INTONATION AND FOCUS IN WEST GREENLANDIC

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Abstract
This contribution investigates focus realisation by means of intonation in West Greenlandic, concentrating on prefinal constituents. It finds that focus is realised in two ways in this language: Focussed words are realised with a complete tonal contour more often than 'given' words, and are usually also marked in terms of pitch range. However, variation occurs with regard to speaker, constituent and focus type. Based on these findings, the article argues for a distinction between different focus types as well as it underlines the importance of a theoretical modelling of pitch range modifications.

1   Introduction

West Greenlandic, a language from the Inuit branch of the Eskimo-Aleut language family, does not have any stress or accent and is thus one of those languages that Jun classifies as "non-stress and non-lexical pitch-accent languages" (Jun 2005:445). This group of languages has not been recognised in more traditional intonational typologies categorising languages as intonation languages (e.g., English), tone languages (e.g., Mandarin) or lexical pitch-accent languages (e.g., Japanese), and only a few of these languages that do not fit into the traditional three categories have been described intonationally. Therefore, studying a language such as West Greenlandic is interesting from the typological perspective. Seeing that models of information structure and intonation were developed on the basis of data from English and similar languages, research on languages which are typologically far from these is especially important. Additionally, the question of intonational focus realisation has not been considered in previous work on West Greenlandic, which has primarily concentrated on the complex morphological or syntactic properties of this language.

However, before dealing with focus realisation in West Greenlandic, it is indicated to give a short definition of what will be understood as focus here. A discussion of the semantic properties of the notion is outside the scope of this article, but since focus is always induced by questions in the database of this study, the description in (1) is assumed to be sufficient here.

(1)   In the answer of a question-answer pair, that part of the sentence is in focus which is
         a. explicitly asked for in the question or
         b. correcting it.

Two types of focus are covered by this definition; the cases described in (1a) will be referred to as information focus, while the ones described in (1b) will be called corrective focus. A further distinction is made here, namely that between broad and narrow focus. When answering questions like "What happens?", all the elements of a sentence are asked for in the question, and new in the context (all-new sentence). This will be referred to as 'broad focus' here, contrasting with narrow focus cases where a single constituent is asked for in the question. For the sake of clarity, the name 'information focus' will be reserved for narrow

cases in this article, although both are in principle covered by the definition in (1a). Thus, three different types of focus will be assumed in this paper and figure in the empirical data: Broad focus and two types of narrow focus, information and corrective focus.

The organisation of this paper is as follows: The next section describes the study which provided the empirical basis for this article. Section 3 gives a general overview of West Greenlandic intonation before section 4 introduces the means that the language uses to express focus. Two aspects of intonation are found to be affected by focus, a qualitative and a quantitative one, namely the realisation of tonal contour and pitch range. They are dealt with in section 5 and 6, respectively. Further factors interacting with focus realisation in intonation are also considered in these sections. Finally, section 7 draws conclusions and points out theoretical implications of the presented results.

2 Empirical basis

This paper presents results from recordings with four female native speakers of central West Greenlandic: AK, SN, NH and NG. The speakers produced altogether 321 sentences as answers in little dialogues. The recorded material consisted of three basic declarative sentences in unmarked – SOV – word order, which are shown in (2)–(4).

(2) Nanna (angajuminut) (inuusamik) sanavoq.
Nanna (angaju-　　min-　　　　　ut)　(inuusa-　m-　　　　ik)
N.ABS　older.sister　OBL.POSS.3RSG.SG　ALL　doll　OBL.UNPOSS　INSTR
　　　　sana-　v-　o-　q
　　　　make　IND INTR　3SG
"Nanna makes (a doll) (for her older sister)."

(3) Aanaga (Aviajamut) (ulimmik) nuersaavoq.
Aana-　　ga　　　　　　(Aviaja-　m-　　　ut)
grandmother　ABS.POSS.1SG.SG　A.　　OBL.UNPOSS　ALL
　　　　(ulim-　m-　　　ik)　　nuersaa-　v-　o-　q
　　　　shawl　OBL.UNPOSS　INSTR　knit　　IND INTR　3SG
"My grandmother knits (a shawl) (for Aviaja)."

(4) Anaanaga (angaannut) (nataarnamik) igavoq.
Anaana-　ga　　　　　　(angaa-　nn-　　　　ut)
mother　ABS.POSS.1SG.SG　uncle　OBL.POSS.1SG.SG　ALL
　　　　(nataarna-m-　　　　ik)　　iga-　v-　o-　q
　　　　halibut　OBL.UNPOSS　INSTR　cook　IND INTR　3SG
"My mother cooks (a halibut) (for my uncle)."

These sentences were varied in several interacting ways. First, sentence length was varied by leaving out the indirect or both objects,[1] as indicated by the bracketing. This is possible because in the above examples,

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[1] In accordance with the literature, the allative case objects of the example sentences are referred to as 'indirect objects' (cf. Fortescue 1984:211), while 'direct object' is used for constituents that bear absolute case in transitive sentences and are marked by instrumental case in antipassive/half-transitive constructions (cf. ibid.).

antipassive[2] is used. Additionally, an alternative version with object incorporation was recorded, as is illustrated for (2) in (5).

(5)   Nanna (angajuminut) inuusaliorpoq.
        Nanna (angaju-   min-   ut)   inuusa- lior-   p- o-   q
        N.ABS older.sister OBL.POSS.3RSG.SG   ALL   doll   make   IND INTR 3SG
        "Nanna makes a doll (for her older sister)."

Different focus types and focus locations were induced by questions. For (3), e.g., these questions were *Susoqarpa?* "What happens?", *Aanat Aviajamut sumik nuersaava?* "What does your grandmother knit for Aviaja?", *Kimut aanat ulimmik nuersaava?* "For whom does your grandmother knit a shawl?", *Kina Aviajamut ulimmik nuersaava?* "Who knits a shawl for Aviaja?", *Aanat Aviajamut alersimik nuersaava?* "Does your grandmother knit a sock for your Aviaja?", *Aanat Malimmut ulimmik nuersaava?* "Does your grandmother knit a shawl for Malik?" and *Anaanat Aviajamut ulimmik nuersaava?* "Does your mother knit a shawl for Aviaja?". Thus, a realisation in broad focus was recorded of all sentences as well as a realisation each with narrow information focus and one with corrective on the subject, direct object and indirect object, respectively. Note that in general, there are more subjects present than objects in the recorded corpus as a result of variation in sentence length.

All in all, 81 sentences were recorded for each speaker. However, as speakers were instructed to only realise completely natural dialogues, NH suggested a transitive instead of the antipassive formulation in one case. This sentence was subtracted from the data base because it could not be compared with the rest of the data. Eight other sentences for which the same speaker preferred object incorporation were included into the analyses. Two sentences, one from NH and one from NG, were removed from the database because of slips of the tongue.

For the recording, the sentences were presented to the speakers as question-answer pairs in a randomised order, the questioned element was underscored in the answer. The speakers read the sentences in pairs, one asking the questions and the other giving the answers. They were digitally recorded at a sampling rate of 22.05kHz using the speech analysis programme Praat (Boersma & Weenink 2007). This programme was also used for the acoustic analysis.

Smoothened f_0 contours were obtained using a Praat script by Xu (1999, 2005), which allows for the manual correction of errors produced by Praat's pitch calculation algorithm. Another Praat script was used that converted the PitchTiers saved by Xu's script to Pitch objects and, for each word, measured the lowest pitch value and the highest left and (if existing) right of it. If the pitch minimum was at the beginning of the word, corresponding measurements were also conducted at the end so that in all the cases, the pitch heights of the HL(H) tones of the final contour were measured. The script also output the highest overall pitch value

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[2] In the antipassive, also called 'half-transitive', a verb with intransitive morphology is used that only agrees with the subject. Accordingly, the subject receives absolutive case, while the objects can be left out or expressed with oblique case marking. Some inherently transitive verbs have to be antipassivised by a morpheme, while others, as in the examples used in this article, can be used without overt antipassivisation and are thus assumed to be ambiguous or antipassivised by a 0-morpheme (cf. Bok-Bennema 1991:46 et seq.). For further details on antipassive in West Greenlandic and other Inuit languages, see e.g. Sadock (1980), Bok-Bennema (1991) and Bittner (1994).

of each word and the span between the pitch maximum and minimum of the word. Furthermore, it calculated the pitch contour of each word, sorting it into one of the categories 'HL', 'HLH' or into a third category that comprised all other possible contours. In doing so, the script evaluated a difference of at least 5Hz as significant. This means if the first H was at least 5Hz higher than the L, the contour was denominated 'HL' and if the difference between the L tone and the second H tone was also at least 5Hz, it was betokened 'HLH'. Words where none of these movements was larger than 5Hz, or only the difference between L and the second H, were sorted into the third category. The pitch contours of the words were also manually identified by the author independently of the results produced by the script analysis. The automatic assessments were found to agree with the manual labelling in most of the cases.

For the analysis of pitch range, the highest H point, the lowest L point and the span used on each word were normalised across the speakers. The values were normalised relative to the average overall pitch range used by the speaker, using the formula displayed in (6). Statistical significance was determined by two-tailed t-tests with a significance level of 5%.

(6)   Formula used for normalising pitch data

$$y = \frac{x - R_2}{R_1 - R_2}$$

with y = the normalised value, x = the original value, R_1 = the average highest value for a speaker and R_2 = the average lowest value for a speaker.

3   Intonation of West Greenlandic

West Greenlandic is a language that has neither lexical pitch accents, nor stress, nor lexical tones. Its intonation is therefore entirely shaped by boundary tones. In declarative sentences, words usually bear one of two contours – HL or HLH – on the last two or three vocalic morae. Nagano-Madsen decomposes the HLH contour into HL, a property of the word, and a final H, a boundary tone associated with the phrase (cf. Nagano-Madsen 1993:152). In her account, a phrase is exclusively defined by the presence of the phrase-final (HLH) contour, so that phrasing can directly be deduced from the tonal contours. However, a reanalysis is proposed in Arnhold (2007) that interprets variation in the tonal contour not as a result of different phrasing but as a variation in tonal realisation. This incorporates the fact that word length plays a role in the choice of contour. Also, a more marginally occurring contour, LH, as well as a few words without apparent tones have to be accounted for in terms of tonal realisation, as they cannot be explained as results of phrasing. Moreover, it seems more favourable to describe the considerable variation in tonal contours – that also occurs among words in broad focus sentences – as gradual differences instead of categorically different phrasing. An illustration is given in Figure 1, which shows a realisation of a broad focus sentence in which both the HLH and HL contour occur. Finally, this approach will also be shown to account for the effects of focus on tonal contours more easily.
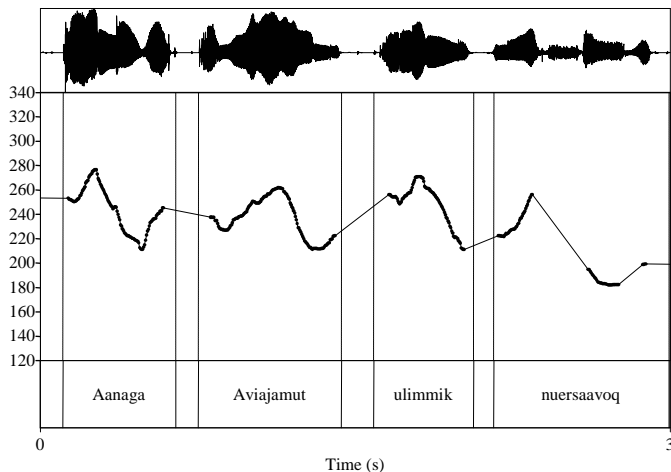
Figure 1. Speaker AK's realisation of the sentence *Aanaga Aviajamut ulimmik nuersaavoq* "My grandmother knits a shawl for Aviaja" in broad focus. Note that all the words are realised with an HLH contour, apart from the direct object ulimmik "shawl.INSTR", which bears HL tones.

Adopting this new analysis, it is claimed that the underlying boundary tones are HLH for all words, regardless of whether they are realised as HL, LH, HLH or whether no tone is realised at all. Therefore, the decomposition of the HLH contour into a property of the word and phrasal component is given up. Instead the whole HLH contour is attributed to the word. A consequence of this reanalysis is that no reference has to be made to phrasing in explaining tonal variation.[3] As a result, it is not necessary to refer to the phonological/intermediate phrase or any prosodic domain larger than the word in analysing the results presented in this study. While the existence of those larger units is left open here, an explicit hierarchy is stated, for example, by Rischel, consisting in the phonological word, phonological phrase, phonological clause, phonological sentence and utterance (cf. Rischel 1974:187).

4   Means of expressing focus

West Greenlandic uses syntactic and morphological as well as phonological means to express focus. As regards syntax, every constituent that is placed deviating from the standard SOV word order is contextually emphasised (cf. Fortescue 1984:174 et seq.). For example, a fronted object can be the topic of the sentence (cf.(7b)), while it may be understood as focussed if it is placed postverbally (cf.(7c)). Also cleft constructions are used to express focus (cf. Fortescue 1984:174).

> (7)   Word order and information structure
> a.   *Neutral word order*
>   Piniartu- p   puisi   pisar- a-   a.
>   hunter   ERG   seal.ABS catch IND.TR 3SG.3SG
>   "The hunter caught the seal."
> b.   *Object topicalisation*
>   Puisi piniartup pisaraa.
> c.   O*bject focus*
>   Piniartup pisaraa puisi.   (adapted from Fortescue 1984:181)

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[3] An alternative that does however seem less attractive is to claim that each word constitutes a phrase of its own.

An example of morphological focus marking is the use of the demonstrative *-una* which marks the focussed constituent in the sentence *Hansiuna toqukkaa* "It was Hansi who killed it" (cf. Fortescue 2003:1396). As concerns phonology, two ways of expressing focus intonationally will be dealt with in the following, variation in tonal contour (cf. section 5) and in pitch range (cf. section 6).

5   Focus realisation by tonal contours

As mentioned above, the contours that occur most frequently on West Greenlandic words are HLH and HL. In the database of this study, the speakers realised these contours on an average of 50% and 45% of the words, respectively. Further 2% displayed LH tones while for 3% of the words, no noticeable movements could be identified. However, the frequencies of occurrence for the contours varied under different information structural conditions. Four different cases were induced by the contextualising questions in the recorded material (cf. section 2): The question "What happens?" leads to broad focus, while a question like "Who cooks a halibut for your uncle?" puts one word in narrow focus, which is called information focus here, whereas the other words are contextually given. The case is similar with questions inducing a correction: One word will be in corrective focus in the answers, the others are given.

These four information structural categories are observed to differ significantly regarding the tonal realisations, as illustrated in Figure 2 (cf. also Table 1). On an average across the speakers, the HLH contour is found on words in corrective focus and information focus in 63% and 60% of the cases, respectively, but only on 43% of the words that are given and on 40% of those that occur in broad focus. HL is realised on 36% of the words in information focus, on 35% of those in corrective focus, on 54% of the words in broad focus and 51% of the given words are realised with HL tones. As can be seen from these numbers, focus leads to a higher number of HLH realisations, while the number of HL realisations decreases. But as will also be noted, words in broad focus behave more like given words.
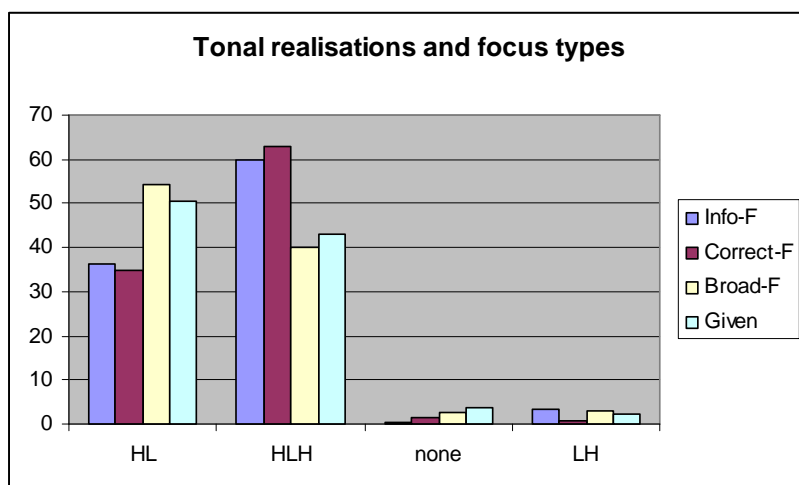

Figure 2. Variation in the frequency of occurrence of tonal contour (in percent, rounded) as an average over the speakers and different constituents. Info-F = information focus, Correct-F = corrective focus, Broad-F = broad focus, Given = given in a sentence in which another word is in information focus or corrective focus.

Apart from that, given words were realised without noteworthy pitch changes in 4% of the cases, and for 1–3% of the words in the other conditions, no contour can be identified. The picture becomes clearer if a further difference is made between words that are given in a sentence in which another word is in information focus and those that are given in the context of a correctively focussed word. Of the latter, 7% do not display noticeable pitch movements, whereas this is only the case for 1% of the words that are given in the context of information focus.

However, nothing of the like can be found in the LH contour. This tonal combination is exclusively found on one word, *Nanna* (a girls' name), which is the subject in (2)/(5), and it is only used by two of the speakers. Since *Nanna* is the only of the evaluated words that has no more than two vocalic morae, the occurrence of the LH contour can be tentatively attributed to the lack of space for a more complete realisation. More investigation is needed here to assess this hypothesis.

With this exception, the realisation of all tonal contours is massively influenced by information structure. Narrow focus, be it information focus or corrective focus, leads to a larger number of HLH realisations and at the same time decreases the number of HL realisations. It also shows that the total absence of surface tones is rare, but tolerated on given words rather then on new or focussed ones. Especially in the context of a contrastively focussed word, tonal realisations on given words are reduced radically. Since all the other contours are interpreted as incomplete realisations of HLH, these results can be interpreted in the following way: focus leads to a more complete tonal realisation.

This contrasts with previous suggestions which analyse differences between the tonal patterns in terms of differences in phrasing. Such an approach is implicit in Rischel's formulation of a prosodic hierarchy of West Greenlandic (cf. Rischel 1974:185 et seq.) and becomes more clear when Nagano-Madsen divides a text into phrases by the presence or absence of what she analyses as the phrase-final contour, i.e. HLH or absolutely final HLL tones (cf. Nagano-Madsen 1993:148). This means that the presence of a word-final H tone is seen as indicating a phrase boundary, whereas a word with HL tones is interpreted as phrase-internal. With such an approach, the interpretation of the above-named results implies that a focussed word with HLH tones is realised as an own phrase or as the phrase-final word. However, not all focussed words have HLH tones so that one could only claim that focus often, but not always results in a different phrasing, a conclusion that is not as attractive a way of accounting for the data as the alternative explanation offered here.

Having identified this general tendency, i.e. that focus induces a more complete tonal realisation, a closer look reveals a more differentiated picture. This will be discussed in the following two subsections.

5.1 Constituents and focus types

In the data corpus of the present study, considerable differences were found between the constituents that were investigated, i.e. the three pre-verbal constituents: subject, indirect object and direct object. This is illustrated in Table 1. As already mentioned, the LH contour only occurs on one of the subjects. Very interesting is the large difference between the two kinds of narrow focus. While correctively focused subjects

are realized with HLH tones in 70% of the case, only 58% of the subjects in information focus bear this contour. A similar, but much weaker tendency is observed for direct objects, whereas indirect objects have the full HLH contour in information more often than in corrective focus. By contrast, the only difference between the two kinds of givenness is the one observed above, namely that given words are more often realised without any noteworthy pitch movements when another word in the sentence is in corrective focus than when a word in information focus occurs in the context. The separate numbers for the constituents also confirm what was said above about broad focus: Words realised in this condition act more like given words than like those in narrow focus.

		Info-F	Correct-F	Broad-F	Given-Inf	Given-C	Average
Average	HL	36	35	54	53	48	45
	HLH	60	63	40	43	44	50
	none	1	2	3	1	7	3
	LH	3	1	3	3	1	2
Subjects	HL	30	28	55	51	48	42
	HLH	58	70	37	39	44	50
	none	2	0	0	0	4	1
	LH	10	2	8	10	4	7
Direct objects	HL	46	39	54	53	49	48
	HLH	54	56	38	47	41	47
	none	0	5	8	0	10	5
	LH	0	0	0	0	0	0
Indirect objects	HL	33	38	54	56	47	46
	HLH	67	63	46	42	46	53
	none	0	0	0	2	7	2
	LH	0	0	0	0	0	0

Table 1. Variation in the frequency of occurrence of tonal contour (in percent, rounded) for the different constituents and as an average over the constituents. Info-F = information focus, Correct-F = corrective focus, Broad-F = broad focus, Given-Inf = given in a sentence in which another word is in information focus, Given-C = given in a sentence in which another word is in corrective focus.

5.2   Speaker variation

Tonal realisations vary considerably between the speakers. Above, it was mentioned that LH boundary tones are only used by two of the speakers, NG and NH (7% and 2% of the cases, respectively). Furthermore, realisations without noticeable pitch movements are only found in the realisations of two speakers, NH and SN (10% and 1%, respectively). But also concerning the usage of the two core contours, HLH and HL, there is a large amount of variation between the speakers. NG realises nearly all the words with the complete HLH contour and NH and SN prefer HL tones only, while AK uses both contours to an almost equal extend. For all the speakers, narrow focus induces a higher percentage of complete HLH realisations. But narrow focus can raise the number of HLH realisations most in SN's and NH's strategy of tonal marking, because they have the smallest amount of words with HLH tones for givenness and broad focus. This is illustrated in Table 2, where broad focus is subsumed under the non-focus condition so that 'focus' should be understood as narrow focus.

a. AK	Focussed	Non-focussed		b. SN	Focussed	Non-focussed
HL	40	48		HL	57	84
HLH	60	52		HLH	43	15
none	0	0		none	0	1
LH	0	0		LH	0	0

c. NH	Focussed	Non-focussed		d. NG	Focussed	Non-focussed
HL	42	73		HL	3	2
HLH	49	11		HLH	94	90
none	4	13		none	0	0
LH	4	2		LH	3	8

Table 2. Variation in the frequency of occurrence of tonal contour (in percent, rounded) for focussed and non-focussed words, as an average on the constituents. Focussed = average on words in narrow focus. Non-focussed = average on words in broad focus and given words. a. For speaker AK. b. For speaker SN. c. For speaker NH. d. For speaker NG.

As can be seen, by far most of the words that are given or in broad focus are realised as HL by NH and SN. However, while focus does not completely reverse the percentages for those two speakers – in SN's data, even more words bear HL tones than HLH contour in narrow focus – a comparison between the left and the right column of Table 2b and Table 2c shows that the number of HLH realisations is strongly increased in the case of narrow focus for both NH and SN. In narrow focus, the frequency of occurrence for HLH is 38% (NH) and 28% (SN) higher, respectively. In contrast, the speakers AK and NG use the complete HLH contour much more often on words in narrow focus than SN and NH, but the difference to the other information structural conditions is considerably smaller.

6 Focus realisation by pitch range

In the following, the notion of pitch range will be split into two parts which are called 'span' and 'register'. According to Gussenhoven (2004:76 et seq.), the term 'span' indicates the distance between the pitch minimum and the pitch maximum of a stretch of utterance, while 'register' refers to the overall pitch level on which it is realised. Therefore, there are two ways in which focus can be expected to affect pitch range. Either the register can be raised or the span can be increased, but of course a combination of both effects is also possible. This chapter will show that all of these strategies are used to mark focus in West Greenlandic; however, not all are observed in every circumstance.

As can be seen from a simple comparison between given and focussed words (including those in broad focus), as illustrated in Figure 3, span is increased by focus. This effect proved to be statistically significant ($t(619)=6.04$, p<0.001). The increase of span is brought about mainly by raising the pitch maxima ($t(619)=5.46$, p<0.001), whereas no significant difference was found for the minima ($t(619)<1$).
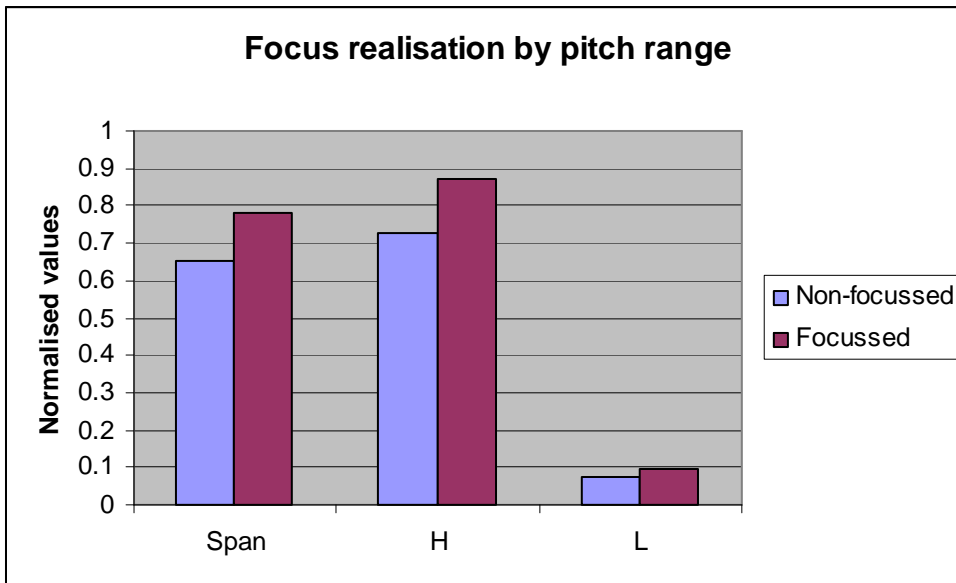
Figure 3. Average normalised span, highest pitch (H) and lowest pitch (L) for the total of focussed and non-focussed words uttered by all speakers. Focus comprises broad focus, information and corrective focus.

However, an increased span is not the only way of marking focus on pitch range, as was already alluded to. Similarly to what was shown for tonal realisations in the previous chapter, focus realisation in terms of pitch range also displays considerable variation if details are considered. Variation for different focus types and constituents and between the speakers will be illustrated in the following sections. The next subchapter concentrates on the different realisations of focus types, omitting variation between the constituents and speakers in a first step.

6.1   Realisation of different focus types

Information and corrective focus as well as broad focus differ significantly from given words with regard to span, as might have been expected from the results presented in the last section. However, the difference between given words and those in broad focus is much smaller than that between words that are given and those in the other two focus types. This can be explained if the different kinds of givenness are considered in addition to distinguishing between the different focus types. While the span for words in broad focus significantly differs from words that are given in a sentence in which another word is in corrective focus (t(250)=2.94, p<0.01), it is only insignificantly higher than the span for words that are given with another word being in information focus (t(256)<1). As illustrated in Figure 4, all given words are realised with a relatively small span, but if a correctively focussed word is in the context, the register is additionally lowered, as shown by the combination of very low maxima and minima.
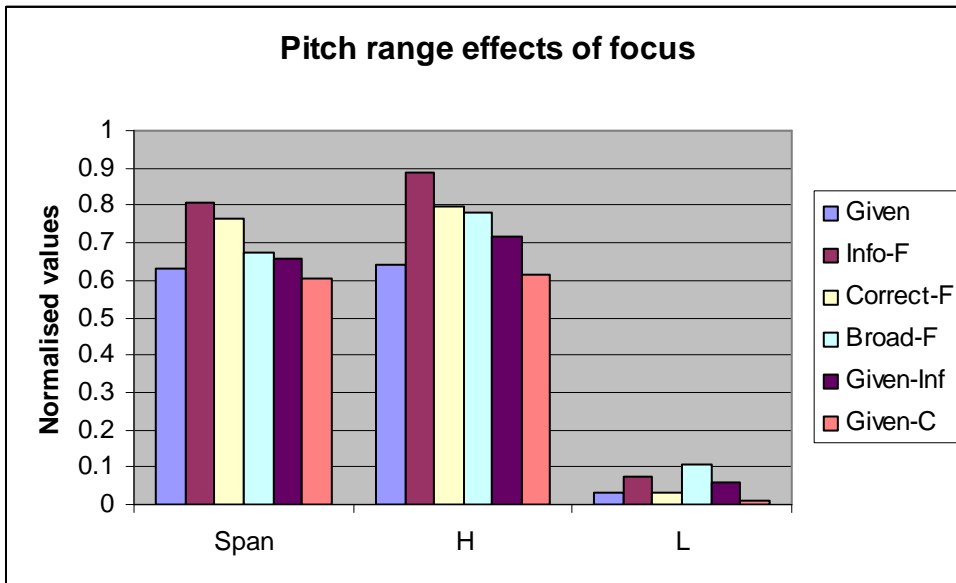
Figure 4. Normalised span, highest pitch (H) and lowest pitch (L) as an average value on the average values for subjects, direct and indirect objects. Info-F = information focus, Correct-F = corrective focus, Broad-F = broad focus, Given-Inf = given in a sentence in which another word is in information focus, Given-C = given in a sentence in which another word is in corrective focus, Given = total of both kinds of givenness.

The differences between the focus types also appear in the graph. Broad focus seems to be primarily marked by a raised register, since it induces a raising of pitch minima as well as maxima. For corrective and information focus, an increased span rather than a raised register seems to be present, with corrective focus inducing rather low minima and information focus resulting in raised maxima.

6.2   Differences between the constituents

In the data corpus of this study, focus is not uniformly marked on all the constituents, but differences are found between the preverbal constituents that were considered, i.e. subject, direct and indirect objects. As an illustration, Figure 5 displays four different realisations of the sentence *Nanna angajuminut inuusamik sanavoq* "Nanna makes a doll for her older sister": in broad focus and with narrow information focus on each of the three preverbal constituents. The broad focus realisation shows regular downstep, and the preverbal constituents all have a similar pitch span. Compared to this, focus marking in terms of span is visible for focus on the subject and the direct object, but not that clearly for the indirect object. The focussed direct object is also realised at a raised register, over and above the greater span, while subject focus additionally causes the postfocal constituents to be realised at a lower register.
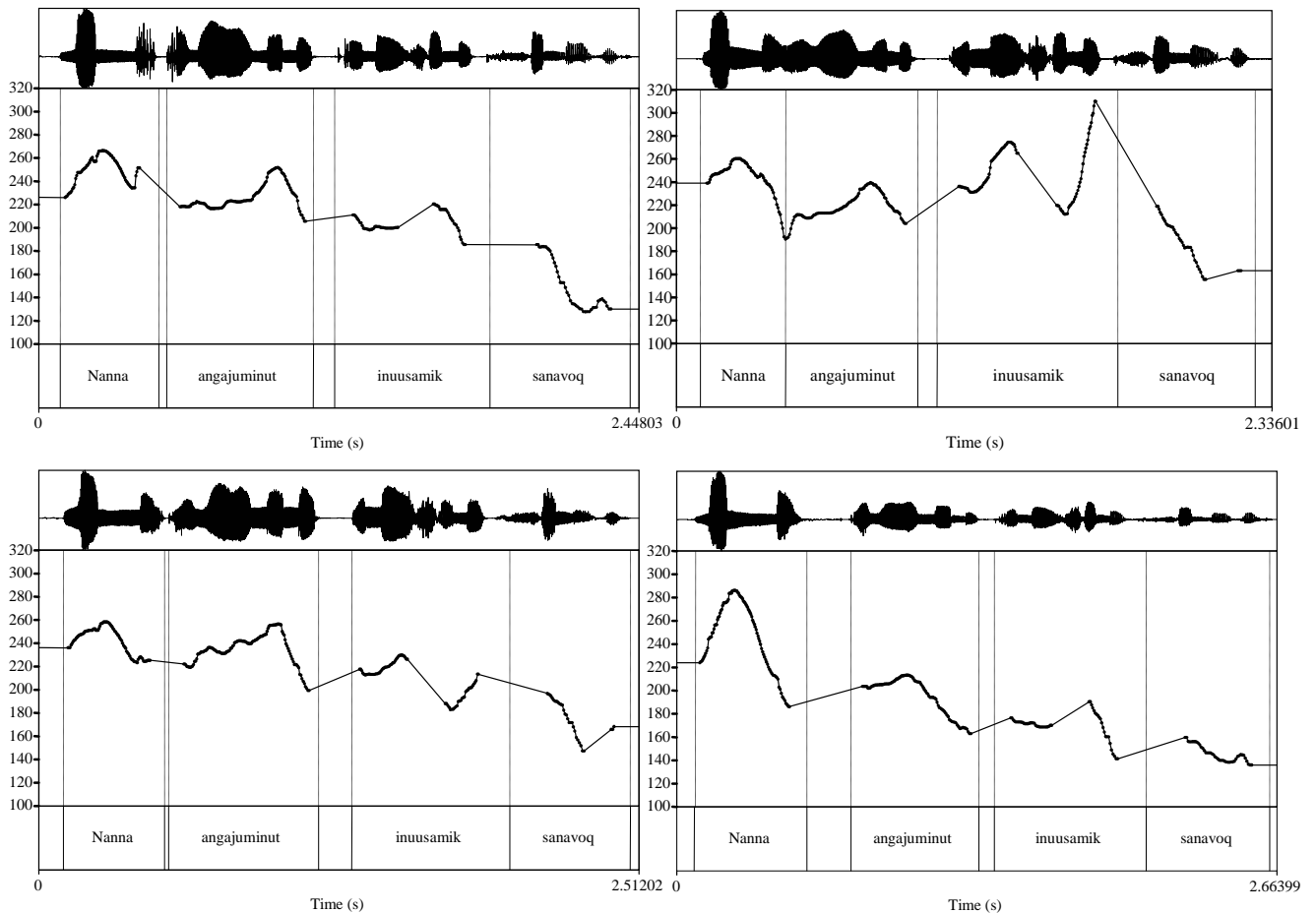
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Figure 5. Speaker SN's realisations of the sentence *Nanna angajuminut inuusamik sanavoq* "Nanna makes a doll for her older sister" in broad focus (top left panel) and with information focus on the subject *Nanna* (top right panel), the indirect object *angajuminut* (bottom left panel) and the direct object *inuusamik* (bottom right panel).

The same tendencies are also found when the complete database is analysed for statistically significant differences in the focus marking on the prefinal constituents, as will be shown in the following.

In general, focus on a direct object is marked by a raised register for all three focus types. This means that both the highest and the lowest pitch are significantly higher than they are for given words. The span is not affected for corrective and broad focus. Only information focus shows an additional increase of span ($t(30)=3.83$, p<0.001).

In contrast, an increased span is the only means used for marking subject focus. In comparison with the total of given words, this increase is however only significant for information focus ($t(201)=3.74$, p<0.001) and corrective focus ($t(200)=3.33$, p<0.01). However, the contrast that emerged between broad focus and the other two focus types is not that strong when the difference between the two kinds of givenness is being made. Then it shows that all three kinds of focus differ significantly from words that are given in a sentence in which another word is in corrective focus ($t(129)=4.66$, p<0.001 for information focus; $t(128)=4.36$, p<0.001 for corrective focus; $t(128)=3.10$ p<0.01 for broad focus), but not from those that are

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given in the context of a word in information focus.[4] This means that subject focus is marked stronger in contrast to constituents that are given in a sentence that contains a corrective focus than to those in sentences containing an information focus. One could also say that corrective subject focus induces a stronger compression of pitch span on the given words in its context than does information subject focus. This is a further difference to direct objects, where no significant distinction between the two kinds of givenness is found.

For indirect objects, there are more kinds of givenness than for the other two constituents that were investigated, and accordingly, the indirect objects display the most complex pattern of focus marking. As with the other constituents, indirect objects can occur as given in a sentence in which another word is in information or in corrective focus. But as can be seen from section 2, indirect objects are the only constituents that occur both prefocally, i.e. before a focussed direct object, and postfocally, i.e. after a focussed subject. So indirect objects can be given in four different ways and given words in all four contexts can be compared with words in the three focus conditions. This comparison is summarised in Table 3.

Indirect object	Info-F			Correct-F			Broad-F		
Significance	Span	H	L	Span	H	L	Span	H	L
Given	X	0	0	X	X	0	0	0	0
Given (in Inf)	0	0	0	X	0	0	0	0	0
Given (in C)	0	0	0	X	X	0	0	0	0
G (Prefocal)	X	0	X	X	X	0	0	0	0
G (Postfocal)	0	0	0	0	0	0	0	0	0
G (Pre, in Inf)	X	0	X	X	0	0	0	0	0
G (Pre, in C)	X	0	0	X	X	0	0	0	0
G (Post, in Inf)	0	0	0	0	0	0	0	0	0
G (Post, in C)	0	0	X	0	X	X	0	0	X

Table 3. Significance of the difference between various kinds of givenness and the three focus types in terms of span, highest pitch (H) and lowest pitch (L) for indirect objects. Significant differences are marked by X; 0 marks insignificant differences. Info-F = information focus, Correct-F = corrective focus, Broad-F = broad focus, G = given, Inf = given in a sentence in which another word is in information focus, C = given in a sentence in which another word is in corrective focus, Pre = given pre-focally, Post = given post-focally, Given = total of all kinds of givenness.

The overview displays considerable variations between the different kinds of givenness. Compared to the total of given words, the only significant effect seems to be that information and corrective focus induce a higher span, but no significant effects are found for the highest or lowest pitch. However, when some of the subcases are considered it shows that, if marked, information focus results in a lowering of L tones, whereas increased span on correctively focussed words is a result of a raising the H tones. Different from the results for the other two constituents, no marking at all is found for broad focus. The only exception is a significant difference to words that are given after a word in corrective focus, which show very low pitch minima.

As the results presented in this chapter have demonstrated, a comparison between focussed and given words does not only show variations between the focus types, but also between different kinds of givenness.

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[4] However, a significant lowering of L tones for words in corrective focus is found compared to those that are given in a sentence containing narrow information focus. Still, H tones are also (insignificantly) lowered, so that no significant effect on span results.

Moreover, while some general tendencies emerge for the marking of different focus types, there are considerable variations between the three constituents that were investigated. Therefore, it can be said that information and corrective focus are frequently marked by an increased span, possibly combined with a raised register, while broad focus is often marked by a raised register or an increased span or receives no marking at all. This interacts with differences between the constituents as to whether increased span or raised register are used more prominently. Also, the extent varies to which focus – or, for that sake, givenness – is marked.

6.3 Speaker variation in pitch range

Of course, the speakers' voices differ so that they have different overall pitch ranges, but apart form that, the data also shows speaker variation for the normalised values. This is illustrated in Figure 6 with the example of the pitch range used on subjects in different information structural conditions. Here, the greatest variation between these conditions occurs for speaker SN. For NG, a very clear marking of information focus can be observed, whereas for NH and AK, no larger differences in pitch span are found. Also for the other constituents, SN's data displays the biggest variation in terms of span, while, for example, NH marks information focus very clearly on the direct objects, similar to the results for NG that are illustrated in the graphic below.
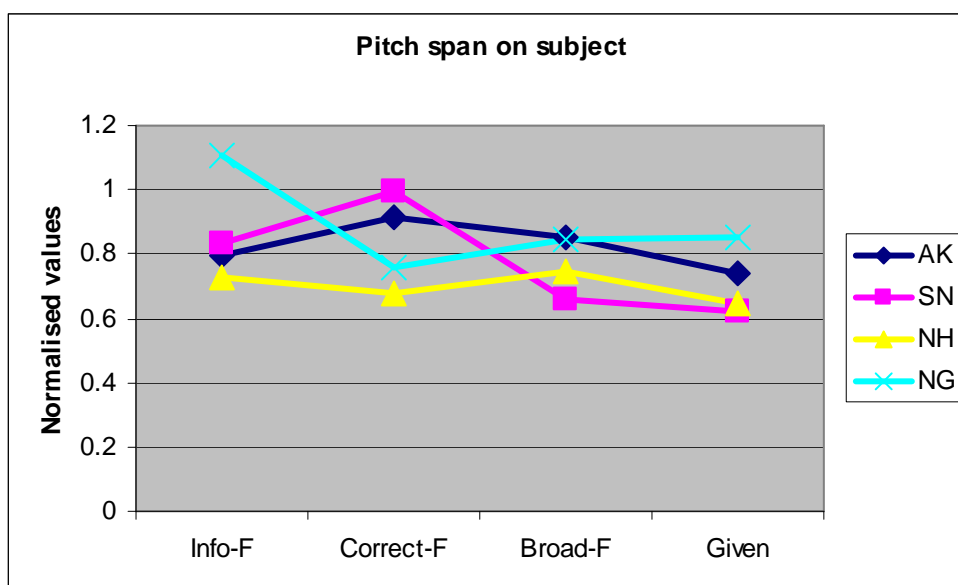

Figure 6. Normalised span used by the four speakers on subjects in different information structural conditions. Info-F = information focus, Correct-F = corrective focus, Broad-F = broad focus, Given = given in a sentence in which another word is in information or corrective focus.

Differences between the speakers are also found when pitch minima and maxima are considered. This shows that focus realisation in terms of pitch range is also to a certain extent subject to individual variation, similarly to what was demonstrated above for tonal realisations.

7   Conclusion

This contribution shows that focus in West Greenlandic is expressed in two ways; it affects both tonal realisations, a qualitative dimension, and pitch range, a quantitative dimension. For tonal contours, the effect of narrow focus could clearly be identified as an increased number of complete – HLH – realisations, as compared to given words, but also in relation to those in all-new sentences. The case is more complicated for pitch range. Two different strategies are used to mark focus, a raising of the register and an increase in span, which sometimes also occur in combination. Variation is induced by three factors that also influence focus marking in terms of tonal realisation. First, differences were found between the speakers who have individual preferences for certain contours or who differ from each other with respect to the way they modify pitch range.

Second, variation between the expression of focus on subject, direct and indirect object was observed. This might partly be due to the fact that all the recorded sentences are in unmarked word order so that the subject is always sentence-initial, and the indirect and direct object occupy the second and pre-verbal position, respectively. Additionally, indirect objects figure as given in more contexts than the other two constituents so that it is not surprising that the findings for indirect objects deviate somewhat from those for direct objects and subjects.

Third, information focus, corrective focus and broad focus are marked in different ways. Seen from the perspective of information structural theory, the results of this study indicate the existence of different focus types for West Greenlandic. Two kinds of narrow focus must be kept apart here, information focus and corrective focus. Words in broad focus sometimes resemble given words, but sometimes also those in information and corrective focus. In most of the cases, the results indicate that broad focus takes a position between information focus and corrective focus on the one hand and given material on the other hand. Theoretically, this can be accounted for either by saying that the data show a strong difference between broad and narrow focus or by claiming that broad focus is in fact not a case of focus at all, but merely new information, a position that is for example taken by Selkirk (to appear). While this question is left open here, the difference between the two kinds of narrow focus and thus the existence of different focus types is a clear result that should be incorporated into a definition of focus.

The results of the present study do not only provide input for the theory of information structure, but are most of all an empirical contribution to the development of theories of intonation. It appears that the means West Greenlandic uses to express focus are relatively hard to account for. Tonal realisation would have to be attributed to the sphere of phonetics, especially since focus does not always result in the same tonal contour. The same is true of the effects of focus on pitch range, which can currently only be accounted for in terms of downstep. A phonological modelling of differences in pitch range is suggested by Féry & Ishihara (2007). But also following this suggestion, the distinction between the two focus marking strategies – an increase in span and a raise of the register – would have to be attributed to phonetic implementation.

Altogether, it can be said that in addition to describing an aspect of the intonation of West Greenlandic, the results of the present study also raise questions and points for further development in the

theories on intonation and information structure. Thereby this paper stresses the importance of research on a typologically broad array of languages as an empirical basis for theoretical development.

REFERENCES

Arnhold, A. 2007. Focus realisation in West Greenlandic intonation. Master thesis. University of Potsdam.

Boersma, P. & Weenink, D. 2007. Praat: doing phonetics by computer (Version 4.3.36) [Computer programme]. Retrieved from http://www.praat.org/

Bok-Bennema, R. 1991. *Case and Agreement in Inuit.* Berlin/New York: Foris. (Studies in generative grammar 38)

Bittner, M. 1994. *Case, Scope, and Binding.* Dortrecht: Kluwer. (Studies in Natural Language and Linguistic Theory 30)

Féry, C. & Ishihara, S. 2007. How focus and givenness shapes prosody. Ms. University of Potsdam.

Fortescue, M. 1984. *West Greenlandic*. London/Sydney/Dover, New Hampshire: Croom Helm.

Fortescue, M. 2003. West Greenlandic (Eskimo). In: Booij, G. E., Lehmann, C., Mugdan, J. & Skopeteas, S. in colloboration with Kesselheim, W. (eds.) *Morphology: An international handbook on inflection and word-formation*. Berlin: Walter de Gruyter (HSK 17, 2), 1389-1399.

Gussenhoven, C. 2004. *The phonology of tone and intonation*. Cambridge: Cambridge University Press.

Jun, S.-A. 2005. Prosodic typology. In: Jun, S.-A. (ed.), *Prosodic typology. The phonology of intonation and phrasing.* Oxford: Oxford University Press, 430-458.

Nagano-Madsen, Y. 1993. Phrase-final intonation in West Greenlandic Eskimo. *Working Papers* 40, Lund University, Dept. of Linguistics, 145-155.

Rischel, J. 1974. *Topics in West Greenlandic phonology. Regularities underlying the phonetic appearance of wordforms in a polysythetic language.* Copenhagen: Akademisk Forlag.

Sadock, J. M. 1980. Noun incorporation in Greenlandic: A case of syntactic word formation. *Language* 56/2: 300-319.

Sadock, J. M. 2003. *A Grammar of Kalaallisut (West Greenlandic Inuttut)*. München: Lincom. (Languages of the World/Materials 162)

Selkirk, E. (to appear) Contrastive focus, givenness and the unmarked status of "discourse-new". To appear in: Féry, C., Fanselow, G. & Krifka, M. (eds.), *Interdisciplinary Studies on Information Structure (ISIS)* 6. Potsdam: Universitätverlag Potsdam.

Xu, Y. 1999. Effects of tone and focus on the formation and alignment of f_0 contours. *Journal of Phonetics* 27:55-105.

Xu, Y. 2005. TimeNormalizeF0.praat (Version 2.3.2) [Praat script]. Retrieved from http://www.phon.ucl.ac.uk/home/yi/downloads.html