a pitch accent indicating focus tonally. If we compare the narrow focus realization of a target word containing a lexical high tone with a realization in broad focus (postverbally, cf. Fig. 2 above) or in topic position (preverbally as in the narrow focus condition, cf. the right panel of Fig. 3), we observe the same tonal pattern, i.e., a rise in pitch on the target word. Thus, we conclude that information structural components such as topic, narrow and broad focus are not expressed by means of post-lexical tones (pitch accents) as is the case in languages such as Basque or Swedish (cf. Gussenhoven 2004).

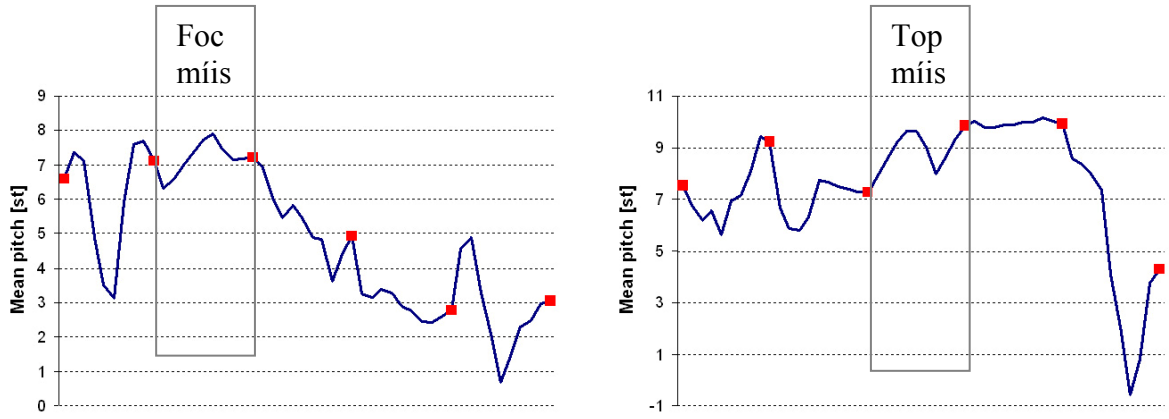

Fig. 3: Target word *míis* 'broom' with lexical high tone in preverbal position, normalized across six speakers; the left panel shows narrow focus, and the right panel topic position.

3.5 Summary

Concerning the prosodic properties of Yucatec Maya, we have shown that a lexical low tone is realized as a low level pitch, whereas a lexical high tone is realized as a rise in pitch (cf. also Kügler & Skopeteas 2006). Further, the realization of the lexical tones is not affected by information structure, i.e. information structure appears to induce no qualitative effects on the realisation of lexical tones. Focus is mainly expressed by means of syntax, which is explored in more detail in the next section.

4 Encoding Information Structure in Spontaneous Production

We have seen in Section 2 that Yucatec Maya displays a number of morpho-syntactic devices for the encoding of topic and focus. We have shown in Section 3 that the language does not employ tonal means for the encoding of information structure. In this Section, we present data obtained through a production experiment in which spontaneous responses to different question types were elicited. This data shows the impact of the mentioned structural and prosodic properties on the choice of a given grammatical construction in particular discourse conditions.

The experiment discussed in this paper was developed within the project D2 “Typology of Information Structure” (part of the SFB 632 “Information Structure”) and is part of the Questionnaire on Information Structure (Skopeteas et al. 2006)[6].

[6] See Skopeteas et al. (2006:119ff.) for a full documentation of the experimental procedure and material.

Experimental procedure

Subjects were shown a sheet of paper that contained four pictures. All pictures presented situations in which two entities were involved in events which are typically encoded by transitive verbs (*x* hits *y*, *x* kicks *y*, *x* carries *y*, *x* cuts *y*, etc.). The subjects were given one minute to observe what happens in the pictures; after that, the pictures were taken away and four questions relating to the pictures were played from a laptop. The questions were pre-recorded with two native speakers on a DAT recorder (SONY 100) and digitized at a sampling frequency of 22050 Hz. Subjects were instructed to listen to the questions and give a spontaneous answer. This experiment was part of a longer session (about 40 min.) that contained pseudo-randomized tasks from six different production experiments that were used as fillers for each other.

Sixteen native speakers of Yucatec Maya participated in this experiment. Their responses were recorded using head-mounted microphones on the same DAT recorder.

Experimental conditions

For the purposes of this paper, we will consider four of the eight conditions of this experiment. Two factors are instantiated in the four conditions:

(a) solicited argument: agent or patient;

(b) relation of the (intended) answer to the question: completive (i.e., filling a gap in the presupposed information) vs. corrective (i.e., replacing a part of the presupposed information).

The combination of these factors results in four conditions. The questions establishing these conditions are exemplified in (6).

(6) a. question inducing completive answer: agent
máax léench'in-t-ik le xìib-o'?
who push-TRR-INCMPL DEF man-D2
'Who is pushing the man?

b. question inducing completive answer: patient
ba'x t-u léench'in-t-ah le xìib-o'?
what PFV-A.3 push-TRR-CMPL DEF man-D2
'What is the man pushing?

c. question inducing corrective answer: agent
x-ch'úup léench'in-t-ik le xìib-o'?
F-woman push-TRR-INCMPL DEF man-D2
'Is a woman pushing the man?' (with respect to a stimulus in which 'a man is pushing the man')

d. corrective answer: patient
le x-ch'úup-o' táan wáah u
DEF F-woman-D2 PROG INT A.3
léench'in-t-ik hun-túul xìib?
push-TRR-INCMPL one-CL.AN man
'Is the woman pushing a man?' (with respect to a stimulus in which 'the woman is pushing a girl')

The conditions exemplified in (6) were factorially implemented in 16 items presenting different events, all involving two participants. Each subject was confronted with each item once and with each experimental condition twice. Thus the experimental procedure resulted in a corpus of (16×2=)32 answers per condition, which are discussed in the following Subsection.

Results

In accordance with the syntactic properties of the language which have been presented in Section 2, all question types presented in (6) elicited focus constructions to some extent. In the following examples, the argument which is

solicited through the question is placed preverbally and the argument which is part of the background of the question is placed postverbally.

(7) a. A-focus
Q= Who is looking at the girl?
hun-túul xibpal pak-t-ik
one-CL.AN man:child see-TRR-INCMPL
le x-ch'úuppal-o'.
DEF F-woman:child-D2
'It is a boy that is looking at the girl.'

b. P-focus
Q= What is the man kicking?
hun-p'éel esten... k'áanche' k-u
one-CL.INAN HESIT chair IPFV-A.3
kóochek'-t-ik le xìib-o'.
kick:foot-TRR-INCMPL DEF man-D2
'It is a chair that the man is kicking.'

The solicited information may also occur postverbally, as in the following example. The argument which is part of the background of the question is placed in the topic position.

(8) Q= Is the man kicking a table?
le xìib-o' túun kóochek'-t-ik
DEF man-D2 PROG:A.3 kick:foot-TRR-INCMPL
hun-p'éel silla
one-CL.INAN chair
'The man is kicking a chair.'

Answers with two preverbal arguments also occur, but only in the conditions in which the agent is a topic and the patient is in focus (and not vice versa).

(9) Q= Is the woman hitting a flower?
ma', le x-ch'úup-o' hun-p'éel k'áax k-u
NEG DEF F-woman-D2 one-CL.INAN wood IPFV-A.3
lox-ik.
hit-INCMPL
'No, the girl hits a piece of wood.'

Since the subjects were instructed to give a spontaneous answer to the recorded questions, the results contain also elliptical sentences that do not allow insights into the function of sentential positions.

(10) Q= Who is carrying the pot?
hun-túul máak.
one-CL.AN man
'A man.'

Argument ellipsis is attested, too. In these answers, the focused argument and the verb are realized and the argument which is part of the question's background is elided. There are two possible realizations of focused arguments in these sentences, either in the preverbal focus position (11b) or postverbally (11a).

(11) a. Postverbal realization
Q= What is the man pulling?
túun kóol-ik hun-p'éel mesa
PROG:A.3 pull-INCMPL one-CL.INAN table
'He is pulling a table.'

b. Preverbal realization
Q= What is the man carrying?
hun-túul x-ch'úup k-u bis-ik
one-CL.AN F-woman IPFV-A.3 carry-INCMPL
'It is a woman that he's carrying.'

Fig. 4 and Fig. 5 show the results gained in the four experimental conditions. Note that the figures only contain those answers that (a) do not imply a

misinterpetation of the stimulus and that (b) do not display verb ellipsis. Three types of answers are distinguished in Fig. 4: focus constructions as exemplified in (7), postverbal placement of the solicited information as illustrated in (8) and "other". The cases classified as "other" contain pseudo-clefts or complex sentences with a dislocated argument.

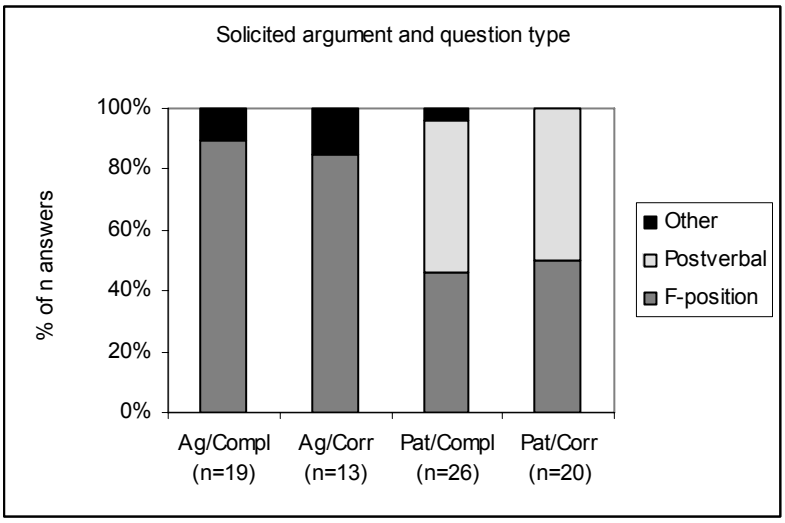

Fig. 4: Encoding the argument which is solicited through the question ("Ag": agent in focus; "Pat": patient in focus; "Compl": completive answer; "Corr": corrective answer).

Fig. 4 shows an asymmetry in the encoding of agents and patients, when solicited through the questions. Agents are almost always placed in the preverbal focus position, while patients may occur in the postverbal position, too. This result reveals that patients may also be focused in situ. Furthermore we can observe descriptively in Fig. 4 that the type of question (i.e., corrective vs. completive) does not have an impact.

An argument which is part of the background of the question can be encoded either as a topic (see (8) and (9)), or postverbally (see (7)), or is elided (see (11)). The observed occurrence of these options is presented in Figure 5: in agent questions the background argument is the patient, and in patient questions the background argument is the agent.

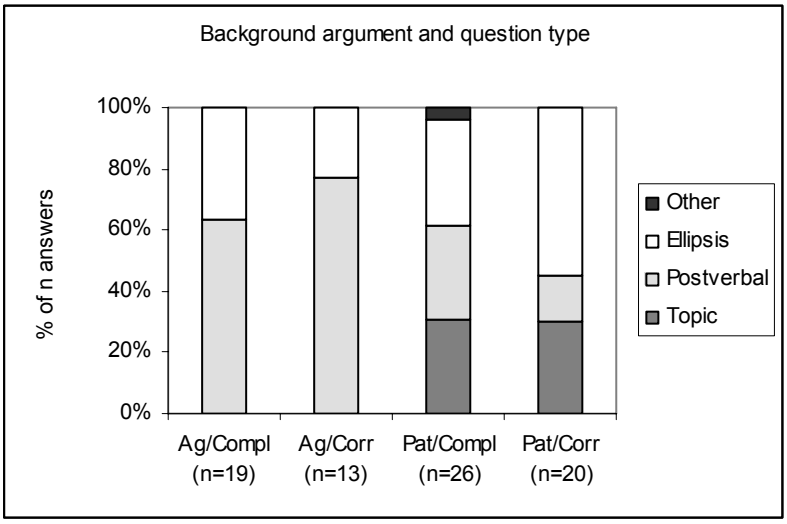

Fig. 5: Encoding the background argument

Figure 5 shows that an asymmetry holds for the topicalization of the arguments, too: an agent is placed in the topic position when it is background information (see patient questions), while a patient which is the background information is always encoded postverbally. As already observed with respect to the encoding of the solicited argument, the difference between corrective and completive answers does not crucially affect the encoding of the background argument in Yucatec Maya.

The common denominator between the two observed asymmetries is a general preference for Agent first orders. In sentences with two third person nominals, one of which is topicalized, the construction is ambiguous due to the lack of case marking. For these sentences, there is a strong preference to interpret the topicalized argument as an agent which probably results in the asymmetry presented in Fig. 5.

5 Summary

We demonstrated in Section 2 that Yucatec Maya provides unambiguous syntactic means for the encoding of information structure. In Section 3, we

illustrated that information structure appears to induce no qualitative effects on the realization of lexical tones. The consequence of these observations is that speakers will have to choose a syntactic device in order to encode the information structure of arguments. This hypothesis was confirmed by a production experiment that we presented in Section 4: in all question types, speakers produced a high amount of syntactic constructions that focused the solicited argument. The data obtained by this experiment also revealed an asymmetry between focused patients and focused agents: while agent questions almost always triggered agent focus, patient questions only triggered patient focus in half of the answers. In the other half, the patient – though it is the solicited argument – remains in situ. The data from topicalization revealed a reverse asymmetry; the agent is the preferred topic while the patient does not occur in topic position. Both asymmetries are attributed here to a general preference for agent first orders in Yucatec Maya.

6 Glosses

A	cross-reference marker, set A
B	cross-reference marker, set B
CL	classifier
AN	animate
INAN	inanimate
CMPL	completive
D	deictic
DEF	definite
EXIST	existential
F	feminine
HESIT	hesitative

INCMPL	incompletive
INT	interrogative
IPFV	imperfective
NEG	negative
PFV	perfective
PROG	progressive
SUBJ	subjunctive
TRR	transitivizer

References

Archibald, J. 1996. The acquisition of foot type. Paper presented at the conference on laboratory phonology at the Northwestern University. Chicago.

Blair, R. W.; Vermont-Salas, R. 1965. *Spoken (Yucatec) Maya*. Chicago: Department of Anthropology, University of Chicago.

Boersma, P.; Weenink, D. 2006. Praat: doing phonetics by computer (Version 4.2.34) [Computer program]. Retrieved January 12, 2005, from http://www.praat.org/

Bohnemeyer, J. 1998. Sententiale Topics im Yukatekischen. In *Deskriptive Grammatik und allgemeiner Sprachvergleich,* Zaefferer, D. (ed.). Tübingen: Niemeyer, 55-85.

Bricker, V. R. 1979. Wh-questions, relativization, and clefting in Yucatec Maya. In *Papers in Mayan Linguistics*, Martin, L. (ed.), 107-136.

Bruce, G. 1977. *Swedish word accents in sentence perspective*. Lund: Gleerup.

Durbin, M. & Ojeda, F. 1978, "Basic word-order in Yucatec Maya". In *Papers in Mayan Linguistics*, vol. 2., England, N.C. (ed.). Columbia: University of Missouri, Department of Anthropology (University of Missouri Miscellenous Publications in anthropology, 6), 69-77.

England, N.C. 1991. "Changes in basic word order in Mayan languages". *International Journal of American Linguistics* 57.4:446-486.

Fisher, W.M. 1976. On tonal features in the Yucatecan dialects. *Mayan Linguistics* 1, 29-43.

Gussenhoven, C. 2004. *Tone and Intonation*. Cambr.: CUP.

Kügler, F. & Skopeteas. S. 2006. "Interaction of Lexical Tone and Information Structure in Yucatec Maya". *TAL* 2006, 83-88.

Ladd, D.R. 1996. *Intonational phonology*. Cambr.: CUP.

Lehmann, C. s.d., YUCLEX. Erfurt: Univ. of Erfurt.

Lehmann, C. 1990. "Yukatekisch". *Zeitschrift für Sprachwissenschaft* 9 (1-2), 28-51.

Nolan, F. 2003. Intonational equivalence: an experimental evaluation of pitch scales. In: Solè, M. J., Recasens, D. & Romero, J. (eds) *Proceedings of the XVth International Congress of Phonetic Sciences, Barcelona, Spain, 3-9 August 2003*, 771-774.

Norman, W. & Campbell, L. 1978. "Toward a Proto-Mayan syntax: a comparative perspective on grammar". In *Papers in Mayan Linguistics*, vol. 2., England, N.C. (ed.). Columbia: University of Missouri, Department of Anthropology (University of Missouri Miscellenous Publications in anthropology, 6), 136-155.

Pike, K. L. 1946. "Phonemic pitch in Maya". *International Journal of American Linguistics* 12(2), 82-88.

Reetz, H. 1999. *Artikulatorische und akustische Phonetik*. Trier: Wissenschaftlicher Verlag.

Skopeteas, S. & Fiedler, I. & Hellmuth, S. & Schwarz, A. & Stoel, R. & Fanselow, G. & Féry, C. & Krifka, M. 2006. "Questionnaire on Information Structure." *ISIS*, Vol. 4.

Skopeteas, S. & Verhoeven, E. 2005. "Postverbal argument order in Yucatec Maya". *Sprachtypologie und Universalienforschung* 53(1), 71-79.

Straight, S. 1976. *The acquisition of Maya phonology: Variation in child language*. New York: Garland.

Xu, Y. 1999. Effects of tone and focus on the formation and alignment of F0 contours. *Journal of Phonetics* 27: 55-105.

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Prosodic Focus in Vietnamese*

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This paper reports on pilot work on the expression of *Information Structure* in Vietnamese and argues that Focus in Vietnamese is exclusively expressed prosodically: there are no specific focus markers, and the language uses phonology to express intonational emphasis in similar ways to languages like English or German. The exploratory data indicates that (i) focus is prosodically expressed while word order remains constant, (ii) listeners show good recoverability of the intended focus structure, and (iii) that there is a trading relationship between several phonetic parameters (duration, f0, amplitude) involved to signal prosodic (acoustic) emphasis.

Keywords: Information Structure, Vietnamese, Focus, Perception (Statement-Question Matching)

1 Introduction

Mon-Khmer languages are known for the complexity of their tone system: lexical contrasts are marked by tonal (pitch) as well as laryngeal features (Yip, 1995). This interaction of voice quality and lexical tone also characterizes Vietnamese (Brunelle, 2003, 2006). Several more recent experimental studies have explored the perception of tone in the northern (Hanoi) and the southern (Saigon) Vietnamese dialect with six and five contrasting tones respectively, and have established that there is a higher and a lower pitch register (Brunelle, 2006;

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Michaud & Vu, 2004; Michaud, 2004; Michaud et al., 2006; Nguyễn & Edmondson, 1997; Brunelle & Jannedy, 2007). The f0-contours shown in Fig.1 are representative of the standard Hà Nội dialect. The only exception is the rising tone *sắc*, which is realized relatively low, a variant found in some young female Northerners. In the Hà Nội dialect, laryngealization is tone-medial in *ngã* (steeply rising f0 trajectory marked with "▲") and tone-final in *hỏi* and *nặng* (glottalization). The three tones with a laryngealized voice quality are represented by a dotted line. The *huyền* tone is partially breathy. The rising tone *sắc* is fully modal and usually rises from the bottom of the pitch range to the top. The three tones in the lower register are *hỏi, huyền* and *nặng*. The neutral tone is called *ngang* and remains fairly stable in pitch throughout.

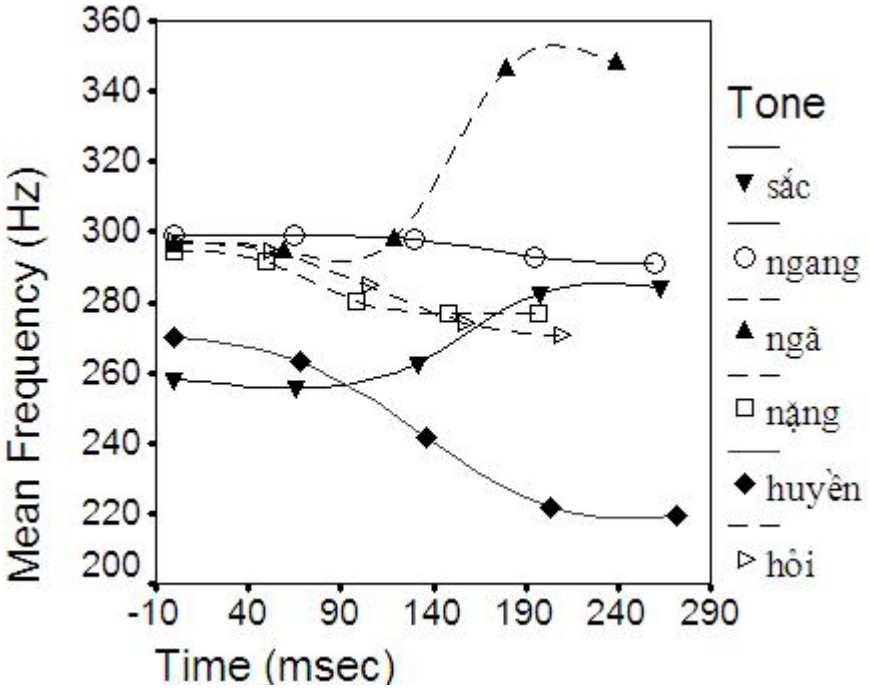

Fig 1.: Mean f0-contours (over five repetitions) for the six lexical tones of the Hà Nội dialect of Vietnamese as produced by a female speaker (used as stimuli in the experiment described in Brunelle & Jannedy, 2007).

Vietnamese is an isolating language, most words consists of mono-syllables. It is unclear though if syllables are the tone bearing units in Vietnamese (as is the case in Ewe, Hausa, Chicheŵa or Mandarin Chinese) or if moras are (as in Japanese or Thai, see Morén, 2003). Furthermore, it is remarkable that Vietnamese has no tone-sandhi rules, as we know them for languages such as Mandarin Chinese, Cantonese or Taiwanese. Tone-Sandhi refers to the changes in the values of lexical tones in the context of other tones. A well-known example from Mandarin Chinese is the change of a low-tone to a rising tone when it is followed by another low tone. No such consistent rules are known for Vietnamese and none of the standard grammar books on the language (Thompson, 1965; Nguyễn, 1997) make reference to it. There is also no phonological downstep: the successive lowering of high tones often observed in register tone languages. There may be other non-systematic intonational downtrends such as final lowering (the lowering of the pitch towards the end of an utterance or phrase) or declination (a decline of the f0 over the course of the utterance); however, with the exception of Dung et al. (1998), none of the grammars, offer somewhat systematic descriptions of intonational variation.

Given the tonal complexity of the language and what has been stated in the sporadic reports published on tones, tone implementation and intonational emphasis, the question arises whether or not the language makes use of prosodic cues to signal information structural content or whether it needs to revert to other means such as the usage of particles or specialized syntactic positions to signal focus or topic. Occasional references to the use of prosodic means for emphasis and for phrasing can be found on some of the older, somewhat sparse, literature (Thompson, 1965; 1981; Nguyễn, 1990; Dung et. al. 1998).

> ”Heavy stress singles out the syllable or syllables of each pause group which carry the heaviest burden of conveying information. Weak stress accompanies syllables, which bear the lowest information-

> conveying load in the pause group. They often refer to things which have been brought up earlier or which are expectable in the general context. Other syllables are accompanied by medium stress."
>
> Thompson (1965:106)

Tran (1967:24) also describes intensity as one of the integral aspects of intonation in Vietnamese. Intonation contours are "superimposed on the basic tone system; they modify the pitch characteristics of the tones, but do not affect the tonemic contrast between them […] the basic intonation contours are intrinsically linked with the overall intensity patterns." Similarly, Michaud & Vu (2004) state: "Vietnamese also possesses intonational emphasis: as in many languages, the great variability observed in the realization of the lexical tones largely reflects the informational prominence of various syllables in the utterance..." and they conclude "[…] a stable correlate of emphasis is curve amplification, manifested [...] as an increased slope of F0 curve [...] or as F0 register raising."

The lack of detailed descriptions of phonetic or phonological properties of structuring or emphasizing information in Vietnamese is apparent. Evidence reported in the literature and our first pilot studies strongly suggest that Vietnamese shows properties that are often associated with intonational phrasing and prosodic prominence in intonation languages: it has pitch range effects of the same sort seen in the intonational marking of emphasis and it also has pausing and other rhythmic effects of the sort associated with intonational phrasing observed in English and German.

In studying prosodic prominences and the resulting pragmatic interpretation of *prosodic focus*, there are two over-arching questions that are more effectively responded to if they are addressed together. One question pertains to the mechanics of how the speaker imparts prominences to some parts of an utterance but not to others, while the other question addresses the listener's

interpretation of such prominences - i.e., the function of prosodic focus from the listener's point of view. A fundamental assumption in posing the first question is that the speaker has various methods at his/her disposal to make some part of an utterance prosodically more prominent than other parts. In English and languages like English, for example, one important means of making a particular word more prominent than surrounding words is to align a pitch accent — a prominence lending tonal morpheme — with the syllable in a word that bears primary stress. Most current accounts of prosodic focus in English recognize this mechanism of putting a constituent in prosodic focus, and in one particularly influential account, due to Selkirk (1984, 1995), this is the only mechanism recognized. Other accounts, however, suggest that other aspects of the tune also may play a role in imparting prominence. For example, the accented word that is the last accented material in its phrase is also aligned to another tonal morpheme, the phrase accent, which is simultaneously aligned to the end of the phrase as well. When it is followed immediately by the phrase accent, a pitch accent becomes the 'nuclear accent' in its phrase. In the account of Pierrehumbert (1980) and her colleagues (e.g., Beckman & Pierrehumbert, 1986; Beckman & Edwards, 1994), any nuclear accent is more prominent than all earlier, non-nuclear accents. (This is related to Ladd's (1980, 1996) notion of 'deaccenting', which says that an accented word can be made prominent if all following material is left unaccented, effectively positioning the nuclear accented word early in its phrase). The important point is that if word order remains constant and it can be observed that prosodic emphasis is being shifted from one constituent to another, a structure with an early prosodic prominence is cognitively more salient (due to the unaccented post nuclear tail) than a structure with a prosodic prominence late in the utterance (Beckman, 1996). This is probably due to the probability of distributions of early prominences versus late prominences in running discourse and the expectations that hearers have.

An equally fundamental assumption underlying the second question is that speakers use prosody and prosodic focus to facilitate and guide the hearer's understanding and comprehension of the message being conveyed at any particular time in a discourse. Thus, one of the uses of intonation is to guide the listener's interpretation of the utterance in relationship to the larger discourse context. Different intonational structures, then, are used to distinguish one discourse purpose, one extension of the current discourse state, from other possible moves in the mutual building of the discourse structure by the speaker and hearer, they are used to manage discourse content (Krifka, 2006). This function of intonation makes it difficult to test claims that two or more intonation patterns differ categorically.

This differs markedly from claims about the number of tones in contrast in languages such as Mandarin Chinese, Cantonese or Vietnamese, which can be tested by seeing whether the tune distinguishes one word from any other word that could have occurred in the same place. Listeners are generally very good at identifying which of two minimally contrasting words they heard. They are generally much less facile at identifying different discourse intentions, unless the differences also trigger a difference in truth conditions. One of the challenges for psycholinguistics, therefore, is to devise tasks that tap the listener’s competence in interpreting the intended discourse purpose rather than training listeners to attend to specific aspects of the signal. In studying the functions of prosodic focus, for example, the psycholinguist must find an experimental design that can be used to determine how exactly different prosodic manipulations contribute to the introduction of new entities or highlighting of old entities in the interpretation of the discourse purpose of an utterance.

2 Focus

The canonical word order in Vietnamese is SVO (Nguyễn , 1997; Thompson, 1965), and this structure is used consistently when answering any *wh*-focus alternative question (Krifka, 2006; 2007). That is, focus is always marked in situ for all sentence constituents. Consider the following example of a transitive sentence:

(1)

S	V	O
Phương	đi	xe đạp.
Phuong	ride	bicycle.

'Phuong is riding a bicycle.'

We elicited replies to focus alternative questions asking for sentence focus (a), subject focus (b), object focus (c), verb focus (d), and VP focus (e) from two native speakers of Hà Nội Vietnamese. A sample paradigm is shown below. (Also see the appendix).

(2) a.	Chuyện gì vậy?	**What is happening?**
	[**Phương đi xe đạp**]$_F$	[**Phuong is riding a bicycle**.]$_F$
b.	Ai đi xe đạp?	**Who** is riding a bicycle?
	[**Phương**]$_F$ đi xe đạp.	[**Phuong**]$_F$ is riding a bicycle.
c.	Phương đi gì?	**What** is Phuong riding?
	Phương đi [**xe đạp**.]$_F$	Phuong is riding a [**bicycle**.]$_F$
d.	Phương làm gì với xe đạp?	What **is** Phuong **doing** with the bicycle?
	Phương [**đi**]$_F$ xe đạp.	Phuong [**is riding**]$_F$ the bicycle.
e.	Phương làm gì vậy?	**What is** Phuong **doing**?
	Phương [**đi xe đạp**.]$_F$	Phuong [**is riding a bicycle**.]$_F$

In each panel in Fig. 2, we have bracketed the particular part of the utterance that was in focus.

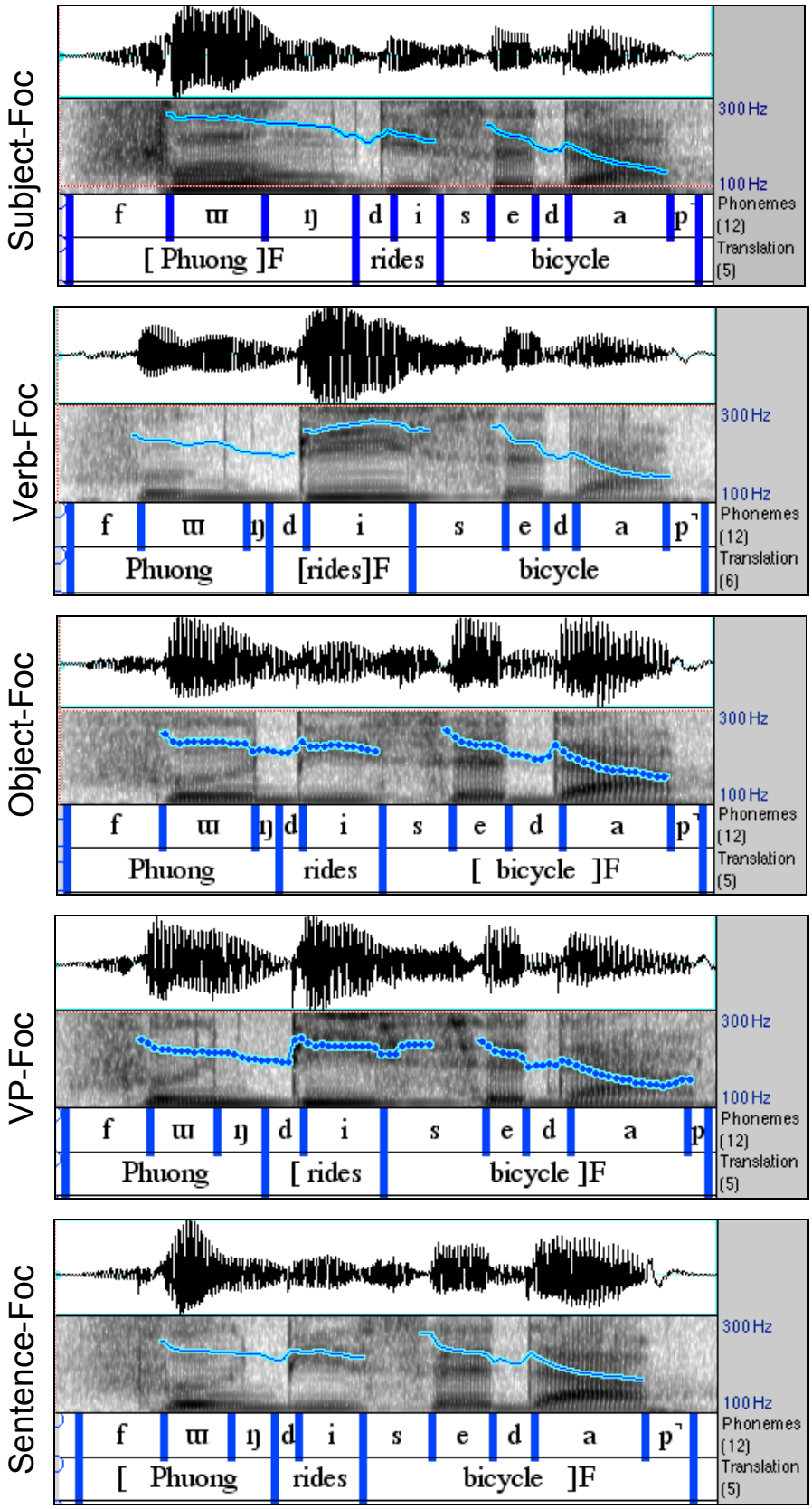

Fig. 2: Spectrogram, waveform and f0 display of five segmented and annotated replies to *wh*-focus alternative questions for speaker 1.

Most importantly, it should be noted that word order remained constant and hence, any kind of contrast between the five kinds of focus condition is expressed prosodically. All f0-curves are plotted on the same pitch range (100Hz to 300Hz) and all sentences are lexically identical, thus we can visually compare these patterns. There appear to be differences in the amplitude (a raw acoustic measure of the strength or volume of a signal) of the signal, as is clearly visible in the waveform (upper display) of each panel. According to native speaker intuitions, amplitude (measured in decibel [dB]) does play a role in Vietnamese to express acoustic emphasis. The intensity of the signal is defined as "average rate of flow of energy per unit time per unit area", measured in watts per cm^2 (Poser, 2002). And loudness in turn, is a perceptual response to the physical property of intensity. That is, roughly speaking, the psychological percept of amplitude is loudness. Note that in the subject focus (Sub-Foc) case, the vowel in the name *Phương* has a particularly great amplitude, visible especially in contrast to the verb focus (V-Foc) case where the vowel in the verb *đi* has the greatest amplitude. In the verb phrase focus (VP-Foc) case, both the verb and the object appear to have a greater amplitude, while in the object focus (O-Foc) panel, there does not seem to be a clear picture with regard to the differentials in amplitude of the signal.

The correct picture of amplitude may be confounded in the O-Foc example due to the fact that the Vietnamese word *xe đạp* is a compound which requires emphasis on the second syllable in order to be interpreted as a compound (cf. Dung et al., 1998:399). Ingram & Nguyễn (submitted) find task related differences in the emphasis patterns in compounds (naming task versus reading task). In more formal settings such as the reading task, they find more reflexes of compound final emphasis than in the naming task. They attribute these to formality or register differences. Our data was elicited in a question-

answer paradigm which could potentially be construed as a casual conversation and thus, as non-formal.

The three simple transitive SVO test sentences used in the perception study are listed below. The focus conditions are the same as in example (2) above (see the Appendix for an explicit listing of the tested utterances). Note that the sample sentence in (3a) is specified for the neutral tone, the level tone *ngang*, with exception of the last syllable, which carries the *nặng* (final laryngealization) tone. We deliberately selected a tonal specification that has the potential for rises and falls during the course of the utterance so that we may explore the potential variation of the f0 range imposed under different focus conditions.

(3) a. Phuong is riding a bicycle. Phương đi xe đạp.
b. Lan is drinking coffee. Lan uống cà-phê.
c. Men is drinking water. Mến uống nuốc.

The sentence in (3b) has a neutral tone on the Subject, a rising tone on the verb (*sắc*) and a falling tone *huyền* on the first syllable of the compound *cà-phê* and a neutral tone again on the final syllable, while the sentence in (3c) is specified lexically throughout with the modal rising tone *sắc.*

Note though that the three utterances above are specified differently for lexical tone. The first sentence type *Phương đi xe đạp.* is lexically specified throughout with the level tone while the third sentence *Mến uống nuốc.* has all rising tones. The third sentence *Lan uống cà-phê.* combines neutral, rising and falling lexical pitch patterns. These few examples already show the complex interplay between lexical tone on the one hand and intonational requirements to signal information structure on the other hand.

The graphs in Fig. 3 show stylized f0 contours, generated by logging the maximum F0 during a labeled interval, that is, during a phoneme. These individual points were plotted and the lines between the points are interpolations rather than actual f0-trajectories. Note further that Vietnamese has complex vowel sounds such as <ướ> that are considered monophthongs rather than diphthongs.

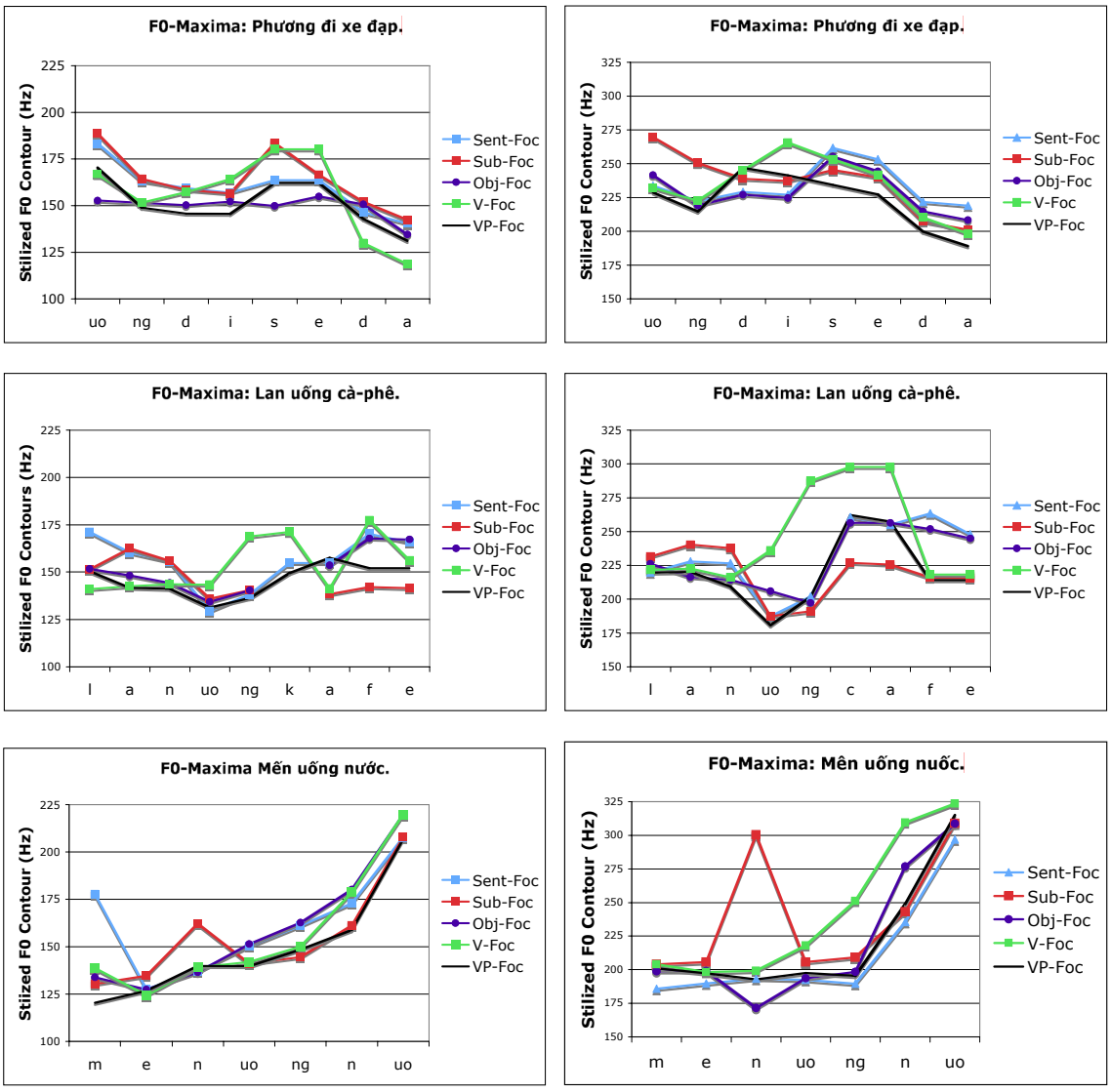

Fig. 3: Stilized F0 Contours (interpolations between the maximum f0 value of each labeled phoneme).

The three graphs on the left show the stylized f0-curves from the male speaker whereas the three graphs on the right show the stylized f0-curves for the same utterances but for the female speaker. Note that we have avoided to plot the initial or final voiceless obstruents in the utterances as f0 cannot be cleanly logged during these sounds. Each line in a graph represents one repetition of the five focus conditions the utterance was produced in. Despite the range of variation observable, there are also commonalities: for example, the subject-focus and the verb-focus utterances appear to have rather pronounced f0-maxima rather early in the utterance, while sentential or object-focus utterances show pitch excursions later, towards the end of the utterances.

For the all rising contour (bottom panel), we can observe the general tendency of a low onset of the contour and a relatively steep final rise, whereas the all neutral contour (top panel) displays a final fall and much less overall variation in the f0 from the onset of the utterance to the end. The tonal contour displayed in the bottom panel appears much less consistent in terms of an overall tendency of the f0 contour throughout the utterance. These observations however can only be viewed as general tendencies, the amount of data is not sufficient enough to make more generalizable statements about the interaction of lexical tone and phrasal tone requirements.

2.1 Perception test

The test material was recorded in a *wh*-question-answer paradigm from a male and a female native speaker of the northern dialect of Vietnamese. While the questions and replies were presented in writing, both speakers were present for the recordings and prompted each other with the questions, they were rendered as quasi-spontaneous rather than read. For each focus condition and sentence type, we elicited one through three tokens of which both speakers selected their “best” renditions.

To understand and evaluate the listener's competence in interpreting the intended discourse purpose of an utterance, we wanted to test whether the *wh*-focus alternative question was recoverable from the reply utterance presented out of context. Six native listeners of Vietnamese, naïve as to the purpose of the experiment, aged between 21 and 26, participated in a short forced-choice identification perception task. The test data consisted of three sentence types that were each elicited in five focus conditions and spoken by our two native speakers (3 x 5 x 2 = 30 test sentences).

These 30 test sentences were played five times each (in randomized order) to each of the six listeners that participated. The sounds were presented over *Sennheiser* headphones and were called up by a script in Praat. The listeners were asked to match each heard utterance back to one of the five questions that were visually displayed to them on a computer screen.

Thus, we elicited 900 responses in total (30 sentences x 5 repetitions x 6 listeners = 900). That is, a total of 180 responses were collected for each of the five focus conditions tested (900 items in perception test / 5 focus conditions = 180 items per focus condition). A summary of the data and responses is provided in Table 1.

	Stimulus -Type				
response	Sub-Foc	V-Foc	O-Foc	VP-Foc	S-Foc
Subject	142 (78.89)	4 (02.22)	3 (01.67)	7 (03.89)	14 (07.78)
Verb	5 (02.78)	135 (75.00)	10 (05.56)	34 (18.89)	7 (03.89)
Object	11 (06.11)	15 (08.33)	94 (52.22)	34 (18.89)	33 (18.33)
Verb Phrase	9 (05.00)	21 (11.67)	33 (18.33)	46 (25.56)	56 (31.11)
Sentence	13 (07.22)	5 (02.78)	40 (22.22)	59 (32.78)	70 (38.89)
Grand Total	180 (100%)	180 (100%)	180 (100%)	180 (100%)	180 (100%)

Table 1: Number of responses in five categories per stimulus type (raw numbers and percentages).

A chi-square test on the raw counts of the observed data was significant (χ^2= 998.47, df = 16, p<.001), indicating that the listeners did not match answer utterances randomly to questions. That is – despite the word order remaining constant in all five focus conditions – the prosody helps to disambiguate and lets listeners correctly match answers to questions. In fact, as Fig. 4 shows, listeners identified the subject-focus, verb-focus and object-focus questions that matched the utterances they heard, quite well. There are less reliable patterns in the VP and sentential focus condition. However, results indicate that even in these conditions, listeners responded above chance level (20%).

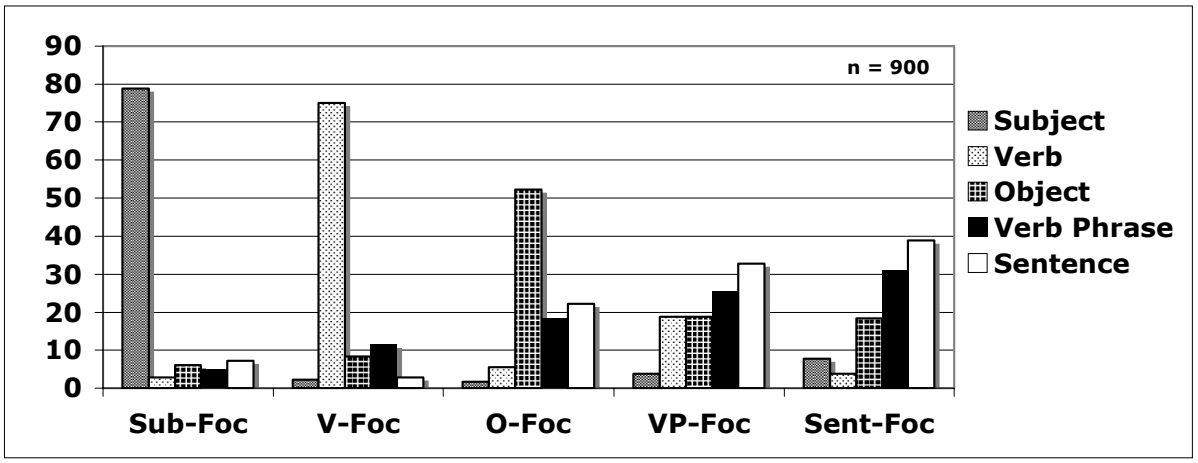

Fig 4: Visualization of the data (in %) presented in Table 1.

Since word order has remained constant, the difference between the focus conditions has to be marked prosodically. However, precisely what parameters (duration, f0, intensity, vocal effort) or what combination thereof are modified is less clear at this point. Considering the VP-Focus and Sentential-Focus conditions, it appears that listeners have a general preference for less marked questions such as those asking for a broader focus constituent such as Sentence focus. Since this study is based on only a relatively small amount of exploratory data, we cannot make further claims about this observation at this stage.

2.2 F0 & duration

Since there is no morphological focus marker in Vietnamese and given the good level of recoverability of the subject, verb, and object focus questions in our question-answer pairing test, there must be something distinguishing these morphosyntactically identical utterances. To make some of these prosodic patterns that listeners probably attend to 'visible', we time-normalized the fundamental frequency contours for each focus condition and calculated the mean over three repetitions of the sentence. For time normalization of the fundamental frequency contour, each labeled interval (in this case, phonemes) is divided into the same number of points (in this case 10). Time normalization allows for a direct comparison of differences in the f0 per labeled interval (see Xu, 1999). Note that in the graph below, the initial obstruent [f] and the final obstruent [p] are omitted from the plot. It is notable that the f0 – on average - is highest during the unrounded high back vowel [ɯ] in the subject focus condition, whereas it is highest during the vowel [i] in the verb focus condition.

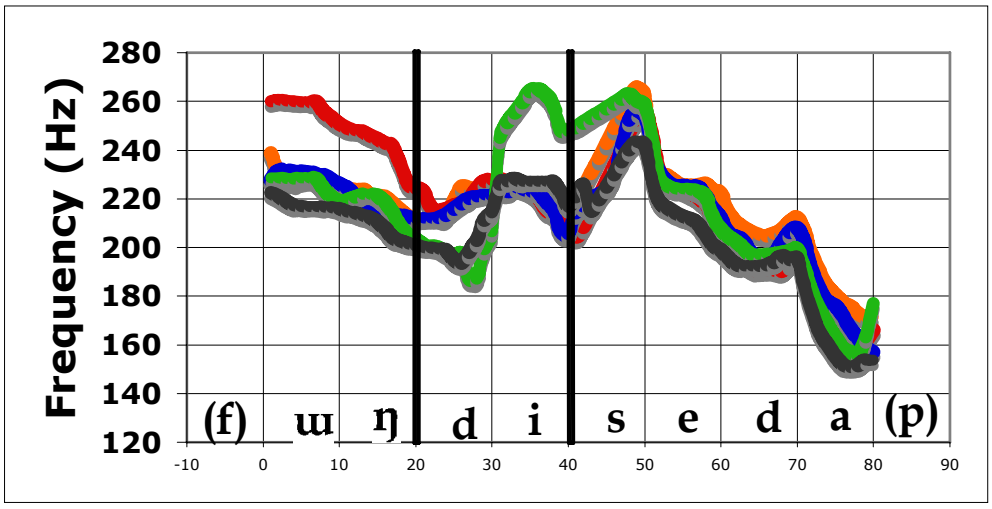

Fig. 5: Plot of the mean (n=3 per focus condition) of time normalized f0-contours for the five focus conditions as produced by our female speaker.

The representation of the data in Fig. 5 is based on actual f0-trajectories whereas the representations in Fig.3 are interpolations between measured f0-maxima. The type of representation below is preferred to evaluate f0-contours, however, in the absence of enough data to generate means, the graphs in Fig. 3 give decent approximations of the overall f0 patterns found in the data. Thus, it appears that local changes in the f0 as we know them from stress accent languages such as English and German, appear to play a role in the expression of focus in Vietnamese. We are reluctant at this point to call these local prominences 'accents' as this term has a specific meaning in the literature. Rather, we term them accentual prominences that are clearly visible for the subject and verb focus conditions.

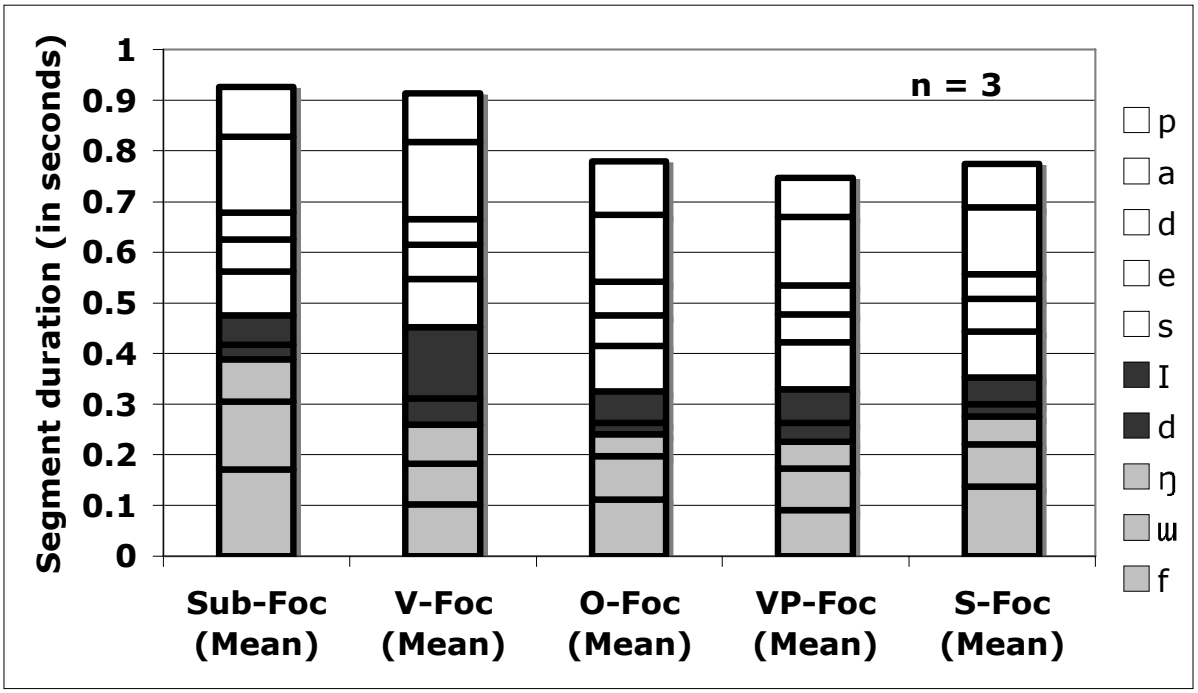

Fig. 6: Duration (in seconds) of each segment in the sentence "Phương đi xe đạp" based on three tokens rendered by one speaker.

None of the other focus conditions appear to have such a distinct pattern, not even the object-focus, even though the object focus reply was reliably matched to the object focus wh-question. Thus, we suspect an interaction of prosodic

parameters to play a role in the interpretation of focus conditions. For example, also note the durational differences between the five focus conditions, displayed in Figure 3. This graph is also only based on three utterances, thus, there is room for variability with the inclusion of more data.

Nevertheless, it appears that there is justification for speculating that durational cues such as the overall length of the utterance or the duration of subcomponents of the utterance (such as the subject (light grey shading in the first bar) or the duration of the verb (dark grey shading in the V-Foc condition) serve as cues to classification and interpretation.

Given the limited amount of data that the f0 and duration observation (Figures 5 and 6) is based on, we need to treat these results with caution but they can nevertheless be taken as an initial indicator that the interaction of prosodic factors does contribute to the encoding of focus conditions in Vietnamese. This said, given that word order remains constant and that no morphological markers are used to indicate focus, we claim that focus is exclusively prosodically (phonologically) marked in Vietnamese, through a combination of different prosodic parameters, including f0, duration and amplitude.

Even though object focus can only be realized in-situ in Vietnamese, there are non-canonical OSV sentences in Vietnamese. According to our informants, though, these are non-felicitous replies to object focus questions. Instead, they claim, OSV utterances must be interpreted as contrastive topic (Jannedy & McNay, 2007).

3 Information Structure

Based on our fieldwork notes and the small amount of data that we have collected so far, we have provided an overview of some general patterns that we have observed in our pilot data on the expression of focus in Vietnamese. The

results from the perception study show that listeners are generally quite able to detect the contextual meaning of the message (information structural content rather than just lexical content), that is, they are performing rather well, matching statements back to questions. That is, the generally, questions are well recoverable from the answer utterances, despite the range of variability observed in the actual renditions of the statements. This indicates to us that information structural content is consistently encoded via prosody. As the amount of data is too limited to conduct greater scale statistical analyses, we would like to conclude with some summary remarks on the descriptive patterns and observed tendencies that we found in on the Vietnamese data.

In summary, we find that focus in Vietnamese is exclusively expressed through phonology and prosody while the canonical word order must remain in tact. We have observed trading relationships between f0, duration and amplitude and possibly spectral tilt (voice quality) to mark emphasis, but how and in what context which parameters are used, remains unclear as of now. There also appear to be interactions between the lexical tonal specifications of utterances and the more global intonational requirements that an utterance must have to satisfy information structural requirements. Further, whether or not the different means that Vietnamese utilizes to signal emphasis are functionally equivalent or contrast with one another in any meaningful way or if they are socially distributed remains to be investigated. Naturally, these claims have to be tested against larger amounts of data collected from more speakers and under a greater variety of syntactic constructions and variability of tonal co-occurrences.

Appendix: Corpus for Perception Test

3 sentence-types in 5 focus conditions:

1.	Chuyện gì vậy?	(What's happening?)	[Phương đi xe đạp.]$_F$
2.	Ai đi xe đạp?	(Who is riding a bicycle?)	[Phương .]$_F$ đi xe đạp.
3.	Phương đi gì?	(What does Phương ride?)	Phương đi [xe đạp.]$_F$
4.	Phương làm gì với xe đạp?		
	(What does Phương do with the bicycle?)		Phương [đi]$_F$ xe đạp.
5.	Phương làm gì vậy?	(What does Phương do?)	Phương [đi xe đạp.]$_F$
6.	Chuyện gì vậy?	(What's happening?)	[Lan uống cà-phê.]$_F$
7.	Ai uống cà-phê?	(Who is drinking coffee?)	[Lan]$_F$ uống cà-phê.
8.	Lan uống gì?	(What does Lan drink?)	Lan uống [cà-phê.]$_F$
9.	Lan làm gì với cà-phê?		
	(Was macht Lan mit dem Kaffee?)		Lan [uống]$_F$ cà-phê.
10.	Lan làm gì vậy?	(What does Lan do?)	Lan [uống cà-phê.]$_F$
11.	Chuyện gì vậy?	(What's happening?)	[Mến uống nước.]$_F$
12.	Ai uống nước?	(Who is drinking water?)	[Mến]$_F$ uống nước.
13.	Mến uống gì?	(What does Mến drink?)	Mến uống [nước.]$_F$
14.	Mến làm gì với nước?		
	(Was macht Mến mit dem Wasser?)		Mến [uống]$_F$ nước.
15.	Mến làm gì vậy?	(What does Mến do?)	Mến [uống nước.]$_F$

References

Beckman, M. E. (1986) *Stress and non-stress Accent.* Foris Publications Holland, Dordrecht, the Netherlands.

Beckman, M. E. (1996) The Parsing of Prosody. *Language and Cognitive Processes,* 11 (1/2), 17-67.

Beckman, M.E. & Edwards, J. (1994) Articulatory Evidence for Differentiating Stress Categories. In *Phonological Structure and Phonetic Form. Papers in Laboratory Phonology III*, Keading, P.A. (ed.) Cambridge University Press.

Beckman, M. E., & J. B. Pierrehumbert (1986) Intonational Structure in Japanese and English. *Phonology Yearbook* 3:255--309.

Brunelle, M. (2003). Coarticulation Effects in Northern Vietnamese. *Proceedings of the 15th International Congress of Phonetic Sciences (ICPhS),* Barcelona**:** 2673-2676.

Brunelle, M. (2006) Tone Perception in Vietnamese Dialects. Presentation given at the *TIE-2 Conference* at the ZAS (Berlin), Sept. 2006.

Brunelle, M & Jannedy, S. (2007) Social Effects on the Perception of Vietnamese Tones. Accepted to *ICPhS 2007* in Saarbrücken.

Dung, B.T., Huong, T. T. & Boulakia, G. (1998) Intonation in Vietnamese, in D. Hirst & A. Di Cristo (eds.), *Intonation Systems: A Survey of Twenty Languages.* Cambridge University Press, Cambridge.

Ingram , J. & Nguyễn, T. (under review) Stress, tone and word prosody in Vietnamese compounds. Submitted to *Journal of the Acoustical Society of America.*

Jannedy, S. & Fiedler, I. (manuscript) Prosody of Focus Marking in Ewe. Humboldt University of Berlin.

Jannedy, S. & McNay, A. (2007) Contrastive Topic Marking in Vietnamese – Prosody, Word Order, And Morphology. Paper presented at the *3rd Workshop on Contrast: Towards a Closer Definition.* Zentrum für Allgemeine Sprachwissenschaft, Berlin).

Krifka, M. (2006) Notions of Information Structure. In Féry, C., Fanselow, G. & Krifka, M. (eds.) *Interdisciplinary Studies on Information Structure* (ISIS) 06 (pp. 13-54). Potsdam: Universitätsverlag Potsdam.

Krifka, M. (2007) The Semantics of Questions and the Focusation of Answers. In Lee, Ch., Gordon, M. & Büring, D. (eds.) *Topic and Focus*. Dordrecht, Springer, 139-150.

Ladd, R. D. (1980) *The Structure of Intonational Meaning.* Indiana University Press, Bloomington.

Ladd, R. D. (1996) *Intonational Phonology.* Cambridge University Press.

Michaud, A. (2004) Final Consonants and Glottalization: New Perspectives from Hanoi Vietnamese. *Phonetica* 61: 119-146.

Michaud, A. (2006) Replicating in Naxi (Tibeto-Burman) an Experiment Designed for Yorùbá: An Approach To 'Prominence-Sensitive Prosody' vs.

'Calculated Prosody'. Proceedings of *Speech Prosody 2006*, pp. 819-822, Dresden, 2-5 May 2006.

Michaud, A. & Vu, T.N. (2004) Glottalized and Non-Glottalized Tones under Emphasis: Open Quotient Curves remain stable, F0 curve is modified. Proceedings of the *Speech Prosody 2004*, pp. 745-748, Nara, Japan,.

Michaud, A., Vu Ngoc, T., Amelot, A. & Roubeau, B. (2006) Nasal release, nasal finals and tonal contrasts in Hanoi Vietnamese: an aerodynamic experiment , *Mon-Khmer Studies*, 36.

Morén, B. (2003) The Mora is the Tone Bearing Unit in Thai. Presentation at the Annual Meeting of the Linguistics Society of America, Atlanta, USA.

Nguyễn Đ.-H (1990) *Vietnamese*. London Oriental and African Language Library. John Benjamins, Amsterdam and Philadelphia.

Nguyễn, V. L. & Edmondson, J. (1997) Tones and Voice Quality in Modern Northern Vietnamese: Instrumental Case Studies. *Mon-Khmer Studies* 28: 1-18.

Pham, A. (2003) The Key Phonetic Properties of Vietnamese Tone: A Reassessment. Paper published at the *Proceedings of the 15th International Conference of Phonetic Sciences* (ICPhS).

Pierrehumbert, Janet. (1980) *The Phonology and Phonetics of English Intonation*. Ph.D. dissertation, MIT.

Poser, B. (2002) Amplitude, Intensity & Loudness (manuscript). Downloadable at: *www.ling.upenn.edu/phonetics/docs/Amplitude.pdf*

Selkirk, E. O. (1984) *Phonology and Syntax: The Relation between Sound and Structure.* Cambridge, MA: MIT Press.

Selkirk, Elisabeth O. (1995). Sentence prosody: Intonation, stress and phrasing. In *Handbook of Phonological Theory*, ed. John Goldsmith, pp. 550–569. Cambridge, MA: Blackwell.

Thompson, Laurence C. 1965. *A Vietnamese Reference Grammar.* University of Washington Press, Washington. (2nd edition, 1987, University of Hawai'i Press, Honolulu).

Tran, H. M. (1967) Tones and Intonation in South Vietnamese. Series A - Occasional Papers #9, *Papers in Southeast Asian Linguistics* No.1. Nguyễn,

D. L., Trễn, H. M. & D. Dellinger (eds.). Canberra, Linguistics Circle of Canberra.

Xu, Y. (1999). Effects of Tone and Focus on the Formation and Alignment of F0 Contours. *Journal of Phonetics* 27: 55-105.

Yip, M. (2002) *Tone.* Cambridge University Press.

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