

Norwegian Intonation and the Resolution of Concessive Anaphora

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Abstract

The present paper reports on a listening comprehension test in which the subjects' task was to decide whether they felt there was an intended causal relation or an intended concessive relation between the conditional clause proposition and the main clause proposition expressed in a set of Norwegian spoken conditionals. In order to do that they had to select a context that would enable them to resolve the reference of the Norwegian concessive anaphor *likevel* ('nevertheless' or 'after all') which occurred in the main clause of each stimulus. We wanted to test the strength of various phonologically discrete prosodic cues relative to the importance of differences in the linear order of syntactic constituents or the occurrence of certain function words in the utterance. The prosodic features proved to be remarkably robust cues to the activation of a specific context. Not only did we find that stimuli which differed only in their prosodic form displayed consistent differences in the test subjects' response patterns but we even found that prosodic features at the utterance level can neutralize the effect of function words that would otherwise help the hearer activate a contrasting context for utterance interpretation (paragraphs 3.1. and 3.3.).

1. Introduction

1.1. Concessive adverbs as anaphora

This paper reports on a listening comprehension test in which the task of the native Norwegian test subjects was to compute one central cognitive effect of the appearance of a Norwegian concessive adverb in the stimulus utterances, the adverb *likevel*, glossable as 'still', 'nevertheless', 'even so', 'all the same', 'after all', 'anyway', depending on context.

Norwegian *likevel* and English *nevertheless* in (1) will be uninterpretable to anyone who does not have access to the immediately preceding discourse structure that enables one to evoke the right context.

(1) *I morgen skal vi plukke blåbær likevel.*

'Tomorrow we're going to pick blueberries nevertheless.'

We need an expressed proposition which referentially binds the concessive adverbs in the same way that a discourse antecedent binds a pronominal anaphor, and which contrasts with the propositional content of the current utterance. Such a proposition is available in (2), where it is possible to establish an antecedent-anaphor link between the condition 'if it rains' and the sentence-final word repeating this condition resumptively and placing it in a concessive relation to the main clause proposition, which implies that the picking of blueberries will take place even in the event that it rains.

(2) *Om det regner, skal vi plukke blåbær likevel.*

'If it rains, we're going to pick blueberries nevertheless.'

The grammatical structure of (2) does not force a concessive interpretation of the conditional construction, however. Instead of being bound internally by the proposition of the preposed conditional clause, we can imagine that the adverbial anaphor *likevel/nevertheless* might be anchored externally by some proposition expressed prior to the utterance of (2), and only the latter alternative is compatible with the appearance of the Norwegian marker *da* and English *then* in (3).

(3) *Om det regner, da skal vi plukke blåbær likevel.*

'If it rains, then we're going to pick blueberries after all/nevertheless.'

The meaning of *da* and *then* is of a procedural sort [1]. These are words that instruct the addressee to construe their antecedent (here: 'if it rains') as a sufficient condition for the truth of the main clause proposition. While someone could produce an utterance of (2) in order to communicate that rain is no excuse for not picking blueberries, (3) with the added *da* constrains the range of interpretations by eliminating the possibility of a concessive reading. The expression *after all* – which in its utterance-final position can only refer to a previous thought contradicting the main clause proposition – may be a more suitable English gloss for Norwegian *likevel* in (3).

1.2. The role of prosody in the inferential process of anchoring *likevel* in the context selected

In our listening test we were exploring to what extent prosodic parameters of various sorts influence listeners' understanding of the way that the Norwegian concessive anaphor *likevel* is intended to be contextually anchored. Do prosodic features of the stimulus ever override the potential communicative effect of a marker like *da* ('then' of 'if-then') (cf. (3))? Do prosodic features ever override the effect of the Norwegian conditional connective *hvis*, which, unlike *om*, is believed to defy the concessive reading of conditionals? How does intonational phrasing and accenting and de-accenting of crucial items in the utterance interact with word order? What is the impact of prosody-driven information structure on the hearer's processing of *likevel*? These are the main questions which we are asking, and which our listening experiment was designed to produce some answers to.

1.3. How to counteract the concession bias

All our stimuli were of the type where the utterance can be interpreted either as concessive, implying that the main clause proposition is true in spite of the truth of the conditional clause proposition, or else as a regular 'if-then' conditional in which the truth of the main clause proposition follows from the truth of the conditional clause proposition (a 'material conditional'). As no contextual frame that might aid the listener's comprehension accompanied the stimulus presented, it is conceivable that it was in general easier for the test subjects to resolve the reference of *likevel* in favor of an internal

antecedent verbally expressed in the stimulus than to imagine some unknown discourse anchor for *likevel* which is not expressed in the stimulus (external anchoring of *likevel*). However, our belief when we set up the experiment was that certain prosodic features might turn out to be strongly conducive to the interpretation of *likevel* as an externally anchored concessive anaphor. All stimulus utterances were such that they could evoke a concessive interpretation in one context and a material conditional interpretation in a different context, and our job was to find out how intonation helps to enter contextual assumptions into the listeners' discourse models that yield either the inference 'Q, because of P' or the inference 'Q, in spite of P'.

2. Listening test

2.1. Recordings and signal editing

Speech recordings were made of one of the authors (TF) in the sound-treated studio of the Linguistics Department using high-quality digital equipment. The utterances were stored as separate files with a sampling frequency of 44.1 kHz. To remove possible low-frequency noise, the files were high-pass filtered with a cut-off frequency of 70 Hz. Signal manipulations involved only editing of the waveform and were done by using the Praat program [2].

2.2. Speech material - test design

The listening test consisted of three different types of stimuli. One of them will not be reported on in this paper, as the results from that block turned out to be rather unrevealing, for reasons that we do not want to speculate on. The other two contained the sentences in (4) and (5).

(4) a. *Om/hvis hun bor på Rena, kan vi besøke henne likevel.*

'If she lives at R., we can visit her nevertheless/after all.'

b. *Om/hvis hun bor på R., da kan vi besøke henne likevel.*

'If she lives at R., then we can visit her after all/?nevertheless.'

c. *Om/hvis hun bor på R., så kan vi besøke henne likevel.*

(same as (4a); the pro-form *så* is supposed to be non-truth-conditional, unlike *da* ('then') in (4b))

(5) a. *Kommer vi i gang om en halvtime, blir vi ferdig i tide likevel.* (lit: come we in motion in a halfhour, become we ready in time nevertheless/after all)

'If we get started in half an hour, we'll finish in time nevertheless (internal binding)/after all (non-local binding).'

b. *Kommer vi i gang om en halvtime, blir vi likevel ferdig i tide.* (same as (5a))

The 'nevertheless' interpretation of (4a-c) activates for the hearer the implicature that the female person referred to lives farther away than the speaker, or possibly the hearer, had thought (but it is still possible to visit her); the 'after all', or 'because' interpretation activates the implicature that she lives closer than the speaker or hearer had thought (and it is therefore possible to visit her). An internal antecedent interpretation of (5a-b) activates the implicature that a start half an hour after the time of utterance is later than expected (though not too late), while an interpretation that involves pragmatic recovery of a referent outside the conditional activates the implicature that getting started half an hour from the time of utterance is earlier than expected and causes the truth of the proposition expressed. In the latter situation, when no textual propositional antecedent that could bind *likevel* is accessible, the referent will be identified as the contradictory

counterpart of the main clause proposition embedded under a past tense belief verb: 'Even if I used to believe otherwise, we can now visit her, *because* she's living at Rena' in (4), and 'Even if I used to believe otherwise, we're going to finish the work in time, *because* we'll get started in half an hour.'

2.3. Prosodic cues

The intonation in the stimuli was varied systematically. Sometimes there was a single Intonation Unit (IU) spanning the entire utterance, at other times there was one IU for the conditional clause and one for the main clause (though with no pausal marking of the utterance-internal IU boundary). The main clause would either contain a single Intonational Phrase (IP) exhausting the IU, or two IP's. East Norwegian IP's are characterized by an obligatory right-edge F0 maximum which highlights the closest accented item to the left (a phrasal accent). Earlier work [3] has established that when a Norwegian IU contains two IP's, the hearer is instructed to process the meaning expressed in one of them as discourse-activated (topical) information and the meaning of the other IP as new (focal) information. Hence one of our hypotheses was that when *likevel* is assigned an IP-terminating phrasal accent and there is yet another phrasal accent in the main clause, then *likevel* is likely to be processed as an anaphor which represents an activated proposition and has a local discourse antecedent, while the other phrasal accent in the main clause will be associated with new information. In our opinion this double-IP pattern ought to support a concessive interpretation of the relation between the conditional clause and the main clause propositions, i.e. the assumption that the main clause proposition is true in spite of the fact that the conditional clause proposition is true as well.

We also tested the complementary hypothesis, namely whether a main clause consisting of a single IP actually favors a pragmatic interpretation where the truth of the main clause proposition is judged to depend on the truth of the conditional clause proposition, in other words a pragmatic strengthening of the conditional relation to a causal relation. That implies that *likevel* is used with the same meaning as English *after all* and lacks a local discourse antecedent. We furthermore varied the word order in the main clause systematically to see whether a *likevel* in final position tended to be processed differently than a non-final *likevel*.

Of the two Norwegian conditional connectives *hvis* and *om*, the latter is supposed to permit a concessive interpretation of the pragmatic relationship between the subordinate clause and the main clause and the former is not. We wished to test the resilience of the lexical distinction between the two connectives in stimuli containing an intonation believed to be adverse to the causal *after all* interpretation.

Finally we contrasted stimuli with the pro-form *da* ('then' of 'if-then' conditionals) after the conditional clause (cf. (4b)) and stimuli with the pro-form *så* after the conditional clause (cf. (4c)), varying the prosodic handling of those markers systematically to test our hypothesis that a *så* produced with word- and phrase-accent actually assumes those lexical properties that are believed to distinguish *da* from *så*.

2.4. Listening test procedure

The listening test was run by using the CSRE (Computerized Speech Research Environment) system. Individual listeners were seated in the Linguistics Department's studio and were presented with the stimuli over two high-quality loudspeakers.

The listeners indicated their interpretations of the utterances by clicking on either *til tross for* ('in spite of') or *på grunn av* ('because of') displayed on a computer screen. Clicking on an answering alternative prompted the program to present the next stimulus so that response pause was defined by the subjects themselves. Apart from the listeners' reactions, their reaction times were registered, defined as the time span from the end of a stimulus to a response given by clicking.

To avoid learning effects, the order of presentation for the three types of stimuli was permuted for individual listeners. The stimuli of each type were presented twice blockwise, with a randomized order within each block. Since there were 22 different *Rena* stimuli and 13 different *half an hour* stimuli, each listener judged a total of 44 and 26 utterances, respectively.

A group of 15 subjects aged between 21 and 60 years (average 36.5) volunteered in the listening test. They had a varying dialectal background, however, no listeners from the West or North Norwegian dialect areas participated. Given the number of 15 subjects and two repetitions of each stimulus, the total number of judgements per stimulus was 30.

3. Results

3.1. The *om-hvis* distinction vs. intonational phrasing

The Norwegian conditional connective *om* is supposed to make it relatively easy to read the clause it introduces as a concessive conditional if that interpretation is supported by independent contextual evidence; the conditional connective *hvis*, on the other hand, sounds very awkward with the 'even' type of concessive modifier so it should be generally harder to impose a concessive reading on a clause introduced by *hvis*. What we found was that the *om-hvis* distinction affected the test subjects' resolution of the reference of *likevel* substantially only when the stimulus contained no other strongly biasing cue to reference resolution. A good example is the pair (6)-(7) where the concessive anaphor is non-final and lacks a phrasal accent, and where there is a single IU spanning the stimulus but one IP per clause.

(6) [[**om** hun 'bor på 'RENA så kan vi]_{IP}
['likevel be 'SØKE henne]_{IP}]_{IU}
concessive 'nevertheless': 26/30 - causal 'after all': 4/30

(7) [[**hvis** hun 'bor på 'RENA så kan vi]_{IP}
['likevel be 'SØKE henne]_{IP}]_{IU}
concessive 'nevertheless': 15/30 - causal 'after all': 15/30

In (8)-(9), however, the intonation-based rule mentioned in 2.3. which instructs the hearer to associate the material in one of the main clause IP's with discourse-given information is seen to override the lexical difference between *om* and *hvis*. The intonational phrasing of (8)-(9) is apparently perceptually more salient for the majority of listeners than the connective.

(8) [[**om** hun 'bor på 'RENA]_{IP}]_{IU}
[[kan vi be 'SØKE henne]_{IP} ['LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 26/30 - causal 'after all': 4/30

(9) [[**hvis** hun 'bor på 'RENA]_{IP}]_{IU}
[[kan vi be 'SØKE henne]_{IP} ['LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 21/30 - causal 'after all': 9/30

As the concessive anaphor *likevel* is one of two phrase-accented items in the main clause of (8)-(9), the majority of test subjects identified its intended referent as the proposition of the preceding conditional clause, processing the stimulus as a concessive conditional even in (9) where the speaker's choice of conditional connective was *hvis*. Conversely, when a

phrasal accent on *likevel* in a broad-focus structure with a single IP pointed to a non-local referent and a causal relation between the two clauses, the lexical distinction between *om* and *hvis* was again ignored by a majority of subjects, as illustrated by the pair (10)-(11).

(10) [[**om** hun 'bor på 'Rena kan vi be 'søke henne
['LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 8/30 - causal 'after all': 22/30

(11) [[**hvis** hun 'bor på 'Rena kan vi be 'søke henne
['LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 6/30 - causal 'after all': 24/30

3.2. Final vs. non-final *likevel*

Observe that while the intonation alone is presumably responsible for the fact that the judgements were so similar in (8) and (9), the combination of word order and prosody is responsible for the substantial difference between the test subjects' handling of (10)-(11) on the one hand and (6)-(7) on the other. The difference between a final *likevel* with phrasal accent and a non-final *likevel* without phrasal accent was found to be particularly acute in the stimuli of the type shown in (5). While (12) proved to be a relevant stimulus in that the perceived focality of *likevel* directed the test subjects to a causal interpretation of the relation between the conditional clause and main clause propositions, the absence of a focus on *likevel* in (13) was seen to split the group of test subjects, suggesting that the relevance of that stimulus was considerably reduced (for English glosses, see (5)).

(12) [['kommer vi i gang om en 'halvtime blir vi 'ferdig i tide
['LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 3/30 - causal 'after all': 27/30

(13) [['kommer vi i gang om en 'halvtime blir vi 'likevel
['ferdig-i 'TIDE]_{IP}]_{IU}
concessive 'nevertheless': 13/30 - causal 'after all': 17/30

We also found that the word order difference between a final and a non-final *likevel* was important in its own right, not only when there is additional support from prosody. *Likevel* was sentence-final and the second of two phrase-accented items in (8) and (9) (in 3.1.), but as that apparently did not reduce the number of 'nevertheless' judgements there, it was surprising to find that (14), with exactly the same intonational phrasing as (8)-(9) and the same final position for *likevel*, by no means favored the 'nevertheless' interpretation the way that (15) did.

(14) [['kommer vi i gang om en 'HALVTIME]_{IP}]_{IU}
[[blir vi 'FERDIG i]]_{IP} ['tide 'LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 16/30 - causal 'after all': 14/30

(15) [['kommer vi i gang om en 'HALVTIME]_{IP}]_{IU}
[[blir vi 'LIKEVEL]_{IP} ['ferdig i 'TIDE]_{IP}]_{IU}
concessive 'nevertheless': 23/30 - causal 'after all': 7/30

We are not able to account for why the intonational phrasing in (14) failed to provide consistent aid in the reference resolution task, even though the same intonational phrasing in (8), and even (9), turned out to be a reliable cue. In other words, we fail to see why the speaker's placement of *likevel* in the second rather than the first IP of the main clause in (14) interfered with the double-IP intonation there but did not have a similar effect in (8)-(9). And the difference in the sets of judgements of the two stimuli (14) and (15) is all the more puzzling in light of the data in (16) and (10) (repeated here) where the former differs from the latter in its phrasal accents on the finite verb *kan* as well as on *likevel*, revealing the sometimes very striking effect of the prosodically based

instruction to the hearer to anchor *likevel* in the immediately preceding discourse when the main clause contains two IP boundaries (hence two phrasal accents). The conditional clause in (16) below represents discourse-given information but so does the concessive anaphor *likevel* which carries the phrasal accent in the second IP of (16). The rule that one of the IPs in a double-IP IU represents new information and the other one represents already activated information is seen to apply not only when IP boundaries and clause boundaries coincide. In (16) the phrasal accent on the modal auxiliary *kan* ('can') is located in the second clause but in the first IP; a comparison between (16) and the single-IP intonation in (10) shows that the presence of the first phrasal accent in (16) is highly relevant.

- (16) [[om hun 'bor på 'Rena 'KAN-vi-be]_{IP}
 ['søke henne 'LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 29/30 - causal 'after all': 1/30
 (10) [[om hun 'bor på 'Rena kan vi be 'søke henne
 'LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 8/30 - causal 'after all': 22/30

3.3. *Da* vs. *så*

In some of our stimuli, *likevel* was not sentence-final, yet it was the only item with a phrasal accent on it, which implies that the material to its right is extra-metrical in the sense that it is not part of an IP. There is then a conflict between the prosodic cues, which point to a causal interpretation, and the linear order of elements, which points to a concessive interpretation. However, the confusion that some may have felt when faced with the stimulus of (17), being of the type described above, is offset by the speaker's substitution of *da* for *så* in the main clause of the stimulus in (18), which is otherwise identical to (17).

- (17) [[om hun 'bor på 'RENA]_{IP}]_{IU}
 [[så kan vi 'LIKEVEL be]_{IP} 'søke henne]_{IU}
concessive 'nevertheless': 17/30 - causal 'after all': 13/30
 (18) [[om hun 'bor på 'RENA]_{IP}]_{IU}
 [[da kan vi 'LIKEVEL be]_{IP} 'søke henne]_{IU}
concessive 'nevertheless': 5/30 - causal 'after all': 25/30

The difference in the judgements of (17) and (18) was to be expected. *Så* in (18) is normally a non-referential pro-form, while *da* is the referential Norwegian counterpart of the English *then* of *if-then*. We suspected that the combination of a phrasal accent on the function word *så* in (17) and a shift of *likevel* to the sentence-final, focal position might neutralize what is otherwise a lexical difference between *så* and *da* that Norwegian speakers are inclined to pay attention to. There should actually be no need for a phrasal accent on the non-referential *så*, but having observed that this conditional *så* gets accented a lot in natural speech, we suspected that it has come to be used systematically as a marker of the resumptive topic in a topic-focus structure imposed on the main clause in conditional constructions, and we decided to include stimuli of the type shown in (19)-(20) in our test. The data we received from (19)-(20) suggests that at least for some native users of Norwegian, conditional *så* automatically assumes the lexical properties of conditional *da* when it gets a phrasal accent as well as word accent, most importantly the ability to refer to the proposition of the preceding conditional clause.

- (19) [[om hun 'bor på 'RENA]_{IP}]_{IU}
 [['SÅ kan vi be]_{IP} ['søke henne 'LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 6/30 - causal 'after all': 24/30
 (20) [[om hun 'bor på 'RENA]_{IP}]_{IU}

[['DA kan vi be]_{IP} ['søke henne 'LIKEVEL]_{IP}]_{IU}
concessive 'nevertheless': 3/30 - causal 'after all': 27/30
 If *så* in (19) – like *da* in (20) – refers to the proposition of the conditional clause, then the later concessive anaphor *likevel* in (19) cannot also have that reference. Instead it must be anchored outside the conditional construction, like English *after all*.

4. Conclusions

In order for the listeners who participated in our test to submit their responses in a non-arbitrary way, they had to activate in their minds one of two mutually inconsistent sets of contextual assumptions. Resolving the reference of the Norwegian concessive anaphor *likevel* was a prerequisite of being able to select, with confidence, one of the sets at the expense of the other. Our stimuli were deliberately chosen so that no single linguistic item in the utterance would, in our opinion, force either the 'in spite of' alternative or the 'because of' alternative. In their normal orthographically written form, some of the stimuli employed may be said to contain at least one non-truth-conditional procedural indicator which we believed might be strongly inductive to conjuring up a certain frame or mind, a context which would cause the test subjects to establish a mental link between *likevel* and what they understood to be its referent. For other stimuli the written form alone would have given the subjects far too little contextual evidence to be able to respond with confidence. Our systematically varied prosodic features were meant to make up for this deficit. The results presented in section 3 testify to the reliability of the Norwegian double-IP intonation as a divider between new information in one IP and a phrase-accented anaphor *likevel* in the opposite IP, which is fairly consistently being linked to a discourse-activated antecedent. This intonational phrasing has even been shown to override the lexical distinction between the two Norwegian conditional connectives *om* and *hvis* (paragraph 3.1.) and the lexical distinction between the pro-forms *så* and *da* introducing the main clause (paragraph 3.3.). The broad-focus intonation pattern involving a single IP that exhausts the IU is also a fairly stable procedural cue to the resolution of the referent of *likevel*, provided the anaphor is in the sentence-final position where it is phrase-accentually highlighted due to the F0 maximum terminating the IP.

5. References

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